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REIMAGINING CULTURE WITH YOUTH: RELATIONSHIP AND REPRESENTATION IN
CULTURALLY CENTERED LEARNING ENVIRONMENTS

by

Lili Yan

A dissertation submitted in partial fulfilment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Instructional Technology and Learning Sciences

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2023

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ABSTRACT

Reimagining Culture with Youth: Relationship and Representation in Culturally Centered
Learning Environments

by

Lili Yan, Doctor of Philosophy

Utah State University, 2023

Major Professor: Dr. Breanne Litts
Department: Instructional Technology and Learning Sciences

The design of learning environments often privileges certain values, knowledges, and practices. Formal learning environments, however, are assumed as acultural spaces, despite the fact they are rooted in norms and expectations from the dominant culture. This assumption limits our ability to design learning environments to support diverse futurities for youth. As a response, this dissertation presents how I reimagine and design a culturally centered learning environment by working alongside a multicultural team of researchers, educators, and designers who came together as a research-practice partnership with the shared goal of centering culture for sixth-grade classrooms. Guided by a case study approach, I followed twelve sixth-grade participants for the 2021-2022 school year to develop an understanding of how a culturally centered learning environment can impact youth's relationship with culture. I (re)conceptualize the holistic process of learning and engagement with culture as *Ti-Wu* and propose a cultural learning model that centers on multiple relationships with culture. I further share how multimedia technology mediates youth's relationship with culture through remixing and reimagining.

This dissertation has implications for the ways in which we can (1) design culturally centered learning environments to engage youth with culture and support the development of diverse relationships with culture, (2) develop youth's relationship with culture through designing multimedia learning activities in formal learning environments, and (3) decenter Western-oriented research discourse on cultural learning and development.

(174 pages)

PUBLIC ABSTRACT

Reimagining Culture with Youth: Relationship and Representation in Culturally Centered
Learning Environments

Lili Yan

This dissertation intends to develop an understanding of how culturally centered learning environments impact youth's relationship with culture. Working alongside a multicultural team of researchers, educators, and designers who came together with a shared goal of designing curricular activities to engage sixth graders with culture, I followed 12 sixth graders for a school year to understand their development of relationships with culture. I (re)conceptualize the holistic process of learning and engagement with culture as *Ti-Wu* and propose a cultural learning model that helps us understand how youth develop multiple relationships with culture. I further share how multimedia technology mediates youth's relationship with culture through remixing and reimagining. This dissertation has implications for the ways in which we can (1) design a culturally centered learning environment to engage youth with culture and support the development of diverse relationships with culture, (2) develop youth's relationship with culture through designing multimedia learning activities in formal learning environments, and (3) decenter Western-oriented research discourse on cultural learning and development.

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CHAPTER 1 INTRODUCTION TO MULTIPLE PAPER DISSERTATION

The COVID-19 pandemic and co-occurring social movements present “co-mingling landscapes of the physical, spiritual, intellectual, social and emotional” (Marin, 2020, p. 309) as a more immediate experience in our lives. As scientific challenges are interwoven with political stances and the public health crisis is mixed with cultural memberships, these entanglements unveil the complex socioecological systems (Taylor, 2020; Warren et al., 2020) that youth learners are a part of.

Culture is an inherent component in our collective reflections on our own species during the current crises. In the field of education, (re)centering culture in learning is exceptionally relevant during this particular time we have now. Although scholars have argued that learning is sociocultural (e.g., Rogoff, 2003; Cole, 1996; Nasir & Bang, 2012), the cultural nature of knowledge is often ignored in educational practices. In fact, formal education often privileges Western science as a normative way of knowing, which is based on the assumptions of settled expectations, the meaning-making process operated on a set of settler colonialism logic of Whiteness as property (Bang et al., 2012).

As a result, formal learning environments often operate on a settled relationship between youth and culture, which limits their engagement with diverse ways of knowing and being. For example, STEM (science, technology, engineering, math, and computing) disciplines are often critiqued for failing to effectively engage learners from marginalized communities (Bang & Marin, 2015), because of the deep epistemological tensions (e.g., Bang & Medin, 2010) that exist between the dominant and minoritized ways of knowing, which further marginalized youths’ relationships with their own communities. In addition, there is often limited space to support

youths' explorations of culture, given the pragmatic setup of disciplines in formal learning environments. Recently, culture has become a central topic as scholars are arguing for a hard reset of education, which includes reconsidering the goals of education, particularly regarding what kind of citizens we are seeking to cultivate (Ladson-Billings, 2021) through (re)centering culture.

In response to these problems about the implicit presence of culture, I focus on how youth develop relationships with culture in culturally centered learning environments for this dissertation work. My work honors the evolving scholarship on culturally relevant (Ladson-Billings, 1995), culturally disruptive (San Pedro, 2018), and culturally sustaining and revitalizing pedagogies (Paris, 2012; McCarty & Lee, 2014). Amid the challenges of the multiple pandemics (Ladson-Billings, 2021), I intend to join these existing efforts to recenter culture with this dissertation work.

Research Purpose

In this dissertation study, I focus on a series of culturally centered learning activities that a multicultural team of researchers, educators, and designers collaboratively designed throughout our multiyear partnership. By working with twelve sixth graders over the course of a school year, I intend to develop an understanding of how a culturally centered learning environment can impact youths' relationships with culture. The goals of the study are threefold: (1) to establish an understanding of how youth develop relationships with culture in a culturally centered learning environment, (2) to capture the ways that youth construct multimedia representations with technology in culturally centered learning activities, and (3) to inform the future design of

culturally centered learning environments. Specifically, this dissertation work is guided by the following research questions:

RQ1: How do youth develop relationship with culture in a culturally centered learning environment?

RQ2: How do culturally centered multimedia representations mediate youths' relationships with culture?

Collaborative Stance

The nature of this dissertation work is collaborative. My dissertation study operated with the collaboration of a multicultural team of researchers, educators, and designers. Therefore, I use “we” when discussing our shared vision and work and use “I” when describing inquiries specific to this dissertation.

Positionality Statement

I enter this space with the acknowledgment that my lived experiences influence how I engage in the broader partnership of this dissertation work, how I understand learning, and how I approach research to be cultural and relational. I regard a positionality statement as a way to share the *textures* (Patel, 2022) of who I am in relation to this work, rather than a static categorization of my identity, culture, and experiences. I came to this work as (1) a Han Chinese from Southeast China with living experiences from both sides of the Yangtze River, (2) a previous college English instructor in Shanghai who engaged with cross-cultural conversations in the everydayness, (3) an international student researcher who is relatively new to the K-12

system in the United States. I come together with the broader team who share the vision of centering culture. In this dissertation work, I foreground youths' learnings and imaginings of culture while I also embark on this new cultural journey.

Intellectual Foundations

The Centrality of Culture

My inquiries of this dissertation are heavily shaped by the rich intellectual foundations of existing scholarship on the cultural foundations of learning, particularly the growing need to develop research and practices that advance the centrality of culture (Nasir et al., 2020) in human learning and development.

The notion that *learning is cultural* is not new. In fact, it is one of the core tenets of sociocultural theories. Sociocultural theories problematize the decontextualized stance that is often represented by cognitive perspectives, such as the focus on individual mental processes (e.g., Greeno, 1997, 1998). Instead, sociocultural perspectives provide a set of theories and methodological approaches that attend to learning that occurs in activity systems (e.g., Hutchins, 1995), which reframes learning and development as a constant process of acquiring diverse repertoires of overlapping, complementary, or even conflicting cultural practices” (Nasir et al., 2006, p. 686). Canonical works of sociocultural perspectives often build on Vygotsky and his concept of mediation. For Vygotsky (1980), humans interact with the environment with signs and tools. Following the tradition of Marxist views on history, Vygotsky believes that society and culture evolve along with the development of signs the same way as with the development of tools. Similar to the use of physical tools, human beings are capable of creating signs and sign systems such as language or number systems. The meanings of signs are culturally constructed

and can change over time. Humans are not only able to acquire socially constructed ways to interpret signs but also able to create personal links between objects and meaning to facilitate thinking. Vygotsky takes language as an example of signs that mediated higher psychological processes, which contributes to the understanding that *learners are cultural* in that humans are capable of using mental tools to mediate thinking, which are culturally and socially constructed.

The cultural process of learning is increasingly received and supported by research across multiple disciplines. Research in neurosciences has identified that our brain is highly malleable for social input, which reveals that social and cultural contexts shape the development of brain structures and functions (e.g., Han et al., 2013). These findings are convergent with advances in developmental research that have shown that culture is not merely the external factors that impact development, but that development itself is culturally shaped (Cole, 1996; Miller & Rodgers, 2001; Rogoff, 2003).

Recent research on centering culture further argues for the need to center cultural diversity (Nasir et al., 2020). Although rich scholarship has been developed to explore *learning as cultural*, educational research, particularly learning sciences, has been historically dominated by Western-oriented stances and approaches. Darder (1991) critiqued assuming culture as a neutral category and further argued that educators often were involved with definitions of culture derived from an individualistic, apolitical, ahistorical, instrumental stance. The lack of acknowledgment of power creates problems in properly addressing issues of diversity and equity, which results in studies of culture that assume nondominant learners and communities as deficient and need to follow a singular pathway normalized in dominant cultures (Nasir et al., 2006).

Therefore, research on *learning as cultural* also intersects and is bound to issues of power. In both educational research and practices, we often encounter arguments about what counts as learning and what counts as a problem of learning. For example, Gutiérrez and Orellana (2006) problematized the narrative of students from historically marginalized communities as an educational problem that we need to solve and pointed out that expectations in schooling are shaped by the hidden curriculum that reflects the White dominant culture values, practices, and worldviews (e.g., Rahman, 2013) over the other. In fact, *the Other* is socially constructed by the logic of settler colonialism (Harris, 1995). Harris (1995) used settled expectations to describe the racial hierarchies that attach a set of assumptions, privileges, and benefits to being White. Although settled expectations take different forms in contemporary life, they remain deeply embedded in the structure of our society and appear to be natural and objective at least to the privileged groups of people (Harris, 1995). Bounded by such logic, the traditions of academia often privilege Western science while non-Western forms of science, in particular Indigenous knowledge systems, are deemed unscientific (Bang et al., 2012; Brayboy & Castagno, 2008).

Similarly, as the spaces to socialize for academic skills, competence, and depositions, formal learning environments also implicitly operate on a set of normativity that prescribes certain relationships, meaning-making processes, and expectations. Bang and colleagues (2012) argue that settled expectations, in schooling, lead to entrenched and hidden boundaries that “tend to control the borders of acceptable meanings and meaning-making practices” (p.303). Settled expectations are also related to “educational racial contract” (Leonardo, 2013, p.105), which describes the teachers’ inequitable expectations of students, particularly reducing students of color to a substandard education. Settled expectations are also about the tendency to limit the

opportunities for the ways that youth can express themselves or can be intellectually engaged. For example, in STEM disciplines, there are normative descriptions of subject matter that are based on the nature and culture divide (e.g., Helmreich, 2009), which defines that certain descriptions of human and nonhuman relationships are acceptable. Therefore, settled expectations privilege particular knowledge paradigms that we are often less aware of, and it marginalizes non-Western ways of knowing and learning. Thus, formal school learning, especially STEM learning is not acultural (e.g., Bang & Medin, 2010). It operates within the dominant Western paradigm, which creates challenges to center culture in learning.

My dissertation work takes *learning as cultural* with a decolonizing perspective that acknowledges the entanglement of education and colonialism (Patel, 2015; Battiste, 2017). The decolonizing perspective helps to articulate that learning and learning environments are historically shaped by colonial logic, particularly the settler logic (Patel, 2015), which results in the assumptions that learning environments and expectations are acultural. Spring (2004) describes deculturalization functions in education in the form of centering the Anglo-American curriculum in school. Patel (2015) believes deculturalization reseats property rights and Whiteness and further problematizes the current inclusion projects by pointing out that research on underrepresented and marginalized populations is built on the assumption of deculturalization. These ideas provide theoretical foundations for this dissertation work to take a decolonizing approach and to posit that learning environments are, in fact, socially and culturally constructed.

Culturally Centered Approaches

Previous studies have contributed to a range of theoretical and practical approaches to center culture through (re)imagining the relationship between learner, learning, and culture. These approaches include culturally relevant (Ladson-Billings, 1995), culturally responsive (Gay, 2010), culturally sustaining (Paris, 2012), culturally revitalizing (McCarty & Lee, 2014), culturally situated (Eglash et al., 2006), culturally disruptive (San Pedro, 2018), and culturally expansive (Van Horne & Bell, 2017; Dreier, 1999). The development of these approaches shows the evolving efforts from making learning relevant, effective, and meaningful to students with diverse backgrounds (e.g., Gay, 2010) by empowering learners to become more intellectually, emotionally, politically, and socially engaged and informed (e.g., Ladson-Billings, 1995) and to dismantle the dominant Western paradigm (San Pedro, 2018). These approaches inform different aspects of this dissertation and will be further unpacked in Chapter 3 and Chapter 4.

Learning as Relational

This dissertation focuses on exploring youths' relationships with culture, which is rooted in evolving scholarship that takes *learning as relational*. In cognitivism-oriented studies, *learning as relational* often means connecting knowledge pieces in a relational way. Constructionist perspectives furthermore focus on how learners build relationships with knowledge. Building relationships with knowledge is a learning trajectory that can be messy and complex. Papert (1980) further explained that learners can develop relationships with tools, which is also the process of how they build relationships with knowledge. This relationship between tool and learner can be studied, designed for, and cultivated. For example, in an interest-driven learning environment, learning is essentially relational. Kafai and Harel (1991) described

this process as “collaboration through the air” (p.88), which suggests that when learners are working in the same physical space together, knowledge floats and wait to be “picked up” (Kafai & Harel, 1991, p. 88). Students’ interest indicates the start of a relationship, and the relationship grows as learned progress in their learning trajectory.

Recent research calls for the need to re-examine prescribed relationships to engage learners in a more meaningful way. In the context of science learning, Hardy and colleagues (2020) argued for a shift in students’ relationship to data to support students’ agency in science learning. Specifically, they identified that traditional school science laboratory investigations often assigned students the role of carrying out procedures, which limited their relationship with data. To support an alternative relationship with data, they shared a case study on how students develop relationships and agency in data production for personal relevant purposes. Furthermore, the emerging scholarship on posthuman pedagogy further enriches the notion of *learning as relational* through emphasizing the interconnectedness between learners and other entities in the learning environment (Yan et al., 2020). From the posthuman perspective, developing relationships is a process of intra-action rather than interaction, which disrupts the pre-assigned roles and abilities of learners (Postma, 2016). These evolving works inform how I frame youth’s learning and engagement with culture as a process of building relationships with culture, which also shapes who we are as human beings.

Learning through Creating Representations

As part of this dissertation work, I explore how youth represent relationships with culture through the process of creating representations. This inquiry builds on existing works on multiliteracies and youths’ multimedia practices within and beyond formal learning

environments. In 1996, the New London Group coined the term *multiliteracies* as a response to the emerging new media and new literacy skills needed accordingly. Multiliteracies scholars focus on how learners communicate meaning through creating multimodal artifacts or representations. The New London Group (1996) defines six modes that serve as resources for constructing meaning: linguistic, visual, audio, gestural, spatial, and multimodal design. These meaning-making resources allow us to construct and express ideas and values in new ways (Jewitt & Kress, 2003).

The development of digital technology provides a more accessible canvas for young people to create content that is potentially vastly scalable (Cho et al., 2020). Youth's use of digital tools (including media-producing tools and media sites) is participatory (Stornaiuolo, & Thomas, 2017) both culturally and politically. As young people are engaging in political, social and cultural actions with these digital tools, the digital form of civic engagement by youth is developing (Cho et al., 2020). Digital representation is also a means for showing youth voice (e.g., Blum-Ross, 2017) and producing counter-narrative to discourses (Stornaiuolo & Thomas, 2017) about youth, especially youth from marginalized populations (Dussel & Dahya, 2017). In this dissertation, I draw on the diverse roles of digital media for youth to represent themselves as a means to design for social futures (New London Group, 1996; Cope & Kalantzis, 2000) and posit learners as meaning makers who socially construct their own realities and experiences.

For the purposes of this dissertation study, I define *representation* as the product that people make to produce and convey meanings to others with the use of different media. My definition is based on Hall's (1997) notion of seeing representation practices as key processes in a cultural circuit. Drawing on prior work in art and art education, I look at representation as consisting of three interrelated and interpretable aspects (Schaafsma, 1985), form, content, and

function. Form refers to the physical form and the formal qualities of a representation can be identified as specific cultural styles and traditions. Content is what the representation is about, including a constellation of meanings that are symbolically represented. Function is the purpose for which the representation is made.

Methodology

My inquiry for this dissertation is heavily shaped by my work on the Cultivating Connections Project with a research-practice partnership (RPP; Coburn & Penuel, 2016) of a multicultural team of researchers, educators, and designers with the shared goal of centering culture in the sixth-grade curriculum. RPP is a form of collaborative educational research that aims for developing authentic partnerships. In the recent white paper “Towards a Field for Collaborative Education Research: Developing a Framework for the Complexity of Necessary Learning” (The Collaborative Education Research Collective, 2023), researchers have pointed out the growing importance of building authentic partnerships as “new ways of engaging together to achieve equitable outcomes” (The Collaborative Education Research Collective, 2023, p.iv), which is essential to address the issue that the pathway of knowledge from research to practice is often one-directional (Penuel et al., 2020). RPP is rooted in the intention to disrupt privilege, process, and practice (Bevan & Penuel, 2017). Specifically, it demands a rethinking of our research in terms of what products of our scholarship we value and how we produce outputs that are mutually beneficial (Bevan, 2017). In our work, we intend to disrupt traditional hierarchies between researchers and practitioners for equitable shaping of our research and design.

In our broader project, funded by the Spencer Foundation, we employ a design-based implementation research methodology (DBIR; Fishman et al., 2013) to design and implement culturally centered curricular units. In alignment with our RPP, DBIR guides our engagement of collaborative, iterative, and systematic research and development to address the persistent problems of teaching and learning (Penuel et al., 2011). DBIR is built on the answerability of research by centering on the questions, such as “What works when, how, and for whom? How do we improve this reform strategy to make it more sustainable? What capacities does the system need to continue to improve?” (Penuel et al., 2011, p.35). Throughout the multiyear partnership, we envision our partnership as a third space (Gutiérrez et al., 1995) that researchers and practitioners create together and grow to be self-sustaining over time. Our work to design a culturally centered learning environment is developing based on four core principles of DBIR (Fishman et al., 2013). *We focus on the persistent problems* of centering culture in a formal learning environment from multiple stakeholders’ perspectives. *We commit to interactive and collaborative design* to develop culturally centered learning activities. As a team, we share the concern on the assumption that learning environments are acultural and our goal is to center culture with *developing theory and knowledge* related to both classroom learning and *implementation through systematic inquiry*. We strive to *develop capacity for sustaining change* in formal learning environments.

Data Collection and Analysis Overview

I use qualitative techniques to guide my data collection and analysis process. The data collection was continuous throughout the school year from September 2021 to May 2022. I collected data on two levels: the design level and the student level. To capture the design of

culturally centered learning activities, I collected Canvas pages of culturally centered learning activities as *curriculum design artifacts*. I conduct *teacher interviews* after the implementation of learning activities, which take the forms of conversational interviews and debrief conversations in team project meetings. Although these data sources do not directly answer the research questions, they were used to build an understanding of the context of the work as well as served as data sources for triangulation.

To understand how youth develop relationships with culture, I followed 12 sixth-grade students who provided both consent and assent to this study. Each participant was assigned a pseudonym (see. Table 1). I conducted semi-structured *student interviews* at three different time points over the school year (start, middle, and end). These interviews include topics on (1) students' learning experience, (2) their understanding and perceptions of culture, own culture, and others' culture, and (3) their reflections on their multimedia projects. I collected a range of *design works* (e.g., podcasts, videos, and writings) to understand how youth created representation. In addition, I followed Emerson and colleagues' (2011) ethnographic *fieldnotes* practices during the learning activities that the teacher partners invited me to. I relied on jottings to document my observation. I collected audio recordings of real-time interactions when it was appropriate to the setting and with permission from the participants. I completed *fieldnotes* soon after each visit. The *fieldnotes* also serve as the triangulation data sources.

Table 1

Overview of Participants

Name	Age	Name	Age
Everley	12	Lainey	11
Savannah	11	Felice	12
Ellison	12	Jackson	11
Lexie	11	Jonah	12

Name	Age	Name	Age
Annabelle	12	Kaylee	12
Evan	12	Shawn	11

Note. Table 1 shows participants' ages at the end of the school year.

The dissertation work is guided by the case study approach (Stake, 1995). The data analysis for this dissertation work was ongoing and spanned throughout data collection as I transcribed interviews, created case summary sheets, and wrote analytic memos. I regularly discussed observations and findings during the team project meetings to solicit feedback to guide further data collection and analysis. Given the multiple-paper structure of this dissertation, I will share the specific data analysis process in Chapter 3 and Chapter 4. Table 2 shows an overview of data collection and analysis for each research question.

Table 2

Overview of Data Collection, Triangulation, and Analysis

Research Question	Primary Data Source	Data Sources for Triangulation	Main Analysis Approach
RQ1: How do youth develop relationship with culture in a culturally centered learning environment?	Student interviews (with a focus on relationship with culture)	Fieldnotes, Design works	Cross-case analysis
RQ2: How do culturally centered multimedia representations mediate youths' relationships with culture?	Design work, Student interviews (with a focus on reflections on design works)	Fieldnotes, Teacher interviews, Curriculum design artifacts	Bidirectional artifact analysis

Dissertation Outline

In this multiple-paper dissertation study, I intend to explore how culturally centered learning environments impact youths' relationships with culture and their representation of the relationships. The multiple-paper approach supports the development of each research inquiry on different levels as well as the contextualization of each study in specific literature.

Chapter 2 provides a context of the work. In this chapter, I first provide a narrative account of the broader partnership for this work by describing in recollection of our evolving partnership, our teacher partners, and how we have been working together during the past few years. In addition, I summarize the forms of culturally centered learning activities and events during the 2021-2022 school year. I focused on introducing four activities to illustrate our culturally centered design.

In the first paper, Chapter 3, I focus on how youth develop relationships with culture in a culturally centered learning environment (RQ1). Using a case study approach, I share data from twelve sixth-grade students over a school year. From the analysis of a range of ways in which sixth graders develop relationships with culture, I identify this learning process as *Ti-Wu*, a holistic epistemic process highly valued in traditional Chinese culture. I present a model of *Ti-Wu* based on different relationships with culture that students demonstrated. I further illustrate their moments of *Ti-Wu* by demonstrating cases about how these relationships change. This paper provides an empirical understanding of how students develop relationships with cultures in a formal learning environment. It has implications for our work to engage with onto-epistemic heterogeneity through (re)conceptualizing learning as *Ti-Wu*.

The second paper, Chapter 4 explores how culturally centered multimedia projects mediate their relationship with culture? (RQ2). In this paper, I develop an understanding of how

sixth graders demonstrate relationships with culture through their remixing works. Specifically, I present six cases from three culturally centered multimedia projects. Throughout the cases, I identified three forms of symbolism that the broader projects afford, which contribute to the development of an adaptive relationship culture through reimagining. The findings of this paper have implications for centering youth's relationship with culture in the design of learning environments for diverse cultures and futurities.

Finally, in Chapter 5, I first provide a summary of findings from Chapter 3 and Chapter 4. I then discuss the findings across the two chapters, particularly on youth's relationship with culture, culturally centered learning environments, multimedia technology as a representation tool, and mobilizing relationships with culture for learning and research, which have implications for future research.

CHAPTER 2 CONTEXT OF WORK

It was a cloudy morning, a bit chilly with a touch of moisture from summer reminiscence. I rushed to Mr. Baggaley’s classroom and found the students were working quietly on their iPads. From a brief whispering exchange with Mr. Baggaley and their student teacher, I learned that they were working on the Cultural Wheels. After a few minutes, the class started to share thoughts on the topic, “What would be different if you change one piece on the cultural wheel?” We were absorbed in contemplation while listening to others imagining changes in language, hobbies, and age. We laughed when Mr. Baggaley shared a story about making a phone call to a grocery store to find his father. The conversations transitioned when the school bus arrived. We set off for hiking on Beaver Mountain, one of the preparation activities for their San Juan River trip. Starting from here, we embarked on the year-long journey of exploring culture in the sixth grade.

Partnership

The episode above describes the first time I entered the sixth-grade classroom for the 2021-2022 school year and officially started another cycle of our research-practice partnership (RPP) as a multicultural team of researchers, designers, K-12 educators, and administrators. We initially came together with the shared goal of building connections across disciplines through centering culture and developing sixth-graders cultural competence (Litts et al., 2020).

Since the Fall of 2018, we have been working together to identify this shared goal through conducting partnership-building meetings, in which we established a vision along with

specific objectives and assigned roles to each team member. For example, we used value mapping techniques (Ryoo & Shea, 2015) to define the values that guide our work, including situating learning and knowledge in place and exchanging cultural knowledges.

Specifically, our work starts with a focus on educating sixth graders from an Experiential Learning School (ELS) about Indigenous people's culture and practices in their field experience. We identified this need through several rounds of discussion about a sixth-grade river trip that the ELS is organizing annually. The ELS is a K-6 elementary school with a place-based ethos. Among the variety of field experiences ELS offers, the river trip is a culminating field experience that students work towards from the time they enter Kindergarten. The river trip is structured as a three-day and two-night trip on the San Juan River from southern Utah, which runs as the border of the Navajo Nation. This proximity, however, was not explicitly acknowledged before. The teachers on our team expressed a strong desire to respectfully make this acknowledgment, which laid the foundation for our partnership.

Teacher Partners

The teachers on our team, Mr. Stuart Baggaley and Mrs. Jennifer Jenkins, have been co-teaching sixth grade for multiple years prior to this broader partnership. For a decade, Mr. Stuart Baggaley has taught across ages and disciplinary areas. He leads afterschool program offerings for youth around robotics and derby racing. Mr. Baggaley is an innovator of design thinking and STEAM teaching approaches. He also plays the ukelele with his students. Mrs. Jennifer Jenkins has been teaching for approximately three decades from grades first through the sixth. In her teaching, she shared constructivism as the philosophy behind the ELS, using experiential

learning and project-based learning as the action behind the theory. For Mrs. Jenkins, education is a process, for both students and teachers. Personally, she is the mother of three daughters and grandmother of two boys. She is highly involved in community and service organizations. Mrs. Jenkins not only respect and appreciate all cultures in her teaching but also as a living standard personally. Mr. Baggaley and Mrs. Jennifer continue to co-teach during the span of this work, which serves as a foundation for the interdisciplinary and culturally centered learning activities that we envision.

How We Work Together

Cultural Competence Training

We started to develop a shared foundation, language, and learning experience through completing a cultural competence course (Tehee et al., 2020). The training consists of four online modules that aim to improve self-awareness, awareness of others, knowledge, and skills based on Sue's (2001) model of cultural competence. The final component is a one-hour session in person that focuses on enhancing perspective taking and building intercultural empathy.

Although the training was originally designed for the higher education setting, we adapted the contents of the training for K-12 teaching and learning.

Evolving Interdependence

In our work to center culture, particularly through making Whiteness visible, we identify that our collective experiences resonate with three key tenets of culturally disruptive pedagogy: tensions, disruptions, and self-discoveries, which leads to our innovations in co-designing

culturally centered learning activities (Litts et al., 2020). As a team, we develop growth in recognizing ourselves as cultural beings and gaining awareness of others' cultures. This shared journey leads to interdependence in our research-practice partnership. Mrs. Jenkins described this interdependent relationship as it evolves in our work:

As we discuss and develop ideas, I love hearing when we were learning how to tell Native American stories. We are learning what ones are appropriate. It never crossed my mind that I would be disrespectful if I told this particular story. So having someone say to me: This is a good story you can tell because it is respectful to the culture. This one is inappropriate to share because it is very sacred to the culture. We need to be mindful of that. That was beautiful. It is educating me side by side. Have we evolved? Yes. Are we at a different level? Absolutely. Because we can do more things and we are just going to be better. So, we take where we are and develop a new unit and a new unit. We just get better all the time. (Mrs. Jennifer Jenkins, Partnership Meeting, 04/2022).

As Mrs. Jenkins shared, we rely on continuous learning about different cultures to support our design of culturally centered learning activities. With the example of teaching Native stories, Mrs. Jenkins illustrates that our interdependence can take the form of distributed expertise. Our sharing of cultural knowledge, teaching experience, and design skills sustain our commitment to refining existing curriculum units as well as developing new ones.

An Overview of Culturally Centered Learning Activities

In our work with a design-based implementation approach (Fishman et al., 2013), we have been collaboratively designing a series of culturally centered curricular activities over time. In this section, I summarize the different forms of learning activities and events (Table 3) that took place during the school year 2021-2022, which is the third school-year design cycle (Year 3) as well as the context of this dissertation. Our iterative design process continues to be generative from year to year and most activities can be traced back to prior years. In this section, I focus on introducing four activities to illustrate our culturally centered design.

Table 3

Overview of Culturally Centered Learning Activities (2021-20222)

Forms of learning activities	Example Unit	Descriptions
Local Field Experience	Beaver Mountain Hiking	A one-day field trip to Beaver Mountain to learn about local Native plants.
Campus-based Activity	The Bears Ears Rally	A multi-assignment project that culminates in a rally open to the school community. Students present their research on the local Bears Ears land dispute in Utah.
Long-distance Field Trip	San Juan River Trip	A three-day and two-night cross-cultural trip on the San Juan River close to the Navajo Nation.
Multimedia Design Project	San Juan Digital Story*	A digital story project that represents students' San Juan River trip experience.
Multimedia Design Project	Ancient Civilization Podcast*	A group project in which students work make a podcast about an ancient civilization.
Classroom-based Sharing	Solar Systems across Cultures	One lesson focuses on sharing Native stories about solar systems and Indigenous science

Forms of learning activities	Example Unit	Descriptions
Multimedia Design Project	Personal Culture Augmented Reality Project*	A multimedia project for students to share their own culture through augmented reality design.
Local Field Experience	Visiting Wuda Ogwa	A half-day field trip to Bear River Massacre site and meet with local Tribal Elders.

*Note. Curricular units with * are the focus of Chapter 4*

The San Juan Digital Story Project

The San Juan Digital Story Project is a multimedia design project anchored in students' San Juan River trip experience (Figure 1). After the multiyear implementation and modification, it is designed to achieve several curricular goals as well as support cross-cultural experiences.

Figure 1

San Juan River Trip



The river trip is metaphorically referred to as a hero's journey for the purpose of developing students' narrative writing skills. The hero's journey is a recurring template that can be identified in myths, folktales, and legends across time. The structure of a hero's journey is

typically about a main character being called to an adventure, meeting a mentor, going through trials and failure, getting new skills, encountering challenges, and returning but becoming a new person (Campbell, 1993). Mr. Baggaley explained that “I use the whole river trip as an actual representation of a hero’s journey. Kind of the text structure for narrative writing. And I reference that throughout the whole trip” (Reflection Meeting, 04//2020).

The San Juan Digital Story Project not only supports the narrative writing goals but also serves as a space of reflection and imagination to achieve several science learning objectives, such as identifying phenomena and understanding the constellations. During the trip, students are prompted to keep journaling about a phenomenon that they notice during their river trip and weave the observation into their stories, particularly the constellations. The science learning process emphasizes on “in-the-moment experience” (Mrs. Jennifer Jenkins, Reflection Meeting, 04/23/2020).

Furthermore, the teachers intentionally engage students with Indigenous storytelling. For example, in order to engage students with Native culture, Mr. Baggaley read Native stories to students. One of the stories he shared was about Kotchimanyako, a young girl who was saved from a flood by a stranger but accidentally let the stars out of a sack that she was told not to open. These stories enrich students’ experiences and perceptions of the land.

The central component of this project is for students to develop a story that captures the river trip experiences and follows the hero’s journey structure. Students can write notes for the stories during the trip and draft the stories on their way back home. After coming back to the school, they edit the story and compile all the stories into a collection.

As a digital media project, the form of students' story projects looks different across the years. In Year 1¹, students created podcasts from the story they wrote. In Year 2², students combined drawings, pictures, and writings to create a four-section story following the structure, "a call to action", "accept the challenge", "face your fear", and "claim the treasure". Because of the COVID-19 pandemic, the learning activity did not happen until near the end of the year when they were able to go on the San Juan River trip. In Year 3, this project took the form of developing a picture story with texts, drawings, and pictures they took during the trip. For example, in Jonah's story "The Preserver", he created a story about a kid, James, who went on an adventure to preserve the bones of mythical creatures. Jonah's story explains how fossils were formed using a combination of drawings and texts (Figure 2).

Figure 2

Jonah's story



A HERO'S JOURNEY

How fossils were formed

Have you ever wondered how we got fossils? Well, that is because of a kid named James.

James was walking around town when he heard a voice that told him that he was about to start an adventure.

¹ 2019-2020 school year

² 2020-2021 school year

The Ancient Civilization Podcast Project

The Ancient Civilization Podcast Project is a culturally centered activity that Mr. Baggaley was leading in Year 3, although making a podcast is part of the sixth-grade learning experience for multiple years. This new Podcast Project consists of three components. Students first gathered information about an ancient civilization that they were interested in by playing the “Backpacking Across the Ancient World” game on Canvas (Figure 3) that Mr. Baggaley created and through reading Epic! Books on ancient civilizations.

Figure 3

Backpacking Across the Ancient World



After researching about the topic, students developed a single-paragraph outline and worked in groups to create a podcast script based on what they learned. The final stage of the project involves producing a podcast with a recording of the script, music, and commercial. After completing the first version of the podcast, students share the products with other groups for feedback.

Mr. Baggaley designed this project with the intention to center students’ engagement with culture, building upon our work to develop students’ awareness of culture, as he reflected:

In the past, it was more just information that they [students] collected. So, this year I am more into the cultural piece — that we became aware of our own culture before we dive into someone else’s cause that’s directly from our work together. You know as we’re trying to realize a lot of kids don’t know their culture is. (Teacher Meeting, 11/2021).

In order to create a space for students to share their cultures, Mr. Baggaley provided prompts for students to reflect on their own culture as they learned about ancient civilizations. He encouraged students to share these reflections at the beginning of their podcast conversations. This learning activity makes space to talk about culture both in small groups and as a whole class.

The Cross-Cultural Playground Poem

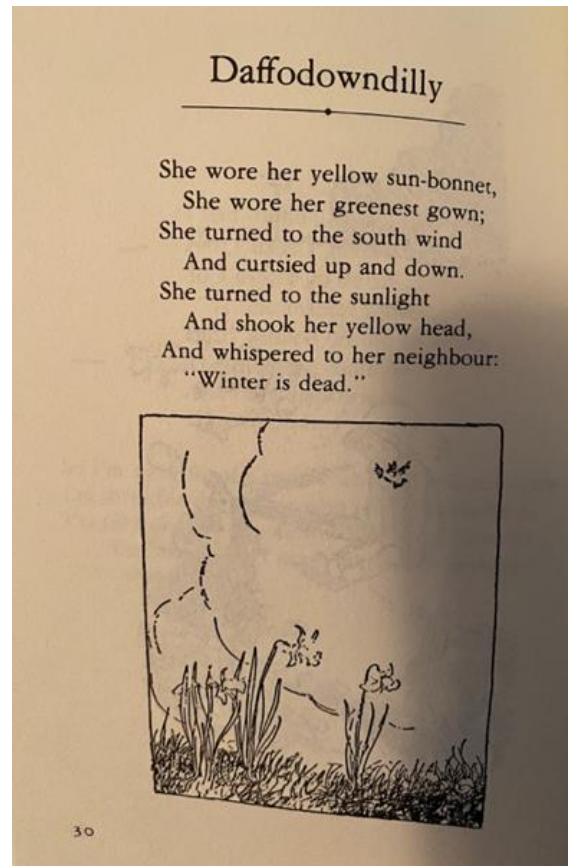
The Cross-Cultural Playground Poem Unit is designed to be responsive to a piece of cultural knowledge that Shawn, one of the sixth graders, shared with me during the second round of interviews for this dissertation. During an interview conducted in March 2022, Shawn shared that he was learning a Chinese poem about spring from his parents. The poem is titled “Qingming”, which is both a Chinese holiday that commemorates ancestors and family members who passed away and the name of a season from the Twenty-Four Solar Terms used in the traditional Chinese calendar.

Inspired by Shawn, we designed this cross-cultural learning experience. In the classroom, students rotated and worked with one of three stations at a time: (1) learning about spring poems in English, (2) learning about Qingming, and (3) writing a playground poem. Students in the first station worked with Mr. Baggaley to read several poems by A.A. Milne (Figure 4) from the book

When We Were Very Young. After that, they worked with their partners to discuss and find meaning in the poems.

Figure 4

Daffodowndilly – A.A.Milne



I led the second station for an experience of "Qingming" and its cultural meaning. I first introduced the Twenty-Four Solar Terms using a countdown video from the opening ceremony of the Winter Olympics 2022. And then we read the poem "Qingming" (Figure 5) together in both Chinese and English. I also introduced some traditional food for the Qingming Season.

Figure 5*Qingming – Du Mu*

For the third station, students worked on writing their own poems. Their poems are a combination of pictures they took from the playground on campus, some drawings or decorations on the picture, and the written text of their poem. Popular themes of the poems include the observations of spring, reflections on sixth grade, and their personal growth during elementary school. As an example, Lainey shared a poem to describe what spring means to her, which was put on the background picture of their school garden with drawings of human characters and flowers (Figure 6).

Figure 6*Lainey's Poem "Spring is Here"*



The Personal Culture Augmented Reality Project

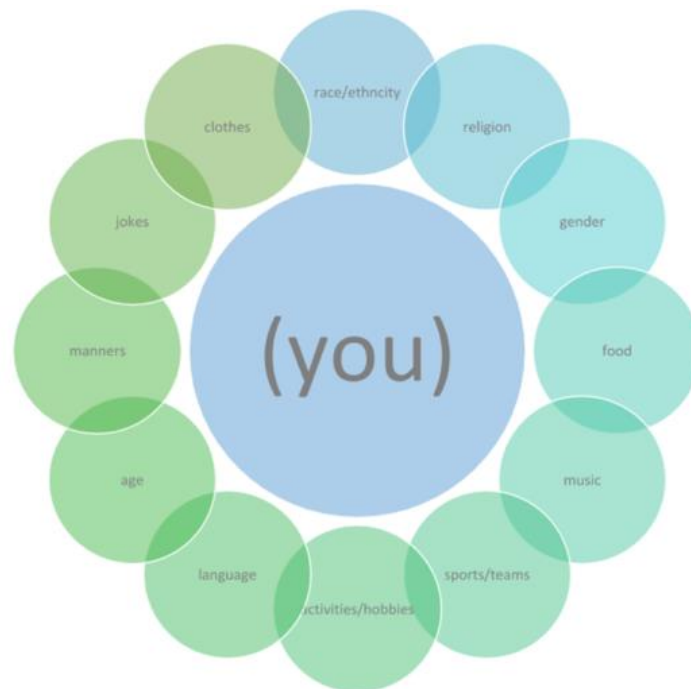
In our previous work during Year 1 and Year 2, we identified that culturally centered curricular units can support the development of the knowledge of other cultures (Yan et al., 2023). This piece of finding informs the design of the Personal Culture Augmented Reality Project, which, instead, intends to support students' engagement and sharing of their own culture. This learning activity spanned the entire school year with two major components: (1) the Cultural Wheel activity and (2) the Augmented Reality Merge Cube design. Students first engaged with the Cultural Wheel activity at the beginning of the school year. At the end of the school year, students revisited the same activity and created a new cultural wheel, which guide the design of their Personal Culture Augmented Reality experiences.

The Cultural Wheel Activity

In this activity, students created a visual representation of different aspects of one's culture, which is structured with four prompts: (1) Fill out the wheel (Figure 7) by writing down your answer for each prompt. Think about answers that match your life and community. (2) Put a star next to the 3-5 pieces that are the most You, the ones that describe you the best. (3) Notice how many of your top pieces are shared with your neighbor; (4) Take one of the pieces and change it. To facilitate the conversations about imagining a change, the following examples are provided: (1) Change your age, what would be different about you? (1) Change your language, what would be different? (3) Change your clothes/manners, what would be different about you and your culture? (d) Change your race, how would life be different?

Figure 7

The Culture Wheel Template



The Cultural Wheel Activity took place twice at the beginning (Time 1) and the end of the school year (Time 2). To facilitate reflections during the Time 2 Cultural Wheel, Mr. Baggaley designed a reading activity with two essays from popular authors. The first essay is a personal culture essay (titled “River Girl”), in which the author Gigi described her relationship with the local river that shapes her identity. The other essay (titled “Death Host Family”) is about adventures that authors took with their host family in another country. Students were provided prompts to reflect on: (1) How can learning a different culture to your own help you to understand your own culture better? (2) What things do you do in your family that add to your personal culture? Or what crazy stuff does your family do?

The Augmented Reality Merge Cube Design

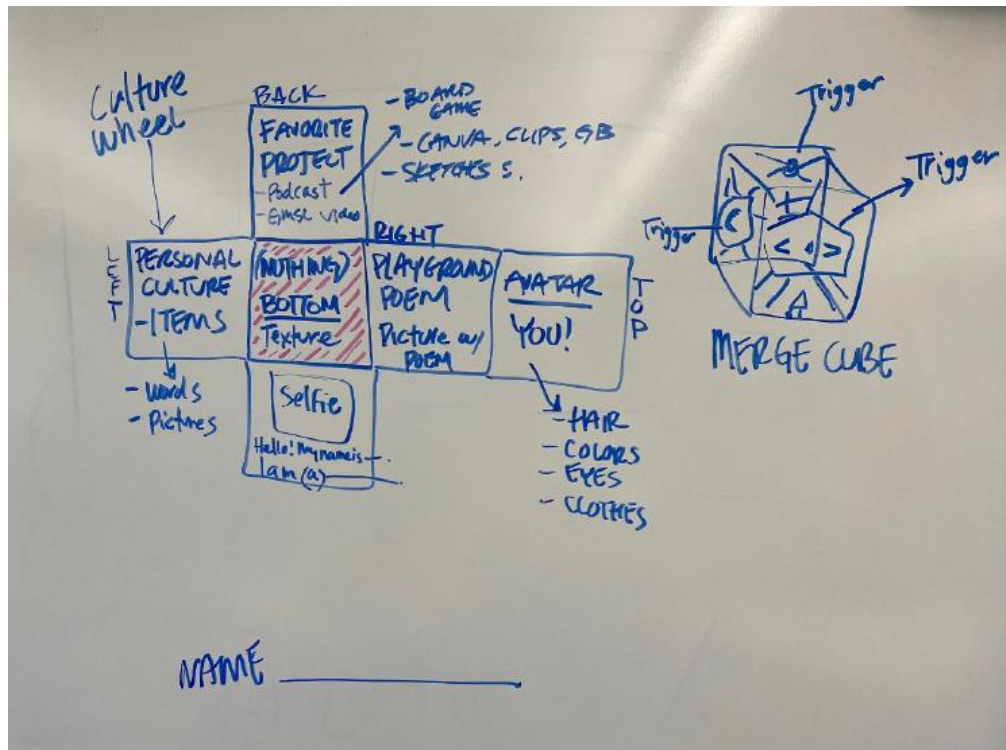
The Personal Culture Augmented Reality is an interactive experience that students design on the CoSpaces platform (<https://cospaces.io/edu/>) with the use of Merge Cube. CoSpaces is a mixed reality web-based design platform and community that allows users to create and engage with interactive media content. The platform affords students rich multimedia resources and visual programming features to express themselves. The Merge Cube is a black and silver physical cube that works as a digital canvas when used in combination with designated learning apps. The teachers on our team have prior experience using Merge Cube in their classrooms. In this activity, Merge Cube was used in combination with the CoSpaces platform.

The Personal Culture Augmented Reality is designed for students to share their experiences during the school year with a focus on the reflections of their personal culture. The teacher first introduced an example project and guided students to work on a plan for their Merge Cube. Students worked on a large paper to lay out the content for each side of the cube (Figure 8)

following the prompts: a statement about my personal culture, something fun about my culture, the project that I am most proud of, and my playground poem. After this step, they moved on to do the digital design on CoSpaces.

Figure 8

Template for Merge Cube Design



Students shared their Personal Culture Projects in an in-class event called the Gallery Walk. For this event, the desks in the classroom were rearranged to form a circle. Each student put their iPad and Merge Cube on the desk. They took turns playing with others' projects and put sticky notes for supportive comments. Figure 9 shows Kaylee's Project as she displayed it for the Gallery Walk in the classroom.

Figure 9

Kaylee's Merge Cube Project



**CHAPTER 3 (RE) CONCEPTUALIZING LEARNING AS *TI-WU*: YOUTH'S
RELATIONSHIP WITH CULTURE IN CULTURALLY CENTERED LEARNING
ENVIRONMENTS**

Abstract

Formal learning environments are assumed as acultural spaces, despite the fact they are rooted in expectations from the dominant culture, which not only perpetuates Whiteness as cultural norms but also limits our ability to meaningfully engage youth with diverse cultures. In response, this study intends to develop an empirical understanding of the impact of a culturally centered learning environment on youth's learning and engagement with culture. Working alongside a team of multicultural researchers, educators, and designers with the shared goal to center culture for sixth-grade classrooms through making the Western culture visible, we design a series of culturally centered learning activities with our multiyear partnership. This study is guided by the research question: *how do sixth graders develop relationships with culture in a culturally centered learning environment?* Taking a case study approach, I followed twelve sixth-grade participants over the course of a school year to examine the different ways that participants relate with culture and how these relationships change over time. This analysis process leads to the development of a model of *Ti-Wu*, a holistic epistemic process that is highly valued in traditional Chinese culture. In the findings, I first share participants' different relationships with culture to explain the model of *Ti-Wu*. I then share moments of *Ti-Wu* through illustrating how relationships with culture change. This study has implications for decentering Western-oriented discourse on learning and engagement with culture as well as how to engage

youth with culture in a formal learning environment that intends to center diverse relationships with culture.

Keywords: culturally centered learning, learning environment, relationship with culture, cultural development, *Ti-Wu*

Introduction

The recent challenges during the COVID-19 pandemic have exposed many deep-seated problems globally, particularly in terms of addressing cultural differences and sustaining diverse cultures, which further deepens the marginalization of the minoritized knowledges, practices, and identities. The opportunity to learn and engage with diverse cultures, however, is often not centered in formal learning environments. For example, in the United States, it is widely assumed that formal learning environments are *acultural* spaces, which are, in fact, shaped by a set of norms that are rooted in the dominant culture (Bang et al., 2012). For example, the division of disciplines, a normalized practice in schools, is a cultural stance that privileges particular ways of knowing, being, and doing (Warren et al, 2020; Litts et al., 2020). Similar assumptions can be found within an individual discipline, particularly in science, where Western science is deemed as acultural and scientific, which devalues other knowledges and practices (Bang, 2020; Nxumalo, 2018; Tallbear, 2011). These assumptions need to be identified in our design for developing learning environments to be more just, sustainable, and culturally thriving for all students, particularly in our current political climate (Bang, 2020; Sengupta-Irving & Vossoughi, 2019; Vakil & Ayers, 2019).

Furthermore, discussing the topic of culture in a learning environment rooted in the dominant culture may take the form of othering that deepens inequity. *Culture* is often used as camouflage for socioeconomic issues. In particular, people from the dominant group demonstrate the tendency to describe behaviors or actions as cultural when they are not (Ball & Ladson-Billings, 2020), since culture may be identified as anything that is deviant or different from the mainstream. For example, Ladson-Billings (2006) argues that much of the discussion about Black and poor children being a part of a culture of poverty (Payne, 2013) erroneously identifies the outcomes of social policies as “culture”. Therefore, in order to center culture in a formal learning environment, we need a culturally centered approach to make visible the dominant culture as well as the dominant way of seeing and knowing.

Driven by this need, this study intends to understand how youth engage with culture in a formal learning environment that centers on culture. I describe a culturally centered learning environment as a designed learning space that operates on both notions that learners and learning are cultural, which values the knowledges, values, practices, and identities shaped by diverse experiences. Alongside a multicultural team of researchers, educators, and designers, I ask: *how do sixth graders develop relationships with culture in a culturally centered learning environment?* Guided by this research question, I employed a case study approach and followed 12 sixth graders for a school year to examine their learning and engagement with culture. By identifying a range of ways that sixth graders relate to culture and how these relationships changed over time, this work contributes an empirical understanding of the ways in which youth engage and learn about culture in a formal learning environment.

In alignment with the broader purpose of my dissertation to center culture and cultural diversity, I posit that we also need to develop knowledge on how youth learn and engage with

culture, which is complementary to the existing literature on learning and learners as cultural. Therefore, I join scholars who argue for researchers and educators to engage with onto-epistemic heterogeneity (Warren et al., 2020) in our work. To this end, a key contribution of this paper is the emergence of a new framework, *Ti-Wu* that I propose to capture the holistic process of cultural learning and engagement. This study identifies *Ti-Wu* as a holistic epistemology highly valued by traditional Chinese culture, which describes a way of learning and knowing that students engage with through culturally centered learning. *Ti-Wu* is a way of knowing under the epistemicide (Zhao, 2020) of Western-centric educational discourse and is often believed as an obsolete practice (Zhang, 2003). *Ti-Wu* captures the holistic process that students engage with when they learn about culture. I regard the acknowledgment of *Ti-Wu* as a vital process for decentering Western-oriented ways of learning, particularly in the context of learning and engaging with culture. In this study, *Ti-Wu* refers to the process of seeking deep and meaningful personal connections or understanding with culture in a designed learning space, such as in school. In this paper, I (re)conceptualize learning as *Ti-Wu* and present a model of the cultural form of *Ti-Wu* by tracing sixth graders' relationships with culture. The contributions of this paper are twofold: (1) sharing an empirical understanding of how youth learn and engage with culture, which leads to another contribution of (2) identifying and conceptualizing learning as *Ti-Wu*, an alternative epistemic process that captures how youth learn and engage with culture.

Literature Review

Culture as a Holistic Concept

As a holistic concept, culture can be challenging to define. Kroeber and Kluckhohn (1953) identified hundreds of definitions and uses of the term culture and it is difficult to follow a unified definition that can guide our understanding across the literature (McDermott, 1999). As a team, we continue this ongoing academic exploration as well as our lived experiences of engaging with and contemplating culture by acknowledging that our definitions and understandings of culture are always in the making. In this section, I explain culture as a holistic concept through three interdependent notions about culture in terms of practice, meaning-making process, and power.

Culture is a set of practices that we might not always be aware of. I first understand culture as a set of practices that can be identified from both a collective perspective and an individual perspective. Collectively, culture is the *repertoires of practice* (Gutierrez & Rogoff, 2003) that arise within community interaction. Participation in a cultural community provides a dynamic view for defining culture, which is different from the membership view that focuses on culture as a static and overgeneralized individual trait (Rogoff, 2003). This dynamic view of culture is also explained by Nasir and colleagues (2006), who define culture as “the constellations of practices communities have historically developed and dynamically shaped in order to accomplish the purposes they value, including tools they use, social networks with which they are connected, ways they organize joint activities, and their ways of conceptualizing and engaging with the world” (p. 686). I further focus on *culture as practice* from a personal perspective. An individual can participate in multiple cultures and to varied degrees (Ball & Ladson-Billings, 2020). However, people might not always be aware of our practices are cultural, for which researchers have metaphorically described culture as “the air we breathe-all

around us but invisible” (Ball & Ladson-Billings, 2020, p.389). Therefore, learning about culture involves engagement and awareness of diverse practices on the collective and individual levels.

Culture is a meaning-making process. Culture as a meaning-making process. In this work, I regard culture as a “socially shared symbolic and meaning system” (Lechner & Boli, 2005, P. 16) and “the social process of significance” (García Canclini, 2006, P.121). The engagement with culture is a continuous process of constructing meaning in social and material contexts beyond the transmission of a static and unchanging body of knowledge between generations (Levinson & Holland, 1996). This stance supports my inquiry on how youth develop relationships with culture through understanding how they develop meaningful relationships with culture rather than assuming the ownership of particular cultures (Anderson-Levitt, 2012) according to their group memberships. Therefore, learning and engaging with culture involves the process of engaging with and constructing meaning systems. To describe this process, Street (1993) defines culture as “an active process of meaning and contest over definition, including its own definition” (p.25). Informed by this stance, in this paper, I look at youths’ relationships with culture as a dynamic process in which they construct and define the meaning of culture from their personal experiences.

Culture can be a form of othering. In a formal learning environment, identifying what counts as culture can be an act of othering on multiple levels. On one hand, in a predominantly White learning environment, culture seems to be peripheral to academic activities. Scholars from different fields have resisted the exoticizing and sometimes racializing of culture (e.g., Street, 1993). For example, the current education discourses often operate on the distinction between “cultural knowledge” and school or domain knowledge, but, in fact, knowledge is fundamentally cultural (Nasir et al., 2008). On the other hand, in some disciplines, such as arts, European

superiority is manifested in a way that notion of cultural development or cultivating became the metonymy for the very idea of European civilization (Gaztambide-Fernandez, 2019), which perpetuates the othering of other cultures over the long course of colonial history (Said, 1994). Therefore, identifying these forms of othering requires a decolonizing approach that decenters White supremacy. Our work to recenter culture in learning environments is a collective attempt that resists forms of othering and promotes youth's deep engagement with culture.

Culturally Centered Learning

Across multiple disciplines such as learning sciences, psychology, and anthropology, researchers have explored the relationship between culture and learning. This study is guided by works from scholars who argue for the centrality of culture in human learning and development (e.g., Nasir, et al., 2020) and who examine not only the impact of culture on learning but that learning and development itself are essentially cultural (Cole, 1996; Miller & Rodgers, 2001; Rogoff, 2003). Our work to develop a culturally centered learning environment is an act toward decolonizing learning environments, particularly formal learning environments.

Historically, culture has long been considered peripheral to a Western-oriented educational environment or a context where educational activities take place. Learning environments often prescribe expectations of certain knowledge, practices, and ways of being and therefore are not culturally neutral. In the U.S., the deculturalization (Spring, 2004) of education is a process shaped by settler logic that reinforces property rights and Whiteness (Patel, 2015). For example, deculturalization often functions through centering the Anglo-American curriculum in school (Spring, 2004). Therefore, recentering culture in school is a form

of decolonizing, which informs our stance for designing culturally centered learning environments.

For decades, researchers have taken noble efforts to build the centrality of culture in both research and educational practices through approaches such as culturally relevant (Ladson-Billings, 1995), culturally responsive (Gay, 2010), culturally sustaining (Paris, 2012), culturally revitalizing (McCarty & Lee, 2014), culturally situated (Eglash et al., 2006), and culturally disruptive (San Pedro, 2018). These evolving practices provide foundations for us to understand how learning can happen in a culturally centered learning environment.

In this paper, I examine youth's learning and engagement with culture in a culturally centered learning environment based on the culturally disruptive (San Pedro, 2018) and culturally relevant (e.g., Ladson-Billings, 1995) approaches that inform our work in the broader project. To design a culturally centered learning environment, we first intend to make the dominant culture visible. Culturally disruptive pedagogy provides a framework to dismantle the dominant Western paradigm by creating ruptures in schooling and social systems that "counter the normalizing of Whiteness" (San Pedro, 2018, p.1221). This gives room for the zone of contact for new knowledge and new identities to take hold (San Pedro, 2018, p. 1207). Therefore, our culturally centered learning environment essentially embraces cultural diversity through decentering the Western culture that shapes curricula and pedagogy. Informed by the culturally relevant approaches (Ladson-Billings, 1995; Ladson-Billings, 2021), in the broader project of this work, the culturally centered learning environment we design is anchored in the following three dimensions: (1) support students' academic achievement through developing culturally centered learning activities for their curricula, (2) develop students' cultural competence through creating opportunities for students to developing an understanding of their

own culture and become fluent in at least one other culture, and (3) develop students' socio-political/critical consciousness through engaging with local cultural communities. Among the multiple goals, this dissertation study focuses on how youth develop relationships with culture to understand their culturally centered learning.

Conceptualizing Cultural Learning as *Ti-Wu*

Our aim to develop a culturally centered learning environment also calls for the need to understand learning beyond the Western-oriented paradigms. Thus, through this inquiry, I identify the process of learning about culture as a holistic process as *Ti-Wu*, which is an epistemological process that is highly valued in traditional Chinese culture (e.g., Zhang, 2003). *Ti-Wu* is widely used in the Chinese language to refer to a valued way of learning. Etymologically, *Ti* refers to both the concept or essence of matters and the personal practices or experiences that an individual can have. *Wu* refers to comprehension, understanding, or awareness, which often occurs with a hunch. Researchers translate *Ti-Wu* as body-thinking (Zhao, 2020) or experience-perception (Zhang, 2010). *Ti-Wu* shares certain characteristics with experiential learning and relies on a relational perspective on learning and engagement. The relational process of *Ti-Wu* is often characterized by two simultaneous processes: (1) seeking exchanges with the outside world to enrich one's own experiences and (2) seeking an understanding of one's inner self through reflection and self-criticism (Qi, 2012). Therefore, *Ti-Wu* offers a holistic understanding of the learning process. In this study, I focus on the cultural form of *Ti-Wu* as a way of learning and engaging with culture, with which youth develop meaningful concepts of culture and life.

Methods

This study builds on a multiyear broader project that employs a designed-based implementation research (DBIR; Fishman et al., 2012) methodology. Driven by the shared goal to connect disciplines through centering culture, we maintain a research-practice partnership (RPP; Coburn & Penuel, 2016) as a multicultural team of researchers, designers, and educators. This study focuses on the iterative design cycle during the 2021-2022 school year.

School and Participants

The Experiential Learning School (ELS) is a public charter elementary school in the Mountain West. The ELS commits to “providing a learning environment that allows and encourages children to explore connections between their learning and the world around them”. Our motivation to design a culturally centered learning environment is also aligned with this vision. The student demographics of the school are 86% White, 5% Multiracial, 6% Hispanic, 1% Black or African American, 2% Asian, 1% American Indian or Alaska Native, and 0% Native Hawaiian or Other Pacific Islander with 18% economically disadvantaged and 13% with the individualized educational program. In the context of this study, two sixth-grade classes were invited to participate in the study, and the parents of 29 students provided consent to the study. I followed 12 sixth graders who assented to participate and whose parent(s) or guardian(s) provided consent for the student to participate in this research. The students were 11 to 12 years old during the time of data collection.

Culturally Centered Learning Activities

Our research-practice partnership commits to developing a culturally centered learning environment that affords a series of centered curriculum units and field experiences with the goal of engaging students with diverse cultures. Table 4 shows an overview of culturally centered learning activities that took place within the scope of the study, which take five forms: local field experience, campus-based activity, long-distance field trip, multimedia design project, and classroom-based sharing.

Table 4

Overview of Culturally Centered Learning Activities (2021-20222)

Forms of learning activities	Example Unit	Descriptions
Local Field Experience	Beaver Mountain Hiking	A one-day field trip to Beaver Mountain to learn about local Native plants.
Campus-based Activity	The Bears Ears Rally	A multi-assignment project that culminates in a rally open to the school community. Students present their research on the local Bears Ears land dispute in Utah.
Long-distance Field Trip	San Juan River Trip	A three-day and two-night cross-cultural trip on the San Juan River close to the Navajo Nation.
Multimedia Design Project	San Juan Digital Story	A digital story project that represents students' San Juan River trip experience.
Multimedia Design Project	Ancient Civilization Podcast	A group project in which students work make a podcast about an ancient civilization.
Classroom-based Sharing	Solar Systems across Cultures	One lesson focuses on sharing Native stories about solar systems and Indigenous science
Classroom-based Sharing	Cross-Cultural Playground Poem	A poem writing unit that engages students with poems from both American and Chinese poets.

Forms of learning activities	Example Unit	Descriptions
Multimedia Design Project	Personal Culture Augmented Reality Project	A multimedia project for students to share their own culture through augmented reality design.
Local Field Experience	Visiting Wuda Ogwa	A half-day field trip to Bear River Massacre site and meet with local Tribal Elders.

Data Collection and Analysis

Guided by the qualitative technique, I collected a range of data for this dissertation work, including interviews, students' design works, and fieldnotes over a school from September 2021 to May 2022. I conducted interviews across three timepoints (the beginning, the middle, and the end of the school year). The series of interviews captured students' responses and descriptions of their understandings of culture as well as their culturally centered learning experiences. I also collected students' culturally centered multimedia projects and fieldnotes from observations of their learning activities. In this paper, the primary data source is the interview data, while the other two data sources were used for triangulation to bolster the analysis.

I constructed cases (Stake, 2008) bounded by data available for each participant. The data analysis was ongoing throughout the data collection following the cycles of three main steps: (1) transcribing interviews, (2) updating case summary sheets, and (3) writing analytic memos. During the school year, I shared memos and observations with the broader team for feedback to guide the next cycles of data collection and analysis. After the case summary sheets for each participant were complete, I conducted cross-case analysis (Borman et al., 2012) with the unit of analysis as *relationship with culture* to identify the commonalities and differences (Miles et al., 2014) across participants. In this paper, I share findings on participants' relationship with culture,

their own cultures, and other cultures, which leads to (re)conceptualizing *Ti-Wu* as a process of how participants engage with culture through building relationships.

Presenting Relationships with Culture

Culture

In this section, I present five relationships with culture. I identify these relationships by analyzing how participants described and shared their ideas of culture. In one response, there are examples of multiple relationships. Thus, these forms of relationship are complementary rather than mutually exclusive.

Nominal Relationship. Participants showed a nominal relationship with culture as they listed concepts that they believed as relevant to culture. These concepts represent their awareness of what could be cultural in daily life, which includes religion, language, food, technology, clothes, lifestyle, etc. To explain the concept of culture, they shared more than one of these concepts. For example, “just like lifestyle, things to do, where you come from, what you eat, your religion, just what makes it unique and stuff” (Jackson³, Time 3). These notions of culture range from physical objectives (e.g., food and clothes) to generalized concepts for people’s beliefs and behaviors (e.g., lifestyle and religion).

Group-Oriented Relationship. In addition to naming different aspects of culture, participants related with culture through identifying different cultural groups. The variety of groups that participants shared include family (e.g., Shawn, Time 1), a community (e.g., Jonah,

³ Pseudonyms for participants in this study are: Everley, Savannah, Ellison, Lexie, Annabelle, Evan, Lainey, Felice, Jackson, Jonah, Kaylee, and Shawn.

Time 1), a country (e.g., Jackson, Time 1). Some participants also identified the sixth grade as a cultural group (e.g., Annabelle, Time 1). The participants related with culture by identifying culture from these groups. Many participants related to families when describing a relationship with culture. For example, Kaylee described this group-oriented relationship, as she said “I think of tradition. And what certain families do” (Kaylee, Time 1). Beyond family, participants also related to community as a cultural group. To describe his relationship with culture, Jonah explained his idea about a cultural community, which is “a community of people that help out each other and support each other” (Jonah, Time 1). Jonah emphasized that interpersonal relationship is part of culture. The group-oriented relationship also includes relationships with different countries. Ellison shared that “like, where different people grow up, or where people grow up, like Russia, China” (Ellison, Time 1). Participants also related to the sixth grade as a cultural group, as Annabelle described that “sixth grade is part of the culture” (Time 2). These examples illustrate different ways that participants shared their group-based relationship with culture.

Historical Relationship. This historical relationship means that participants related to culture through historical connections. Specifically, they referred to ancestors, heritage, and where people were from to understand culture. For example, Everley described her idea of culture by sharing that “I think of different people’s ancestors and where they come from” (Everley, Time 1). For Everley, culture is relevant to the past, which can be traced back to family history (e.g., ancestors) or one’s previous experiences. This historical relationship sometimes intersects with group-oriented relationships. For example, when participants described culture as where people grew up (e.g., Ellison, Time 1) or culture as a tradition passed down (e.g., Kaylee,

Time 1). Therefore, the historical relationship can be both from an individual and a collective perspective.

Action-Oriented Relationship. An action-oriented relationship describes how participants relate with culture through multiple behaviors and actions. The participants not only talked about culture broadly as a lifestyle but also described specific activities as cultural. For example, Felice described culture in the following quote, “I think lifestyles. Different ways people live” (Felice, Time 2). Participants also shared that people could identify cultural differences through an action-oriented relationship. For example, Lexie described culture as “how people do things differently than other people” (Lexie, Time 2). Some participants also emphasized some behaviors as rituals, such as “the way people... do something. Different things they do annually” (Lainey, Time 2). Therefore, the action-oriented relationship focuses on culture as practices.

Adaptive Relationship. Some participants described their relationship with culture through an adaptive perspective, which shows their understanding of culture as a context-specific meaning system. For example, Annabelle elaborated on her relationship with culture by describing the context of being in Egypt, “generally, if you’re going to be in Egypt, you’re going to dress differently, different religion, or things you have to wear because it’s different climate, and other things” (Annabelle, Time 1). In her descriptions, Annabelle demonstrated her understanding of culture as a system of multiple factors, which co-shape people’s beliefs and behaviors. The adaptive relationship with culture shows a way to engage and relate with culture through conceptualizing culture as a system.

Own Culture

In addition to developing relationships with the idea of culture, participants demonstrated various ways that they developed relationships with their own culture throughout the school year. In this section, I describe four relationships with their own culture: (1) limited relationship, (2) family-based relationship, (3) value-based relationship, and (4) leisure relationship. There are examples of participants developing multiple relationships over time.

Limited Relationship. Some participants demonstrated a limited relationship with their own culture as they expressed uncertainty about the relationship with a shared response, “I don’t really know”. They shared two main reasons for this uncertainty: (1) not sure what culture means (Lainey, Time 1), and (2) not sure how to describe their culture even though they believe they have one (Jackson, Time 1). This relationship indicates a distanced relationship with their own culture, which characterizes the difficulty in identifying both what accounts as culture and the impacts of culture. Most of the participants started the school year by showing a limited relationship with their own culture.

Family-based Relationship. Participants described a family-based relationship with their own culture throughout the school year by identifying culture from their family experiences. For example, Shawn related to his own culture by describing his parents’ culture, as he shared, “My parents [are] from China. They cook good food” (Time 1). Savannah related to her own culture through her family activities. She said, “We [my family] go to church and we say prayers every night” (Savannah, Time 1). In addition to religious activities, playing sports is another way that participants identify their culture from family. For example, Felice described that “me and my family are very outdoorsy. We like to be outside and do fun things” (Felice, Time 2). Family impacts one’s culture, as Annabelle explained:

My family. We do dinner manners every night. It's because someone has it. Everyone does too, I guess. That's something that we do. It's one of our family rules, which again plays into culture. We have to take care of our animals because we have a lot of animals at our house. I do feel your family forms most of your culture whether it's you should not do this, or you really should do this. (Annabelle, Time 2).

As Annabelle shared, culture from family shapes our actions, responsibilities, and values. Participants developed a family-based relationship with their own culture through becoming aware and related to culture from their family.

Value-based Relationship. Participants also relate to their culture through identifying values. When describing their own culture, they shared values both on a personal level and a group level. In the following exchange, Everley shared her culture by talking about her personal beliefs:

Interviewer: Yeah. Wonderful. Could you tell me a bit more about your culture?

Everley: So, I wouldn't really go around saying false stuff. I would instead say truth because I like truth. I don't want to be a liar.

Interviewer: So, you believe that kind of describe your culture?

Everley: Kind of truthful and kind.

(Everley, Time 2)

In this conversation, Everley shared her values of being truthful and kind to define her culture. Relating to one's culture through values on interpersonal relationships can also be found

in responses from participants who talked about the values of their culture. For example, Jonah shared about this relationship as he described values on interpersonal relationships, “It's a good culture. Everyone is nice and loving and yeah, good loving culture and fun” (Time 2). In this quote, Jonah talked about his culture by describing the relationship between people in his community. He explained that being nice and loving are shared values. These examples illustrate how participants show value-based relationships with their own culture.

Leisure Relationship. Participants’ relationships with their own culture can also be built from their personal hobbies and leisure preferences. As Savannah described, “My culture is what I enjoy doing and stuff” (Time 3). Across their responses at different time points, they shared a range of hobbies and favorite things to describe their culture, which includes “skiing and pianos” (Annabelle, Time 2), “hiking and exploring the outdoors” (Savannah, Time 3), or “skateboarding and playing video games” (Evan, Time 3). Participants sometimes used these hobbies to illustrate a lifestyle. Evan explained his culture is “more sit back and relax” (Evan, Time 3). Evan further described that “most of the weekends, I just play video games the whole entire weekend unless I’m doing something with a friend” (Evan, Time 3). In this example, Evan shared his leisure relationship with his culture by describing a personal lifestyle. The leisure relationship covers a range of lifestyles, hobbies, actions, and personal preferences.

Other Culture

Participants developed relationships with other cultures through multiple ways of experiencing other cultures. In this section, we highlight two ways that participants relate to other cultures: (1) the difference-oriented relationship and (2) the connection-oriented

relationship. Examples of these relationships can be found in their culturally centered learning experiences in school as well as their experiences outside of the classroom.

Difference-Oriented Relationship. The difference-oriented relationship is developed from experiencing and becoming aware of cultural differences, which shows how participants' relationships with other cultures are bound by differences. Participants demonstrated an awareness of cultural differences consistently throughout the school year. For example, Anabelle commented that "pretty much everyone's culture is different" (Annabelle, Time 1). Despite the shared awareness, they described different ways they experienced cultural differences such as through identifying differences in language, values, sports, food, attire, names, what people do, and where people are from. These understandings of cultural differences came out of their encounter with other cultures in multiple ways. They identified other cultures mainly through knowing someone from a different culture. They mentioned different occasions such as meeting people from the same neighborhood (e.g., Felice, Time 1), talking with classmates who have different cultures (Evan, Time 3), and visiting a family relative who lives in another country (Savanah, Time 2). They also share that they often contrast other cultures with the practices of their own families. For example, Shawn described his understanding of Native culture through contrasting with his family, "the Native American culture, they live off the land. They have sacred stuff. They do all those blessings. That's different from what my family does" (Shawn, Time 3). This example shows Shawn's difference-oriented relationship with other cultures.

Connection-Oriented Relationship. Participants also demonstrated a connection-oriented relationship with other culture, which shows how they sought connections and prepared to interact with people with a different culture. Some participants mentioned that they would like to interact with people with a different culture the same way as they would with other people (e.g.,

Jackson, Time 1). Others shared that they would talk to someone from other cultures differently. Felice explained that “if you talk to someone who has the same culture, you talk to them as if you talk to a family. If not, [I] might wonder why different” (Felice, Time 2). Participants also shared that they would like to learn more to be able to respectfully interact with people from other cultures. For example, Everley reflected that she would like to learn “what things could be hurtful or offensive because I don't want to talk to somebody new and the first word I say is offensive” (Time 3). These examples illustrate the way of relating to other cultures through a connection-oriented relationship.

Toward a Model of *Ti-Wu*

The relationships with culture that the participants demonstrated over the course of the school year contribute to the development of a model for *Ti-Wu* that can be used to identify how youth learn and engage with culture in a culturally centered learning environment. The process of analyzing and identifying these relationships leads to the observations of how students learn and engage with culture: (1) they developed multiple relationships with culture simultaneously, which were trending toward more personal and (2) their relationships with culture and other cultures are entwined. These observations reveal that learning and engaging with culture is a holistic process. Therefore, I identify this learning and engagement as *Ti-Wu*. These relationships contribute to a model of *Ti-Wu* that centers on youths' relationships with culture, own culture, and other culture. In the next sections, I share two sets of moments of *Ti-Wu* identified with this model.

Moments of *Ti-Wu*: The Changing Distance with Culture

Over the course of a school year, participants demonstrated *Ti-Wu* as their relationship with culture shifted. I identified the key theme of changing distance among these moments of *Ti-Wu*. Over the course of the school year, participants became more connected with culture, as they demonstrated the following three moments of *Ti-Wu*: (1) the broadening nominal relationship, (2) the development of multiple relationships beyond the historical relationship, and (3) the development of action-oriented relationships. The moments illustrate that relating with culture is a holistic process.

The Broadening Nominal Relationship

The first form of the moments of *Ti-Wu* centers on participants' broadening nominal relationship with culture, which shows their more connected relationship with culture. As an example, Ellison began the school year by describing culture through naming the place that people relate to. He shared that, "like, where different people grow up, or where people grow up, like Russia, China" (Time 1). Toward the end of the school year, Ellison talked about culture by acknowledging the broadness of the idea:

Interviewer: All right. So, what have you learned about culture in the sixth grade so far?

Ellison: That it's what makes up people. I guess.

Interviewer: Okay. So, what's surprised or impressed you the most about learning about culture?

Ellison: How much there is of somebody's culture.

Interviewer: Yeah. It is a lot, isn't it?

Ellison: Mm-hmm.

Interviewer: So, when you hear the word culture, what do you think about that?

Ellison: Like a person kind of, or people that... or what people like, and what they like learning, stuff like that.

(Time 3)

In this exchange, Ellison shows a broadened understanding of culture. For Ellison, culture is more than where people are from and grow up. Instead, culture is embodied and shapes everything people do. This change indicates a closer distance that Ellison developed with culture. Key to Ellison's *Ti-Wu* is the acknowledgment of culture as a broad concept, as he commented "how much there is of somebody's culture" (Ellison, Time 3). This helps us to understand Ellison's *Ti-Wu* as a process to develop a holistic relationship with culture.

Changing Beyond the Historical Relationship

Another form of the moments of *Ti-Wu* is identified as participants demonstrated multiple perspectives of understanding culture over the school year. This change indicates a closer distance to culture as they moved beyond a historical relationship and became able to relate with culture in their daily life.

For Savannah, her relationship with culture became more connected as she developed multiple perspectives of culture. Savannah described this change in this reflection, "like before I thought it [culture] was just people's ancestors but it's like what you do and what other people do" (Time 3 Interview). This changing relationship with culture was occurring as she developed

relationships with her own culture as well as other culture. Savannah explained, “I kind of realized what my culture was and other people’s culture and stuff” (Savannah, Time 3 Interview). Throughout time, Savannah changed from understanding culture as about people’s ancestors to a perspective that culture is about current actions.

Savannah’s development of multiple relationships with culture also supports a deeper engagement with cultural differences. Savannah showed an awareness of the complexity of one’s culture, which grows as she engages with culture beyond a historical relationship. Over time, Savannah emphasized the importance of not assuming or judging one’s culture. She shared that “everyone has a different culture, and they can’t just like say somebody has German culture but they’re not. We can’t assume cultures because that’s mean and it’s, yeah” (Savannah, Time 2 Interview). Savannah explained the reason for judging or assuming someone’s culture is not appropriate, “everyone’s culture is different, and you can’t judge somebody by their culture because you never know” (Savannah, Time 3 Interview). Throughout time, Savannah demonstrated *Ti-Wu* as she developed multiple relationships with culture and became more connected with culture in daily life.

Developing an Action-Oriented Relationship

Moreover, *Ti-Wu* takes the form of developing an action-oriented relationship. Participants’ distance to culture becomes closer as they develop an action-oriented relationship with culture. This form of *Ti-Wu* was often demonstrated in the move from a group-based relationship to an action-oriented relationship.

At the beginning of the school year, Lainey related to culture through thinking about a particular cultural group – Native people, “I think of things that people are like Native to or

like... I don't know really how to explain the word culture” (Lainey, Time 1). Lainey first shared a more distanced relationship with culture as she described culture in terms of a cultural group that is different from her own. As the school year went on, Lainey started an action-oriented relationship with culture, when she described culture as "the way people...or do something. Different things they do annually" (Lainey, Time 2). Lainey later refined her response and described culture as “different celebrations and how different people... I don’t know. They do different things” (Lainey, Time 3). Throughout the school year, Lainey demonstrated *Ti-Wu* while developing a more personal relationship with culture, which takes the form of her action-based relationship with culture. Specifically, beyond thinking of culture as relevant to other culture, Lainey moved toward identifying culture through the actions and practices that people take.

Moments of *Ti-Wu*: Developing the Reciprocal Relationship between Own and Other Culture

Throughout the school year, participants demonstrated *Ti-Wu* as their relationship with their own culture and other culture developed in a reciprocal way. During this process, their understandings of their own culture and other cultures inform each other. In this section, I share three moments of *Ti-Wu* of the reciprocal relationship between one's own culture and other culture.

Seeing Multiplicity in One’s Own Culture

One form of *Ti-Wu* supported by the engagement with culturally centered learning experiences throughout the whole school year is to embrace the multiple aspects of one's own

culture. Their relationship with their own culture deepens as they embrace the multiplicity of their cultural identity during the process.

Shawn, one of the six graders, demonstrated a family-based relationship with his own culture at the beginning of the school year. When talking about his own culture, he related to his parents' culture to describe his own. He shared that, "My parents [are] from China. They cook good food" (Shawn, Time 1). He contrasted his culture with the rest of his classmates as he described the cultural differences he observed.

Interviewer: Do you know anyone whose culture is different from yours?

Shawn: Yeah. Some, the people in my class, I think they're American culture or something like that. They eat differently, dress differently, and have different traditions and holidays and stuff like that.

Interviewer: Yeah. How do you know their culture is different? You kind of already told me about this. Is there anything else you kind of know about their culture that is different from yours?

Shawn: They can speak a different language. Some of them speak Spanish or something. Like they added on to their culture. Yeah.

(Shawn, Time 1)

In this exchange, Shawn shared the observed cultural differences between his culture and American culture. He particularly described differences in terms of food, tradition, and holidays. He distanced himself from American culture when he referred to classmates who have American

culture as “they”. In the middle of the school year, Shawn shared more about his relationship with the Chinese cultural identity as he shared more knowledge about Chinese culture:

So, it’s the Chinese culture. Chinese meals. We eat a lot of good food. And the good food is part of the culture, too. Because it tastes good, and it originated in China. And China also had the five great inventions like gunpowder, paper, compass, caper crust, and something else, but they’re really smart. (Shawn, Time 2).

In this response, Shawn not only nominally shared about Chinese food but also described his knowledge of Chinese cultural heritage – ancient inventions. He also seemed to distance himself from the historical Chinese culture as he referred to ancestors who contributed to great inventions as “they”. However, Shawn expressed the desire to take the perspective of people currently in China and the ancestors whom he seemed to be othering himself from.

Interviewer: What else you want to know about your culture?

Shawn: I want to know what’s going on in China right now because there’s like the lockdown stuff. And it’s sort of crazy there.

Interviewer: Yeah. Yeah. I also really want to go back, too. I haven’t been back home for like three years-ish. Great, so, how would you like to learn more about your culture?

Shawn: I want to travel there. And if I did have like a time traveler, I could go maybe back into the times and see what it was like there.

(Shawn, Time 2)

In this exchange, Shawn described two relationships with Chinese culture both from the current perspective and the historical perspective. He was aware of his limited perspective of the pandemic situation in China. He also expressed an interest to be more connected with ancient Chinese culture in his “time traveler” metaphor.

Shawn’s relationship with both Chinese culture and American culture became deepened as he explored the historical relationship with the current place he lives in – the land of North America.

I wonder what it was like, like, a long time ago. And we’re doing this thing in class about who really discovered America. And one of the possibilities was the Chinese. One thousand years or so before Columbus. Because when Columbus arrived, there were already people living there. And people discovered anchors that could come from Chinese ships. And they found the water level was lower back then. And when they were diving underwater, they saw some rocks at the bottom leading to a wooden place and they think that’s where they were mending their boats and stuff.

(Shawn, Time 2)

Shawn started to develop a relationship with another dimension of his culture, as he was particularly drawn to the historical evidence that indicates the connection between his own Chinese culture with the land of North America. Over time, Shawn embraced a shift in his cultural identity as he described his culture differently by the end of the school year, “I’m a Chinese. I guess Asian American” (Shawn, Time 3). He explained this multicultural identity by

talking about how his family make rice cakes, “instead of just eating them, we put American things inside, like peanut butter or strawberry jam. We’re blending two cultures right there. I feel pretty connected to my culture” (Shawn, Time 3).

Over the school year, Shawn engaged with the similarities and differences, particularly regarding what he identified as the Chinese culture and the American culture. This experience can be illustrated in the following response when he described this relationship with the American culture he identified.

Interviewer: When you say American culture, you said their culture. What does that mean? Is it you don’t think that is your culture?

Shawn: Some traditions in their culture differ from mine but some of them are the same. When I say their culture, I’m talking about the ones that are different.

(Shawn, Time 3)

Shawn developed *Ti-Wu* of his own culture as he engaged with the similarities and differences between the two cultures. This process also contributed to how he would connect with people who have a different culture. He shared that “all people are people. We shouldn’t be treated differently just because of where they’re from” (Time 3). Throughout his experience, Shawn developed a connected view between himself and the two aspects of his culture, which supports his perspective taking with others. Shawn’s *Ti-Wu* is about both his relationship with his own culture and other cultures, as he commented that people coming from different places should be treated equally.

Distancing One's Own Culture for a Better Understanding

Another form of *Ti-Wu* is demonstrated as participants distance their own culture to build an understanding of both their own culture and other cultures. During this reciprocal process, participants relied on perspective taking to develop relationships with their own culture and other culture.

At the beginning of the school year, Jackson demonstrated a limited relationship with his culture, as he commented, "That's a hard one. I don't really know that. I don't know how I would describe my culture, I guess. I'm from Utah. Yeah, I don't know. I don't really know" (Jackson, Time 1). Jackson shared a limited relationship with his culture except for briefly describing that he was from Utah.

Jackson started to build a more connected relationship with his culture as he attempted to understand his culture from a distanced perspective. Here is an example of how Jackson distanced his culture by imagining a perspective from other culture:

So, that's hard. I don't know exactly what my culture is, but I know that I speak English. I think I'm American culture. I eat regular food, but it wouldn't be regular food for some cultures, maybe. So, what I think of as my daily lifestyle, other cultures might not because I speak English, I live in America, and I do maybe different things than other people. Yeah. I don't really know about my culture. (Jackson, Time 2).

In this response, Jackson described American culture from a distance through perspective taking. Jackson listed different aspects of American culture he identified with, including food,

language, and daily lifestyle. He further alienated these cultural aspects by talking from a distanced perspective. He particularly pointed out that what he considered “regular” might not be perceived as “different” by other cultures. He further provided more details of his understanding of American culture:

I think that’s what American culture would be. Eating for that we think would be regular food, like hamburgers or steak or salad. I don’t know. Food like that versus different... We speak English. We’re from America. We have an American accent. Something different. (Jackson, Time 2).

To complement the previous response, Jackson made regular food such as “hamburgers”, “steak”, or “salad” strange as he described his own culture. He also acknowledged the American accent when describing his language. Both examples illustrate how Jackson employed perspective taking to build a relationship with his own culture through other culture.

This reciprocal process contributes to Jackson’s relationship with own culture and other culture. Jackson became more connected with his own culture as he developed a leisure relationship with his culture. In contrast to his limited relationship, by the end of the school year, he shared that:

I mean, I don’t really know how I can...what my culture, like, what to call it but like I know what I like to do. Like, I like to play basketball and I like to be outside and I’m from Utah and I like to read and, so, yeah. So, I don’t really know like what to call my culture but that’s like some things about my culture. (Jackson, Time 3).

In this response, Jackson shared a leisure relationship with his culture as he engaged in the reciprocal process of learning about his own culture and other culture. Jackson reflected on this process as he at first had difficulty articulating his culture in terms of identifying a cultural group. Over time, Jackson started to focus on his hobbies, preferences, and the place he was from, which are key to his own culture. From this process, Jackson became more connected with his culture through building a leisure relationship.

This reciprocal process also contributes to how Jackson engaged with other culture through exploring similarities and differences. He commented that “I feel like everybody has like a little bit of a different culture, or maybe it’s a lot different from yours, like, mine still. But like I feel like most people have even if they’re really similar, they’re different in some ways. So, yeah” (Jackson, Time 3).

Jackson shared an understanding that everyone’s culture is different. He particularly highlighted that there are nuanced differences even with people who seem to have similar cultures. This understanding is aligned with his view on how to interact with people with others. He stated that, “unless like their culture they want you to interact with them differently. Yeah, I just treat them the same, yeah” (Jackson, Time 3). Jackson developed this connection-based relationship with other culture through perspective taking. The reciprocal process of developing *Ti-Wu* through distancing his own culture deepens both Jackson’s relationship with his culture and other culture.

Identifying cultural values from negotiating with family and self

In addition, *Ti-Wu* is a process of identifying one's values and respecting others' values. This process involves constant negotiation between the culture of one's family and the personal culture, which not only contributes to the development of a value-based relationship with one's own culture but also a connection-based relationship with others, particularly in terms of values.

Throughout the school year, Everley's experience illustrates the process of identifying her cultural beliefs and values through negotiating with her family and self. At the beginning of the school year, Everley shared a family-based relationship with her culture.

Interviewer: Could you tell me a little bit about your culture? Can you think of anything?

Everley: I was born in [a Mountain West state]. My dad's ancestors were from Italy.

Interviewer: That's really cool. How about your mom? Do you know anything about her side?

Everley: She was born in [one West Coast state] and moved to [another West Coast state]. Then moved here.

(Everley, Time 1)

Everley focused on where her family members were from when she first shared her culture. She not only described her European ancestry but also her connection with the state where she currently lives with her family. She identified her cultural connection with the state, as she said "pretty connected [with the Mountain West State]. I like lots of stuff in [the Mountain West State]" (Everley, Time 1).

Over time, Everley started to develop a value-based relationship with her own culture. By the middle of the school year, she shared a different version of her own culture in the following exchange, which I introduced earlier in this paper as an example of a value-based relationship:

Interviewer: Could you tell me a bit more about your culture?

Everley: So, I wouldn't really go around saying false stuff. I would instead say truth because I like truth. I don't want to be a liar.

Interviewer: Mm-hmm. So, you believe that kind of describes your culture?

Everley: Kind of truthful and kind.

(Everley, Time 2)

Everley identified the values of being "truthful and kind" when she described her culture, which is different from the family-based relationship that she shared earlier. This change is connected to her exploration of the impact of family on her relationship with her own culture:

Interviewer: Have you learned anything about your own culture from your family so far?

Everley: I've seen what my parents have done and what they believe in and see how I can fit it into my own life.

Interviewer: Mm-hmm. Could you think of an example of that?

Everley: I can see how my parents treat other people with kindness and so I try to see how I can treat others with kindness to be a better person.

(Everley, Time 2)

In this response, Everley described how she learned about her culture from her family by understanding her parents' actions and beliefs. She highlighted the shared cultural values that she learned from her parents, which also center on kindness. This shift in the relationship with her own culture also guides her interaction with others.

Everley demonstrates perspective-taking as she explored how values unveil in other aspects of her culture. She shared this by talking about her name:

Interviewer: What would you like to know more about your culture?

Everley: I want to know what my name means in other cultures.

Interviewer: Did you say names in other cultures?

Everley: Yeah. What my name means in other places.

(Everley, Time 2)

In multiple cultures, the names of children in the family often represent the parents' or the whole family's values. When asked about Everley's knowledge of the cultural meaning of her name, she responded that "not that I know of that I remember" (Everley, Time 2). However, Everley shared her interest in learning about the meanings of her name in other places. Everley demonstrated perspective taking as she shared an adaptive relationship with culture in other places where the meanings of the name can be shaped by that cultural context. This process suggests that Everley's relationship with her own culture was developing and intertwined with her relationship with other cultures.

The reciprocal process of relating with her own culture and other culture contributes to Everley's twofold relationship with culture towards the end of the school year. She described this relationship through describing the two different sides of culture, "culture is kind of personalized depending on the person and what they like to do. You can have a genetic culture like where you come from but then you can also have your personal culture as your own like some friends" (Everley, Time 3). For Everley, one's culture is made up of two sides, the genetic culture and personal culture. She further explained the differences of the two sides using a clay metaphor. She shared that, "it's [culture is] also about you, what creates you. It's almost like clay and so your parents can help shape that, but you are the person who gets to create the project itself and so then it's finished" (Everley, Time 3).

The clay metaphor explains Everley's value-based relationship with her culture as both family-based and personal. On the family level, she shared more details about how family influences her cultural beliefs:

Interviewer: Have you learned about your own culture from your family?

Everley: Yeah. They've taught some of the things I know about my culture.

Interviewer: Okay. So like what kinds of things have you learned from them?

Everley: I believe the Gospel. They've taught me about that. Different respects, to treat people.

(Everley, Time 3)

In this exchange, Everley described the religious belief that she learned from her family. She also mentioned these value-informed attitudes that inform her interaction with others.

Everley's values are also personal. As another side of her culture, she understood own culture as "things I like" (Everley, Time 3). She also shared more about her relational views, as she commented "I respect nature and other people's beliefs and I'm not going to go out shouting stuff that would offend someone's beliefs" (Everley, Time 3).

This twofold relationship contributes to her relationship with other culture. Since the middle of the school year, Everley shared multiple times about the importance to respect others' values. She reiterated this idea in the following exchange:

Interviewer: What are the things you want to know before you talk to people from a different culture?

Everley: What things could be hurtful or offensive because I don't want to talk to somebody new and the first word I say is offensive.

Interviewer: Yeah. So, like what's offensive and then because you don't want to offend them.

Everley: Like pointing. I don't want to possibly point with the wrong finger.

(Everley, Time 3)

Everley demonstrated a different-oriented relationship with other cultures in terms of language choice when she interacts with others. She was mindful that she might not have the knowledge of what words can be offensive to people who have a different culture. In addition to verbal language, she also elaborated that gestures are also cultural. These examples show how Everley enacted respect as a connection with other cultures as she became able to identify values of her own, which is key to her development of *Ti-Wu*.

Discussion

In this study, I explored how youth learn and engage with culture through developing relationships with culture in a culturally centered learning environment. By tracing twelve sixth graders' relationships with culture over a school year, I identify their learning and engagement with culture as *Ti-Wu*. I propose a model *Ti-Wu* that centers on participants' relationships with culture, own culture, and other cultures. In this section, I first discuss *Ti-Wu* as relational and personal based on the key themes from the findings. I then reflect on this work as a (re)conceptualization of learning as *Ti-Wu*, which generates implications for centering culture in the classrooms.

Youth's Relationship with Culture

This study focuses on how youth develop relationships with culture in a culturally centered learning environment. In the analysis of twelve sixth graders' relationships with culture, their own culture, and other cultures, I identify *Ti-Wu* as the relational process in which youth learn and engage with culture. In particular, the analysis of the relationships with culture highlights moments of *Ti-Wu* as participants developed a closer and more personal relationship with culture. The first section of the findings presents the three moments of *Ti-Wu* for the change in participants' relationship with culture: the broadening nominal relationship, the development of multiple relationships beyond the historical relationship, and the emergence of action-oriented relationships. The three forms of *Ti-Wu* are illustrative of the diverse learning paths toward building a more connected relationship with culture that is personally relevant to the current

time, space, and daily life. Similarly, participants demonstrate a more personal relationship with their own culture. In the second section of the findings, the three moments of *Ti-Wu* detail participants' move towards a more personal relationship with their own culture by (1) embracing multiple aspects of one's culture, (2) identifying the existence of their culture when seeing from the perspective of other culture, and (3) negotiating the relationship between their personal culture from their family culture. This trend toward a more personal relationship with their own culture also contributes to their respect for and deeper relationship with other culture. The reciprocal process is key to participants' *Ti-Wu* over the school year in a culturally centered learning environment. The culturally centered learning environment in this study supports these different learning paths of *Ti-Wu*, as youth experienced and explored a range of cultural learning activities while building relationships with culture, own culture, and other culture.

(Re)conceptualizing Learning as *Ti-Wu*

Although valued by Chinese educators in designing a variety of educational practices across disciplines, *Ti-Wu* has not yet been widely researched. Because of the deep tension with Western-oriented epistemology, *Ti-Wu* seems to be a vague concept, a forbidden space for educational research (Zhang et al., 2010), and an obsolete practice sealed in the dust of history (Zhang et al., 2003).

In this study, I (re)conceptualize *Ti-Wu* as a holistic way of learning and knowing that exists particularly in our engagement with culture. I examine youth's cultural form of *Ti-Wu* as a learning process that contributes to their overall cultural development. I regard youths' moments of *Ti-Wu* in a culturally centered learning environment as their learning trajectories of developing relationships with culture, including the culture of self and others, which are key

developmental milestones (Cantor et al., 2019) in Western learning and developmental theories. To examine youths' *Ti-Wu* of culture, I focus on their relationship to culture as their lived experiences (Dieumegard et al., 2021) that are unfolding in the interactions with the culturally centered learning environment.

Developing relationships is essential to *Ti-Wu*. The process of developing a relationship with culture involves multiple ways of seeing and relating and people often have varied relationships with different cultures. From the perspective of Western psychology, researchers have been using the term *psychological distance* to explain how people relate to culture. *Psychological distance* refers to the degree of subjective relatedness to an event or person across different kinds of distance, such as time, space, and personal identity (Trope & Liberman, 2003). Furthermore, researchers have identified the home-field disadvantage (Medin et al., 2010) that shapes our interpretations of cultural groups other than our own. Individuals, first, tend to take other cultures as marked (exotic or different) while taking their own culture as unmarked (normal or less stand-out). People also tend to assume strong homogeneity of other cultures, while viewing heterogeneity in their own culture group (Medin et al., 2010). This study presents a model of *Ti-Wu*, which broadens the idea of *psychological distance* to capture holistic moves in the relationship with culture, own culture, and other culture.

Supporting Learning and Engagement with Culture in Classrooms

In this study, I identify youth's *Ti-Wu* as relational and personal processes supported by a culturally centered learning environment, which has implications for how we can engage youth with culture in the classrooms. In a formal learning environment, the engagement with culture, particularly other culture, is usually based on a static representation of culture (Berti, 2020),

which prescribes a certain relationship between youth and culture. This static relationship might unintentionally perpetuate colonized representation of culture. As an alternative, *Ti-Wu* is a form of learning that is contrary to the engagement with the grand narratives of cultures, particularly minoritized cultures that are rooted in colonialism and are shaped by Euro-centric meaning-making (e.g., Said, 1994). The findings in this paper demonstrate how sixth graders engaged and developed relationships with culture through demonstrating *Ti-Wu*, which *has* implications for decolonizing cultural learning in a formal learning environment. These findings demonstrate the possibility to broaden the concept of learning for understanding how youth learn about the culture. Specifically, the concept of *Ti-Wu* can inform culturally centered pedagogies that intend to resist the implicit colonial gaze (Van Eeden, 2004) as learners engage with diverse cultures. Toward the broader goal of decolonizing learning and education, learning sciences researchers have worked for decades to confront the White normativity in education by working towards more heterogeneous conceptions of life and learning (Warren et al., 2020). To join these efforts, this study has implications for designing learning activities to support *Ti-Wu* as a means to develop personally meaningful relationships with diverse cultures in a predominantly White learning space.

CHAPTER 4 REIMAGINING RELATIONSHIP WITH CULTURE: SIXTH GRADERS' CULTURALLY CENTERED MULTIMEDIA PROJECTS THROUGH REMIXING

Abstract

Although education is framed as a future-oriented enterprise, we often fail to serve the diverse futurities of youth, particularly in formal learning environments. The cultural norms of formal learning environments are assumed to be the standards and shape how learning environments and learning technologies can be designed. As a result, the formal learning environment and embedded learning activities often operate on static or limited relationships between youth and their diverse range of cultural experiences. To reject this settled relationship with culture, I ask how youth develop relationships with culture through creating multimedia projects in a culturally centered learning environment. Guided by the case study approach, I collected 36 remixing multimedia projects from 12 sixth graders, who created these projects for three culturally centered learning activities over a school year. In order to identify how multimedia projects mediate their relationship with culture, I followed the bi-directional artifact analysis and cross-case analysis approaches. In the findings, I share two cases from each learning activity to demonstrate how participants represent their relationship with culture through symbolizing. Throughout the cases, I identified three forms of symbolism that the three learning activities afforded, which support the development of an adaptive relationship culture. This study has implications for understanding the critical role of remixing in developing youth's relationship with culture and the ways in which we can connect youth's multiple knowledges and experiences in culturally centered learning environments.

Keywords: culturally centered learning environment; multimedia technology; relationship with culture; settler futurities

Introduction

Education and learning are often driven by future-oriented discourses, particularly amidst the tremendous technological growth in the areas such as artificial intelligence, machine learning, and immersive technologies. Formal learning environments in the United States, however, have historically committed to White settler futurities (Tuck & Gaztambide-Fernández, 2013; Kulago, 2019), which implicitly shape how learning environments and learning technologies are designed. In particular, the embedded cultural norms of formal learning environments, such as Anthropocentrism (Bang et al., 2012) and individualism, are often received as the standards. Researchers have broadly identified that these cultural norms are rooted in settled expectations in education and prescribe formal learning environments as acultural spaces (Bang et al., 2012). As a result, the settled expectations (Bang et al., 2012) limit the relationship between youth and the diverse range of cultural experiences, which is reified in the design of formal learning environments and takes the form of settled relationships – static or limited relationships with culture.

Meanwhile, with the growing trend of leveraging a broader range of multimedia technology in the classroom, researchers and educators have been exploring different ways to engage youth with culture through technology. Researchers have investigated the roles of multimedia technology to relate youth with culture. Multimedia technology can afford context-

rich learning opportunities to connect youth with their local cultural heritage and history (e.g., Arayaphan et al., 2022; Petrucco & Agostini, 2016; Adi Badiozaman et al., 2022; Harncharnchai & Saeheaw, 2018). To support youth's understanding of the relationship between school disciplines and the culture of their own communities, Brown and colleagues (2021) designed a culturally situated virtual reality experience for a science classroom. Researchers have also explored the ways in which to engage youth with other culture via multimedia platforms for cross-cultural exchanges (e.g, Liaw, 2019; Whewell et al., 2022; DeWitt et al., 2022; Yeh et al., 2020; Yang & Liaw., 2014). These recent studies not only demonstrate the design possibilities of multimedia technologies for cultural learning and engagement but also make explicit the range of diverse and complex cultural contexts that youth are part of.

Inspired by these efforts and to reject the settled relationship with culture, I seek to explore how youth develop relationships with culture through creating multimedia projects in a culturally centered learning environment. Working with a multicultural team of researchers, educators, and designers, we iteratively designed a series of culturally centered multimedia projects for the sixth-grade classroom. Specifically, this paper is guided by the following research question: *how do culturally centered multimedia projects mediate students' relationship with culture?* Taking a case study approach (Stake, 2008), I build an understanding of sixth graders' different relationships with culture that they demonstrated through remixing multimodal resources to represent culture. Through sharing an empirical understanding of the different relationships with culture that culturally centered multimedia projects afford, this study not only contributes to the exploration of how we can engage youth with culture through multimedia technology but also the ways in which we can center youths' relationships with culture for diverse futurities.

Background

(Re)engaging Culture in Culturally Centered Learning Environments

This study is part of the broader project that aims to develop the centrality of culture (e.g., Nasir, et al., 2020) in a formal learning environment and support students' deep and meaningful engagement with culture by making visible Whiteness and embedded cultural norms (e.g., San Pedro, 2018). The culturally centered learning environment we develop intends to (1) desettle the knowledge, practice, and way of being normalized in a formal learning environment and to (2) create opportunities for teachers, students, and researchers to engage and (re)engage with their own culture and other cultures.

The culturally centered learning environment disrupts settled ways of knowing and being and rebuilds relationality between learners and culture. Formal learning environments often operate on a set of Euro-westernized normativity that prescribes certain relationships, meaning-making processes, and expectations, which are often referred to as settled expectations (Bang et al., 2012). Harris (1995) used settled expectations to describe racial hierarchies that attach a set of assumptions, privileges, and benefits to being White. Although settled expectations take different forms in contemporary life, they remain deeply embedded in the structure of the society and appear to be natural and objective at least to the privileged groups of people (Harris, 1995). Bang and colleagues (2012) argue that settled expectations, in schooling, lead to entrenched and hidden boundaries that "tend to control the borders of acceptable meanings and meaning-making practices" (p.303). For example, in STEM disciplines, there are normative descriptions of subject matter that are based on the nature and culture divide (e.g., Helmreich, 2009), which defines that

only certain descriptions of human and nonhuman relationships are acceptable. These settled and Euro-westernized expectations continue to define whose knowledge, values, beliefs, values and practices are recognized within the education system (Arada et al., 2023).

Furthermore, these settled expectations present formal learning environments to be acultural spaces – or spaces without culture – through forcing youth to assimilate with Euro-westernized culture and values (Arada et al., 2023). We problematize this acultural presentation of learning spaces as they continue to perpetuate White supremacy and settlerhood (Tuck & Gaztambide-Fernández, 2013) while positioning other cultures as an objectified *other*, which results in learners' reduced relationship and engagement with culture. Therefore, our work is driven by the goal to rebuild learners' relationships with culture as a means to desettle learning environments as acultural spaces and to acknowledge that developing learners' relationship with culture is an essential process of supporting diverse futurities.

We envision a culturally centered environment to be supportive of a range of learning activities to engage and (re)engage with culture, both of one's own and others. In particular, our frame of developing learners' relationship with their own culture and other cultures is cultivated from theoretical and practical experiences of centering culture with a series of pedagogical approaches, including culturally relevant (Ladson-Billings, 1995), culturally responsive (Gay, 2010), culturally sustaining (Paris, 2012), culturally revitalizing (McCarty & Lee, 2014), culturally situated (Eglash et al., 2006), and culturally disruptive (San Pedro, 2018). These approaches enlighten the evolving practices that center learners' own culture and engagement with other cultures on a wide range. To disrupt the expectation of separating learners from their cultures and learning according to Euro-westernized cultural norms, researchers have called for teaching to be culturally responsive (e.g., Gay, 2010). Centering learners' own culture in

teaching contributes to sustaining and revitalizing learners' language, literacies, and cultural practices (Paris, 2012; McCarty & Lee, 2014).

Moreover, researchers also examine learners' paths of development while engaging with other cultures. For example, San Pedro (2018) reflected upon the journey of a 12th-grade student named Abby, who is the only White student in a class that recenters Indigenous histories and literacies. Throughout the learning process, Abby reveals her tensions, disruptions, and later self-discoveries as she undergoes the development of her own cultural competence. In fact, the relationship with one's own culture and other cultures is not developing in a silo. Ladson-Billings (2021) argues the development of one's cultural competence involves students gaining an intimate understanding of "their own culture — language, traditions, histories, culture, and so forth AND ... developing fluency and facility in at least one other culture" (Ladson-Billings, 2021, p. 71). In this study, I build an understanding of how youth develop relationships with culture by tracing learners' intertwined relationships with their own culture and other cultures as they work out this relationship through creating multimedia projects.

Remixing as Learning and Reimagining

In this paper, I examine learners' culturally centered multimedia projects that they created in a culturally centered learning environment that we co-designed as a broader team. Guided by the sociocultural perspectives of learning, I approach learning as situative (Nasir & Hand., 2006) in the activity setting of a culturally centered learning environment. Specifically, I take learners' multimedia projects as artifacts that develop across multiple layers of sociocultural contexts, which mediate (Cole, 1998) their relationship with culture.

I focus on how these projects mediate learners' relationship with culture through the process of remixing. Researchers have broadly identified remixing as a pathway to learning (e.g., Brandt et al., 2009), which becomes more prominent in our current digital media culture (Kafai & Burke, 2013). From a media production perspective, remixing is a process of reworking and combining existing creative artifacts in the forms such as music, video, and other interactive media (Dasgupta et al., 2016). As a social process, remixing is essentially participatory. Markham (2013) described remixing as a practice of sampling, borrowing, and creatively reassembling resources to persuade others, which is highly supported by social media and open educational resources (Casey & Wells, 2015). Therefore, remixing is dialogical, intertextual, and relational. In this paper, I conceptualize remixing in a culturally centered learning environment as a circular learning process as learners (1) experience and interact with the broader learning environment and resources, (2) create multimodal meaning systems in their design work, and (3) expand their knowledge, experiences, and relationships with culture.

Experiences of and Interactions with the Broader Learning Environment and Resources

Remixing is a process of experiencing and interacting with the broader learning environment. For example, in the context of K-12 programming learning, learners are able to engage with others' works and resources in learning communities such as Scratch (Kafai & Burke, 2013). Deep engagement with learning resources, such as others' work, is essentially a social learning process. Kotsopoulos and colleagues (2017) defined remixing as experiences "involving the appropriation of objectives or components of objects for use in other objects or for other purposes" (p. 154). Being able to identify usable objects from others' work demonstrates learning and suggests substantial advancement along a zone of proximal

development (Kotsopoulos et al., 2017). In a culturally centered learning environment, I expand remixing as a way of engaging, which broadly includes learners' engagement of collective experience and multiple resources (both physical, semiotic, and cultural) in the learning activities as well as cultural knowledge and representations, including both one's own and other culture.

Creating Multimodal Meaning Systems

Through remixing, learners can create meaning systems to repurpose the multimodal project for their own. In this paper, I look at a series of culturally centered multimedia projects that learners created with the use of multimodal tools that support the development of meaning-making systems. Researchers believe remixing is fundamentally multimodal. For example, “when youth program games, animations, interactive art or digital stories, they not only create program code or texts in the traditional sense but also engage in creating, repurposing and remixing multimodal representations” (Kafai & Peppler, 2011, p. 90). Multimodal literacy scholars challenge the traditional written and oral concepts of literacy by ascribing to the idea that new media and technologies are “increasing complexity and inter-relationship of different modes of meaning” (New London Group, 1996, p. 79). Although all meaning-making is multimodal (Jewitt, 2006), the development and ubiquity of technology not only changes how we make meaning, and the layers of meaning that can be made. I regard learners' remixing through representation as a process of creating multimodal ensembles (Kress et al., 2005) with the remixing of multiple semiotic resources (Kim et al., 2021). In this study, I examine how youth represent their relationship with culture through remixing semiotic resources (Kress, 2009) across different modes, layering, and genres of representation (Hafner, 2015).

Expanding Experiences, Knowledge, and Relationships

Remixing is a process of imagination and reimagination (Yang, 2012). Through remixing, youth can reimagine their social-emotional experiences. Kim and colleagues (2020) examine how students remix elements in their digital stories to their own meaning to communicate emotions that are otherwise challenging to express. The process of remixing one's own story and voice further contributes to the democratization of classroom knowledge. For example, Kreitz (2017) engaged students with remixing, reassembling, and reimagining the archival record of Latinx history to unsettle historical knowledge from the colonial knowledge regime. In this paper, I focus on reimagining as a key process that learners develop relationships with culture in a culturally centered learning environment.

Methods

Learning Site and Participants

This study was conducted via a multiyear research-practice partnership (RPP; Coburn & Penuel, 2016) with a multicultural team of researchers, educators, and designers in the context of developing a culturally centered learning environment for sixth graders in an Experiential Learning School (ELS). The ELS is a public charter K-6 elementary school located in the Mountain West with a commitment to “providing a learning environment that allows and encourages children to explore connections between their learning and the world around them”. The student demographics of the school are 86% White, 5% Multiracial, 6% Hispanic, 1% Black or African American, 2% Asian, 1% American Indian or Alaska Native, and 0% Native

Hawaiian or Other Pacific Islander with 18% economically disadvantaged and 13% with individualized educational program.

Two classes from the sixth grade were invited to this study. Parent(s) and guardian(s) of 29 students consented to this study. I randomly selected 12 students, who assented to participate, and followed their experiences throughout the school year. Participants were 11-12 years old at the time of data collection. Eleven of the students identified themselves as White. One participant identified himself as Asian and later changed to Asian American.

Case Study Approach

Motivated by the main purpose of the study and to illustrate the different ways in which culturally centered multimedia projects mediate participants' relationship with culture, I use the case study approach to guide this work. A case study approach allows the integration of multiple sources of evidence to construct meaning (Stake, 2008) of students' culturally centered multimedia representations. A case, in this study, is bound by data available about one final product of a multimedia project. With students' *relationship with culture* as the unit of analysis, I conducted an intrinsic case study (Stake, 2008) to build an understanding of students' multimedia projects. I, then, take cases as instrumental (Stake, 2008) to compare across cases.

Multimedia Learning Activities

I focus on three culturally centered multimedia projects for the sixth-grade curriculum, which spanned from September 2021 to May 2022. (1) The San Juan Digital Story Project is a digital storytelling project for students to create stories about their river trip experience. Each student started to plan and prepare their stories during the trip and finished with the project when

they were back in the classroom. (2) Ancient Civilization Podcast is a group project designed for 2-4 students working in a group to create a podcast to introduce one ancient civilization that their group chose to do research on. (3) Personal Culture Augmented Reality is a project for students to share their own culture over the school year. Students first engaged with the project during their first week of class and created a visual representation of their culture called the “Cultural Wheel” and they (re)engaged with this activity at the end of the school year. The highlight of this project is the interactive AR experience that each student created based on the Culture Wheel activities.

Data Collection

I collected three data sources for this study, including students’ multimedia design work, interviews, and fieldnotes over the school year. Students’ multimedia design work includes both planning documents and the final products from three culturally centered learning activities co-designed by our broader team. I conducted interviews across three timepoints (the beginning, the middle, and the end of the school year). The series of interviews capture students’ responses and descriptions of the design process, the purpose of their design works, their understandings and experiences of culture as well as their design identity. I also took fieldnotes during the classroom observations of their projects and presentations.

Data Analysis

Informed by the bidirectional artifact analysis approach (Halverson & Magnifico, 2013), I identified each student’s final multimedia product as an artifact. I constructed the artifact and data relevant to the artifact as a case (Stake, 2009). Remixing at the project level can result in

different forms of symbolization of culture. In order to understand the ways in which students engage in remixing, I examined how culture is symbolized in each artifact. Thus, to identify students' relationship with culture, I focus on diverse forms of symbolic practices and processes, through which representation, meaning, and language operate (Hall, 2020). Specifically, I examined each case in both a "backwards" and "forwards" direction overtime on two levels. On the individual artifact level, to identify students' relationship with culture, I traced threads of meaning across the two data types that were collected at different time points: the artifact and the interviews conducted after they completed a project. On the project level, to identify how these projects afford the development of students' relationship with culture, I took the sequence of the projects as progressive in the order of time. Through a constant comparison (Fram, 2013) of each artifact, I present two cases from each project to illustrate the range of ways that students symbolize their relationships with culture. These cases were selected to be illustrative of the diverse forms of symbolic practices and processes with which students engaged through each project.

Findings

This study aims to understand how culturally centered multimedia projects mediate students' relationship with culture. To share findings from this analysis process, I present the following six cases to illustrate the different ways in which these remixing projects mediate students' relationship with culture throughout the process of symbolizing, which leads to the reimagining of their relationship with culture. Across these cases, I identify three forms of *symbolism* that these projects afford: (1) symbolizing other culture, (2) symbolizing with own

culture, and (3) symbolizing own culture. For each project, I present two cases to illustrate students symbolize their relationships with culture. With a comparison across cases, I identify that *reimagining* an adaptive relationship with culture, a way to relate to culture as a holistic system, is a key affordance shared by these culturally centered multimedia projects.

Section 1: Symbolizing Other Culture: Remixing for Digital Stories about the San Juan River

In the San Juan Digital Story Project, each student created a story about their San Juan River trip experiences. The teachers structured their river trip as a hero's journey by incorporating a narrative arc that includes elements such as the main character being called to adventure and going through challenges, temptations, transformation, atonement, and return. The hero's journey structure serves as a narrative resource that is complementary to Indigenous storytelling. During the trip, both students and teachers learned about Native stories as their collective experience. These stories are another piece of narrative resource on how to use a story to explain the phenomena that they observed. In addition to narrative resources, both teachers and students took digital pictures during the trip that students used for remixing. Students were asked to develop their own digital stories inspired by the hero's journey structure.

In the San Juan Digital Story Project, students symbolized Native cultures that they learned about and experienced during the river trip. Across the 12 projects included in the study, students demonstrated a range of ways to represent their own experiences and other cultures: some focus more on a recollection of their own experiences while others are more devoted to depicting a Native cultural space. The process of creating representations of the river trip experiences supports the development of students' adaptive relationship with culture. In this

section, I present two cases to illustrate how students symbolized their relationship with other culture through (1) creating settings and (2) perspective taking.

Case 1 *Scorpion Cricket Journey* – Creating a Setting of Other Culture

Figure 10

Scorpion Cricket Journey



Scorpion cricket journey

Evan created a digital picture story entitled *Scorpion Cricket Journey* (Figure 10). In this story, the main character Bob is a cricket who wants to become a scorpion and scare humans in the area. To achieve this goal, Bob grabbed pinchers, an exoskeleton, and a stinger to tie to his body. Bob met with two kids, Sam and Kia, who noticed that Bob doesn't look like a scorpion. Sam attempted to catch Bob, but Bob told Sam that he wants to become a scorpion to scare humans. To help Bob, Sam used some hot glue securely attach his camouflage. With his new look, Bob was able to scare Kia. The story ends as Bob and Kia went home for dinner and Bob continues to frighten more humans.

Evan remixed multiple resources to share his river trip experiences. His story connects with the observations of the insects, which is a key experience shared by the whole class during the river trip and guided by the observation activity for their science learning goals. To share his observation, Evan put a remix of some drawings (Figure. 11) over a photo of grass at the beginning of the story, which he intends to show where cricket lives. He particularly focused on the different appearances of two insects, which drives the development of the plot that the main character Bob, a cricket who wants to become a scorpion. Evan's story also explains why humans are scared by insects from the perspective of fictional characters, as Evan wrote in Bob's voice, "Sam, I finely scared Kia yes! I am going to scare more people. Bye Sam" (Evan, the Digital Story Project). These examples illustrate how Evan engaged with experiential, narrative, and multimodal resources from the river trip.

Figure 11

Evan's Illustration of the Story Setting at the Beginning of the Story



Etiam Sit Amet Est
Donec Quis Nunc

Hi, i'm Bob the cricket and I want to be a scorpion. So let's try and become one. I'm going to grab pinchers, exoskeleton, and stinger. I'm going to grab some string to tie it to me.

In Evan's digital story, he symbolized Native culture by creating the setting of the story on the Native land. On the last page, Evan shared a drawing of the setting of the story. As Evan explained in the following exchange, he created an illustration of the land where the story took place. In the illustration, Evan used brown and red colors to show the land and rocks and blue for the river area. Evan particularly explained his experience visiting the places where Native Americans lived and built the cave houses, which was a stop during the trip for them to learn about ancient Native cultures:

Evan: That is a picture of where the Native Americans live.

Interviewer: This is where Native Americans live?

Evan: It's one of the things our teacher sent us, that photo, and I drew over it, and it was just one of the places that they built their houses.

Interviewer: Wow. This is a river.

Evan: Mm-hmm.

Interviewer: This is land.

Evan: Right here. It's in a cave, a building.

Interviewer: Kind of inside, the lighter color inside, and these are the rocks. Wow, that's interesting. How does that relate to your story?

Evan: It relates to where the humans live.

(Evan, Interview, Time 2)

Figure 12

Evan's Illustration of the Story Setting at the End of the Story



Evan reimagined his relationship with Native culture through symbolizing, particularly the Native land. Across different modes, this digital story shows that Evan started to relate with Native Americans as he reimagined his activities on Native land. The process of relating spans a chain of symbolizations. Evan first showed grassland (Figure 11), a small niche where the interactions of the main characters take place. He then used another drawing to show a zoom-out view of the place as the ancient cave on Native land (Figure 12) as the actual setting of the story. Through creating these layers of symbolization, Evan reimagined his relationship with Native culture through the land-based connection.

Case 2 *The Girl Who Painted the Rocks* – Perspective Taking with Other Culture

Figure 13

The Girl Who Painted the Rocks

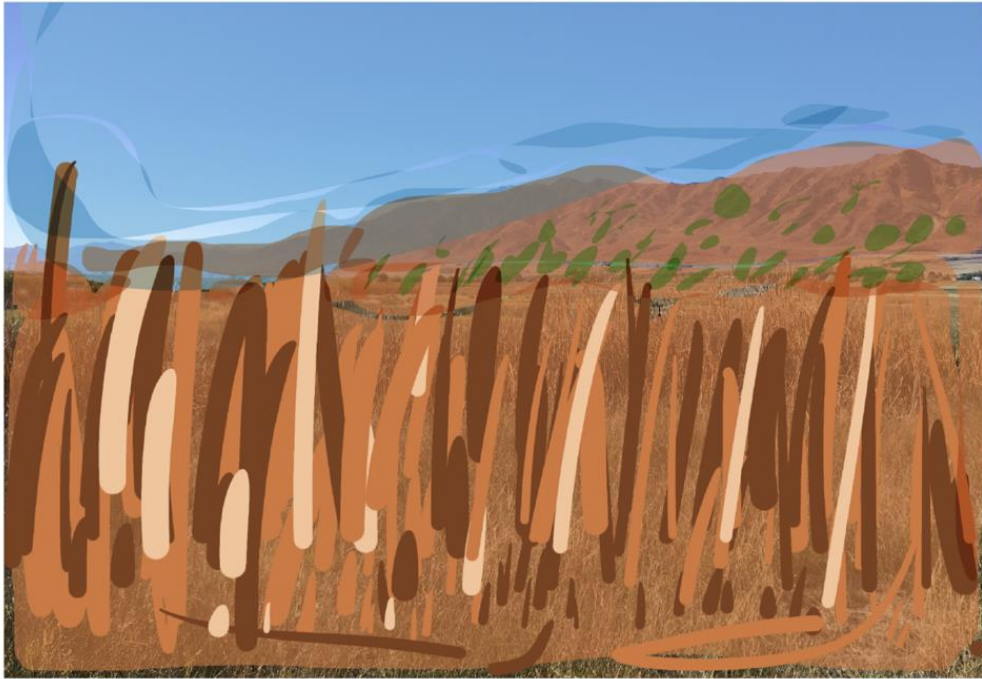


The Girl Who Painted the Rocks

In *The Girl Who Painted the Rocks* (Figure 13), Savannah created a story focused on a Native girl Nightfall who lived on San Juan Hill. One day, Nightfall was told by her family that they had to leave and find a new place to live. They smashed the pottery in their house and set off on their canoes. However, Nightfall got lost from others and ran into the Elders of the Anasazi, their ancient enemies. To punish Nightfall for trespassing on their land, Nightfall was forced to cover the Navajo Sandstone with varnish. While applying the varnish, Nightfall saw a great blue heron and did not realize that she dropped all the varnish on the Anasazi Elders who immediately turned into vultures. In the end, Nightfall was able to get back to her canoe and find her Shima (mother). And people can still see the varnish that Nightfall spilled on the Navajo Sandstone.

Figure 14

Savannah's Illustration at the Beginning of the Story



There once was a girl named Nightfall. She had long dark brown hair that she always wore in a long braid down her back. Nightfall was very forgetful and forgot everything. She lived in a house up by San Juan Hill.

Savannah's story remixed multimodal resources and ways of storytelling to show her river trip experiences. She shared the collective river trip experiences that are key to the plot of this story. The story focused on the observation of red rocks in the area, particularly on the formation of varnish-like marks on the rocks (Figure 15). Savannah wove the experience of canoeing as a class into the story. In this story, canoeing is also described as both a collective experience and an individual experience, "the people got in their canoes and set off to find their new home. On their way, Nightfall took a wrong turn. She had forgotten where to turn and ran into the Elders of the Anasazi, or ancient enemies" (Savannah, the Digital Story Project). Although people set off on their canoes as a group, Nightfall got lost and had to canoe by herself.

Nightfall's challenge shows both a collective and an individual perspective of the experience. Savannah's story explains how the colors of the rocks were formed.

Figure 15

Savannah's Illustration at the End of the Story



Savannah symbolized the experience of Native cultures in the river trip area, which demonstrates the cultural knowledge that she learned. As a class, Savannah visited the ancient ruins of Native houses, based on which she created a story context for this practice, as she wrote, “One Day, Nightfall’s Shima, or mother, told her that they had to find a new place to live. She listened to Shima and went to grab her things and got ready to go. The people got all of their pottery and went to the top of the hill and smashed the pottery” (Savannah, the Digital Story Project). In this excerpt, Savannah created a specific context for the cultural practice “smashing pottery”, a piece of cultural knowledge that she learned from the river guides during the trip.

Savannah later shared “I got the idea from the river house because there was like a house with lots of people. So, it was like a village house thing. Then I saw that they smashed pots when they were leaving. So, people knew that they were there. So, I got my idea from that” (Savannah, Interview, Time 2). In addition, Savannah also constructs Nightfall’s native identity through the use of Native language to demonstrate relationships. In this same excerpt, Savannah used the Navajo word “Shima” for mother. This language choice first demonstrates Savannah’s knowledge of Native culture. It further shows how Savannah attempts to demonstrate the interpersonal relationship between Nightfall and her mom.

Savannah reimagined her relationship with Native American cultures through perspective taking. In her literary space, Savannah reimagined her river trip experience from the perspective of the main character who is a Native girl, Nightfall. As a practice of perspective taking, Savannah constructed Nightfall’s interpersonal relationships and contextualized the cultural practice of “smashing pottery” by imagining the meaning of the practice to people from the cultural community. Savannah built these meaning systems that symbolize Native culture, which allows Savannah to develop a relationship with Native culture.

Summary: Case 1 and Case 2

Case 1 and Case 2 demonstrate students’ reimagining of their relationship with Native cultures through symbolizing their experiences in the river trip area, which contributes to their development of an adaptive relationship with culture. Evan symbolized Native culture more as the setting and the background of his story by alluding to Native land as where the story took place. In contrast, Savannah demonstrated an adaptive relationship with culture, as she created a fictional story space from the perspective of a Native girl, which allows her to symbolize a

Native cultural space in the story. Although the two forms of symbolization are different, both cases demonstrate how Evan and Savannah reimagined their relationship with Native cultures through remixing.

Section 2: Symbolizing with Own Culture: Remixing for Ancient Civilization Podcasts

In the Ancient Civilization Podcast Project, students worked in small groups (2 to 4 members) to create a podcast about one of the ancient civilizations they explored. Students first gathered information for their podcasts by conducting structured research on the topic. Based on their research, they create a single-paragraph outline of their findings, with which they developed scripts for their podcast.

These podcast projects are a remix of recordings, music, and audio effects from GarageBand, their own recording, their knowledge of ancient civilization, and personal observations of their own culture. The podcasts from the twelve participants and their partners cover the following topics: ancient Vikings, ancient Egypt, Ancient Japan, ancient Machu Picchu, ancient China, ancient Greece, and ancient Mesopotamia. In their podcasts, they shared knowledge of the government, religion, technology, and geography of ancient civilizations. They also reflected on different aspects of their culture and life, including lifestyle, living in the Mountain West, technology, language, sports, and fashion. In this section, I present two cases to illustrate how students create symbolization with their own culture through (1) recontextualizing other culture and (2) displacing their own culture.

Case 4: *Life in Machu Picchu!* – Recontextualizing Other Culture

Figure 16

Life in Machu Picchu! Podcast Cover



Playing

000-Episode Name: Title of Episode

For the ancient civilization project, Savannah worked with her partner on a podcast about ancient Machu Picchu (Figure 16) through remixing. Their podcast started with a short pop music clip from GarageBand. In a dialogue style, they talked about how they perceived the culture of the state they live in as different from Machu Picchu as well as topics on the religion, technology, and government of the Inca people. Their Podcast ends with a commercial on Machu Picchu showers.

Savannah and her partner symbolized other cultures through introducing Machu Picchu alongside reflections on their own culture. They first oriented their audience that they would talk about the differences they observed from ancient Machu Picchu culture:

Culture [of a state in the Mountain West] or anywhere where you live or know has many different cultures but in Machu Picchu, they have way more than you'd think as you read and find that they have many different things than just Machu Picchu itself. There are many different objects and many different materials in Machu Picchu and we hope you enjoy it. (Savannah, the Podcast Project).

As shared in the excerpt above, they emphasized the range of ways that Machu Picchu culture could be different from the culture of the state they currently live in. They further explained these differences in terms of technology, religion, and government:

Our civilization is different because all houses have their own showers, and you don't have to share the shower with your neighbor. We also have phones and iPads. We are different from the Inca people in many ways. Their government is different from ours because they have royalty, and we have a president. In my culture, we go to church on Sundays, and we drive to church in our car, in their time they walk up to the hill to go to their temples. (Savannah, the Podcast Project).

As a group, they constructed the Machu Picchu shower as a cultural symbol in this project. Savannah and her partner mentioned it several times throughout the podcast and their ending commercial is about Machu Picchu shower. The Machu Picchu show is a technology that bridges the two students' own culture and ancient culture. In their podcast, they introduced the Machu Picchu shower in the following description, "the Inca people had showers that were located at the top of the hill, so the more wealthy people lived at the top where there were showers. Then the more poor people live at the bottom" (Savannah, the Podcast Project). In a post-project interview, Savannah shared more details about her knowledge of Machu Picchu shower, as she explained "they created showers out of like rocks and stuff and they just had a bucket on top, poured it down, and they had a bathroom and stuff" (Savannah, Interview, Time 2). Although constructed differently, the shared function of Machu Picchu shower and a modern shower stood out to Savannah and her partner. They also shared these differences in their

podcast, “our civilization is different because all the houses have their own showers and you don’t have to share the shower with your neighbor” (Savannah, the Podcast Project). This similar yet different experience with the shower demonstrates their relationship with ancient Machu Picchu culture through this particular piece of technology. Savannah further shared the intention of focusing on Machu Picchu power is to demonstrate “how smart the people that lived in Machu Picchu were” (Savannah, Interview, Time 2) and “they can create stuff. Like, they created stuff that we have now so it shows, you know, they are smart and stuff” (Savannah, Interview, Time 2).

In their commercial of the podcast, Savannah and her partner recontextualized the Machu Picchu shower with a modern commercial tone:

Do you need a new shower? If you do, get a relaxing shower from Machu Picchu. We have the best showers and they are so relaxing! Contact Alpaca Showers for more information. (Savannah, the Podcast Project).

In the context of a fictional Alpaca Showers company, Savannah and her partner intersect the ancient and modern experiences in this commercial. Machu Picchu showers are represented by modern commercial culture. The commercial starts by highlighting the needs of customers (“do you need a new shower?”) and the function of the product (“so relaxing”). Savannah later added the custom service part in the interview, “Buy Machu Picchu showers. We can come and install them right in your house. It’ll only take up a few feet” (Savannah, Interview, Time 2). Therefore, the commercialization of Machu Picchu shows how they represent ancient technology through their modern cultural experience.

Furthermore, Savannah and her partner also acknowledged that they failed to represent Machu Picchu culture with the mode of music. Savannah shared that “we tried doing kind of like pop music because in a podcast, it kind of has that kind of pop kind. Yeah, because I couldn’t think of any Machu Picchu music” (Savannah, Interview, Time 2). This reflection demonstrates a relationship between their design decision and limited cultural knowledge.

Savannah and her partner reimagined their relationship with other culture through symbolizing Machu Picchu with their own culture. They described multiple cultural symbols of Machu Picchu from the process of contrasting Machu Picchu with their own cultural context. In particular, they created a commercial about the Machu Picchu shower, a key symbolization of their project. In their commercial, they symbolized the Machu Picchu shower with a modern commercial context, which demonstrates how they reimagined relationships with both other culture and their own.

Case 4 *The Ancient Vikings*– Displacing Own Culture

Figure 17

The Ancient Vikings Podcast Cover



In their remixing podcast project about the Ancient Vikings (Figure 17), Jackson and his partner started by talking about the contrast of living in their Mountain West state with what life might look like for ancient Vikings. As a group, they shared their knowledge of ancient Vikings, particularly on their boats and ships, religion and worldview, as well as their contribution to developing a democratic society. They selected a music clip from GarageBand for the opening of the podcast and used voice change effects in the commercial.

Jackson and his partner symbolized other culture through identifying several contrasting aspects between their own culture and Ancient Viking culture. At the beginning of their podcast, they described their experience living in a state in the Mountain West and contrasted this experience with ancient Vikings:

I have lived in [a state in the Mountain West] my whole life. I was born in [a city], and I've lived there with my family for all the 11 years I've been alive. Unlike me, however, the ancient Vikings traveled around a lot. They were explorers and raiders, and a lot of their life was spent at sea. There are lots of things people don't know about the ancient Vikings, and it is important to learn about them. (Jackson, the Podcast Project).

In the excerpt above, they shared the observed differences between their daily life and ancient Vikings in terms of traveling. They suggested that ancient Vikings had a different culture as their lifestyle is different. They described ancient Vikings as explorers and raiders spending life at sea, which is different from the lifestyle in the mountainous area that they lived in. Jackson further explained the purpose of sharing differences he learned in an interview, "well, kind of very culture, every civilization is different, but also, some of them are similar. They each

had their own similarities and differences to make them their own civilization or own culture. But they had some of the same beliefs or the same technology” (Jackson, Interview, Time 2).

As an example, Jackson and his partner talked about boats and ships as key symbols of ancient Viking cultures. “For their time, the ancient Vikings had pretty advanced boats and ships, and believed that a bunch of worlds were connected by a gigantic tree. They built long ships that were quick and easy to build, made out of wood with a figurehead in the shape of a threatening creature.” (Jackson, the Podcast Project). In this excerpt, they described that ancient Vikings had “advanced” boats and ships, which shows how they relate with ancient Vikings via technology. They also described the ships as “with a figurehead in the shape of a threatening creature”, which indicates their attention to the differences in specific ancient cultural context.

Jackson and his partner focused on Viking shields as a key symbol of ancient Vikings. By the end of the podcast, they presented a commercial from Erik’s shield shop:

Come on down to Erik’s shield shop. We’ve got all your Viking shields. Wood shields, metal shields, smiley face shields, and, for a limited time only, a Captain America shield for only 35 dollars. Come down to Erik’s shield shop today!
Batteries not included. (Jackson, the Podcast Project).

In this commercial, Jackson and his partner created a fictional Viking shield shop as the context. Among the range of shields that they advertised, they highlighted the Captain America shield as a limited-time-only commodity. Jackson shared that they came up with an idea as they learned about different Viking shields, “the Viking shields had different paintings or designs on them, so we just thought it’d be cool if we changed that a little bit and made a commercial about

different shield designs and stuff... I did a little bit [of research], and we just saw drawings or whatever of different shields. They all looked different, so we got our idea from that” (Jackson, Interview, Time 2).

Displacing Captain America shield in another context is an intentional design decision. Jackson further explained that the function of describing the Captain America shield is to create funny effects. “We thought that would be funny because they had round shields a lot. So, the thought it would be funny if we just put a Captain America thing in there because that’s something we have today” (Jackson, Interview, Time 2). In fact, the Captain American shield also shows how their daily experience connects with ancient culture. “It’s just a well-known shield if you’ve seen Captain America or if you know about Captain America. So, we just thought that would be a funny little thing to put in there. It was really just to be funny” (Jackson, Interview, Time 2). For this commercial, Jackson and his partner created the funny effect by inserting cultural symbols of ancient Vikings from their current times into the context of ancient Vikings that they created throughout the Podcast.

Jackson and his partner reimagined their relationship with other culture by symbolizing with their own culture. They symbolized ancient Viking culture with an understanding of their own culture which is particularly highlighted in their Podcast commercial. They presented a perspective of their own culture from a distance and displaced the Captain America’s shield into a fictional ancient context. The process of symbolizing supports how they reimagined relationships with both their own culture and other culture.

Summary: Case 3 and Case 4

The two cases demonstrate how students symbolized ancient cultures with their own culture, particularly through their connection with two pieces of technology: shower (Savannah)

and shield (Jackson). Both Savannah and Jackson shared their observed similarities and differences between their culture and ancient culture. They both complicate their relationship with ancient culture through problematizing simplified contrast. For example, Jackson acknowledged the limitation of living in one area to show the importance of learning about other cultures. And Savannah's discovery that showers are not a new technology. In their commercial, Savannah used the contemporary cultural space that she is part of by using the genre of language that is typical of how we broadcast an advertisement to represent Machu Picchu showers. In contrast, Jackson created a fictional ancient shield shop context, in which he highlighted the Captain America's shield, a symbol of contemporary pop culture. The process of remixing through blending genres and layers demonstrates students' reimagining of relationships with their own culture and other culture.

Section 3: Symbolizing Own Culture: Remixing for the Personal Culture Augmented Reality Project

The Personal Culture Augmented Reality Project is a culminating project for the whole school year. At the beginning of the school year, each student completed an initial representation of their culture and identity, using a template that their teacher created (Figure 18) for the Cultural Wheel activity. By the end of the school year, they revisited this activity and created a new version of the cultural wheel. To facilitate reflections during the Time 2 Cultural Wheel, their teacher designed a reading activity with two essays from popular authors. Each student created an interactive Augmented Reality Merge Cube experience to share their personal culture. They designed the interactive experiences on the CoSpaces platform through remixing a Merge

Cube template “All about me” and a range of visual and audio resources available on the platform (Figure 19).

Figure 18

The Culture Wheel Template

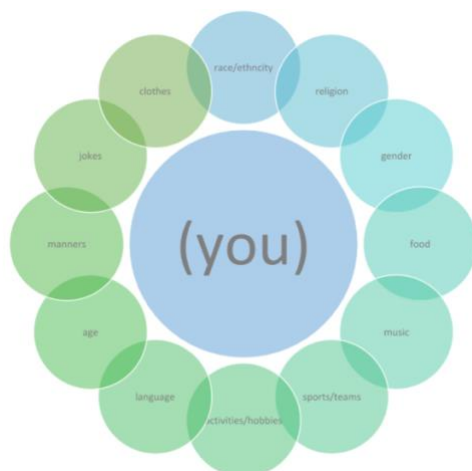


Figure 19

Teacher's Merge Cube Example

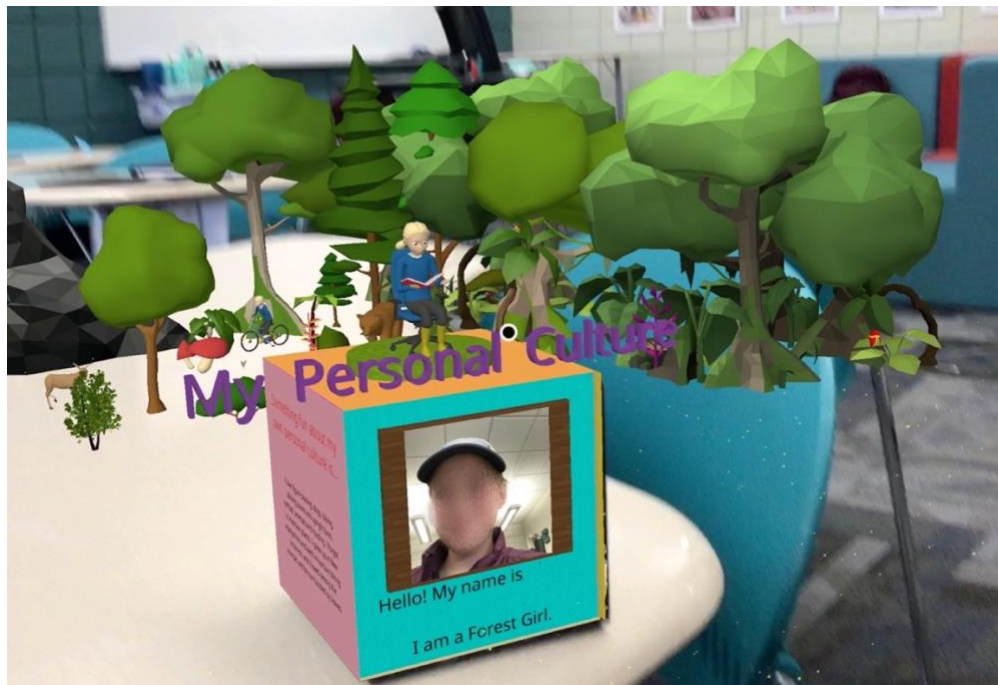


For their projects, students were prompted to share a one-sentence statement of their personal culture and created an audio recording to describe their personal culture. They also designed and arranged the following elements on different sides of the cube: a selfie, a playground poem they created about spring and campus, something fun about their culture, and the project that they are most proud of during the school year. In this section, I share two cases to illustrate how students symbolized their own culture through (1) reconnecting with a previous relationship and (2) identifying new relationships.

Case 5: “I am a forest girl” – Reconnecting with Previous Relationship

Figure 20

Annabelle’s Merge Cube



For the Personal Culture Augmented Reality Project, Annabelle created an immersive and interactive experience to share her culture, which centers on the symbolization of her culture as a “forest girl” (Figure 20). Annabelle created a 3D avatar of herself reading a book with a drop of a forest. In her virtual forest, she put a rock arch, trees, animals, and herself circling in the forest. On the front of the cube, Annabelle put a statement about her personal culture “I am a forest girl” along with her selfie and name. On one side of the cube, she shared more about this experience, “I grew up in [State] and went mountain biking in forests and I loved seeing animals and being surrounded by leaves” (the AR Project). To explain more about herself being a “forest girl”, Annabelle added the following audio statement, which would be played once the interactive experience is in the display mode.

My personal culture includes biking, softball, dogs, and more. I used to live in [State] where me and my family would go biking through dense forests just outside of the [University] campus which was near my house. I also love playing softball and watching baseball. The Red Sox are my favorite team and they made me fall in love with playing softball with all of the talent they possess. We currently own three dogs, and they might just be the only reason I get up in the morning. I always miss [State] so sometimes I question whether or not I remain a forest girl, but I know that no matter how far away from home I am, I will stay a forest girl. (Annabelle, Voiceover from the AR Project).

In her project, Annabelle focused on symbolizing her relationship with the forest among multiple relationships with culture that she shared. She highlighted this important relationship of her culture through the immersive environment across multiple modes, such as visual and audio.

In particular, she designed a virtual forest and verbally explained her connection with the forest, which creates an immersive experience that centers on this relationship. In her cultural statement as “a forest girl”, Annabelle used a similar statement from the Personal Culture Essay, “River Girl”, which they read together as a class.

Annabelle reconnected with this relationship, as her relationship with culture evolved over the school year. On the first culture wheel that she created at the beginning of the year, Annabelle filled the Culture Wheel with different aspects of her culture and identity. However, these elements demonstrated a limited relationship with her own culture. In an interview after the first Cultural Wheel activity, Annabelle shared that “I don’t really know” (Annabelle, Interview, Time 1) in response to a question asking her to describe her culture, even though she had already created a cultural wheel.

Annabelle’s relationship with the forest emerged as she explored the influence of previous family experiences on her own culture. She became able to identify relationships with her own culture, as she began to share more about her hobbies and the different places her family lived. During the middle of the school year, Annabelle reflected:

Some of my hobbies are: I like playing piano; I love ice skating; I like playing softball. A lot of that would have changed because I was originally from [State], and then we moved to [State], and then we moved here. I also like playing bass and I might not have ended up doing that. That so far has been a really big part of my fourth- to sixth-grade years. Music has been part of my family for a long time. (Annabelle, Interview, Time 2).

Here, Annabelle describes her culture by sharing her hobbies. In particular, she also demonstrates the awareness that some hobbies are shaped by her family. Over the rest of the school year, Annabelle related to her family culture more as she talked about past experiences.

Annabelle's trajectory of relating more with her family leads to the identification of her cultural relationship with the forest, which is supported by the process of designing the Augmented Reality experience, as she reflected:

I think it [the project] made me miss [State] a lot more, because that was where I grew up. On the culture cube, I called myself a forest girl. Me and my family used to go mountain biking through the forests a lot, maybe every Sunday afternoon or whatever, and it's right by my dad's work. That was nice. My sister and my dad would just go mountain biking. My mom didn't really like mountain biking. My little brother was way too young. He was one. He couldn't even walk. He didn't come along. Neither did she. We'd just go mountain biking a lot. My forest was my backyard, part normal backyard, and the rest was the forest. I grew up in a forest a little bit, and the street, you could barely see the houses. Yeah. There are barely any forests I'm used to here. Yeah. Then, also, I figured out that I like doing other things, too. (Annabelle, Interview, Time 3).

Annabelle shared a detailed recollection of her previous experience living adjacent to the forest, as she shared that "it made me miss [State] a lot more" (Annabelle, Time 3). She also described her relationship with the forest through saying "my forest was my backyard, part normal backyard" (Time 3) and "I grew up in a forest a little bit" (Annabelle, Time 3). The connection to these previous family experiences deepens her relationship with her own culture.

Annabelle’s reimagined relationship with her culture through reconnecting with the previous relationships. Looking across the school year, her relationship with her culture evolved from a limited relationship to gradually being able to articulate her cultural identity. In particular, the process of the project supports her reconnection with her prior family experience living in another state and how family activities in and close to the forest yield special personal meaning. Symbolizing this piece of her culture reveals how Annabelle reimagined her relationship with her own culture through reconnecting with previous experiences.

Case 6 “My culture is me” – Identifying New Relationship with Culture

Figure 21

Shawn’s Merge Cube



In this project, Shawn created this Merge Cube experience to share multiple relationships with his culture (Figure 21). On the top of the cube, he put an avatar of himself riding on a tiger

with an eagle on the shoulder. He created an expansive lake at the back of the cube with different boats and ships. He also designed a virtual island of dinosaurs and some trees and rocks nearby. On the front of his cube, there is a drawing of himself and a statement: “Hello! My name is Shawn! I am a musician!” On the left side of the cube, Shawn described the fun part of his personal culture, “something fun about my own personal culture is that I really like music and fencing. I really like the San Juan trip” (Shawn, the AR project). On the other side, he presented his favorite project of the year and a playground poem. Shawn provided an audio description of his personal culture:

My personal culture is about nature and music. Nature is mostly made up of tiny little parts, which make up the big picture. Like a lot of things in life. Nature is relaxing to look at because it’s actually made up of little parts. When you look closer, there are actually little fountains surrounding my picture. Like nature, music is made up of little parts. When you hear the whole piece of music, it sounds really cool. But all of it can be broken down into individual notes, and those notes build up the whole song. There weren’t many music options in CoSpaces, but if you look close enough, the dinosaurs on my island are dancing, something related to music. Even the old man on one of the boats is dancing. My personal culture is nature and music. (Shawn, Voiceover from the AR Project).

In this statement, Shawn emphasized his relationship with nature and music as his personal culture. He provides more verbal explanations about his relationship with music and how he visually symbolizes this relationship due to limited musical resources on CoSpaces. In particular, he symbolized his culture through the relationship with nature as a highlight of this

interactive experience that CoSpaces platform affords. Shawn described this intention during the Gallery Walk session. He shared that,

Back there. I really like nature. So that lake behind there is what I am trying to highlight. I added a shark and dolphins because they are endangered animals. Yeah, I just like preserving endangered animals. And I am also riding a tiger because I like tigers and with a sword because I like fencing. And back here, there's a bunch of nature stuff and dinosaurs. (Gallery Walk Presentation, 05//2022).

He commented on this symbolization process, in fact, supported him to represent richer meaning, as he reflectively shared “I learned that I can't say everything. Sometimes I need to put symbols on there, like the nature things” (Shawn, Time 3). He explained the relationship between nature and technology in his project, as he commented, “My Merge Cube is made up of nature. Technology and nature blended together in my Merge Cube” (Shawn, Interview, Time 3).

Shawn developed a relationship with nature as part of his own culture that evolved over the school year. On the first Culture Wheel, he created at the beginning of the school year, he identified himself as Asian. He related to his culture by identifying where his parents were from. In an interview after the Culture Wheel activity, he shared what he learned about his culture from his family, “there's a lot of good food. The language is a big thing since every culture has their own language. Each culture has different holidays like the Chinese New Year. They have different writing. That's actually language. They also have different music and stuff and clothes” (Shawn, Interview, Time 1). In this quote, Shawn identified several elements from the Cultural Wheel activity to describe his culture such as language, music, and clothing. For Shawn, he

expressed a desire to develop a more connected relationship with the Chinese culture, as he said, “like maybe spending a year or two in China because that's where the culture actually is. I mean, actually being there” (Shawn, Interview, Time 1). This wish to develop a relationship with China is supported by his belief that culture is connected to a place.

Shawn: Your culture stays the same, I think, where you are.

Interviewer: Cultures stay the same?

Shawn: Yeah, wherever you are.

Interviewer: Wherever you are. Great.

Shawn: Unless you change the way you live.

(Shawn, Interview, Time 2)

By the end of the school year, Shawn developed a more connected relationship with his own culture, as he commented on this relationship as “pretty connected, actually, because my culture is me” (Shawn, Interview, Time 3). This connected relationship not only refers to his relationship with Chinese culture but also the new relationships that he developed. Notably, Shawn shifted from identifying his cultural identity solely as a Chinese to Asian American this time (Shawn, Cultural Wheel Time 2), which happened simultaneously with his relationship with nature. And he described his relationship with nature as new to his relationship with his own culture, “I discovered that I like nature a lot more than I first thought at the start of the year. I’m going on hikes and stuff a lot. I never realized it. All of the Chinese stuff doesn’t change. It changed” (Shawn, Interview, Time 3). Shawn further explained the impact of field trips on this emerging relationship with nature. He reflected on these experiences, as he shared, “We went

hiking a lot. I learned a bunch about a bunch of stuff, like science aspects, and writing aspects. We had this journal and we had to write in it every day” (Shawn, Interview, Time 3). For Shawn, hiking is a way to relate to nature, “I liked when we were going hiking because it exercises me, and we get to be in nature” (Shawn, Interview, Time 3).

Shawn symbolized multiple relationships with his culture in this Personal Culture Augmented Reality Project. Over the school year, he demonstrated a shift in the relationship, as he changed from identifying himself as Chinese toward embracing multiplicity in his culture as an Asian American. This process happened alongside his development of a relationship with nature. Through symbolizing this new relationship with nature, Shawn reimagined a more connected relationship with his culture.

Summary: Case 5 and Case 6

The two cases demonstrate how students symbolized their relationships with their own culture, which evolved throughout the school year. Annabelle reimagined her relationship with culture, as she built a more connected relationship with her culture through identifying the impact of prior family experiences in a different state. Meanwhile, Shawn grew beyond relating to culture as family and developed a connected view of culture, as he embraced new relationships, particularly his relationship with nature. Both cases illustrate how students reimagined relationships with their own culture through symbolizing key changes.

Summary of Findings

These remixing projects allowed for different forms of symbolization of culture that mediate reimagining relationships with culture. By affording different engagements with culture,

these projects support the intertwined and reciprocal relationship with one's own culture and other culture, which we often assume are in competition with each other. Looking across the cases, I identified how this reciprocity plays out and contributes to developing an adaptive relationship with culture.

Forms of Engagement and Symbolization

Across the three remixing projects, students developed the intertwined and reciprocal relationship between one's own culture and other culture through three forms of symbolizing: (1) symbolizing other culture, (2) symbolizing with own culture, and (3) symbolizing own culture, which demonstrate different forms of engagement that these projects afford. The three projects spanned different time periods of the school year and afford the engagement with own culture and other cultures to different extents. Looking in terms of the time order, the San Juan Digital Story supported students' land-based experiences with the Native cultural perspectives. As the next project, the Ancient Civilization Podcast was designed with space for students to bring in an understanding of their own culture for introducing the ancient civilizations. Building on students' practice to share their own culture in the Podcast Project, the Personal Culture Augmented Reality Project, particularly the design of the Augmented Reality Merge Cube, takes representing one's culture as the main focus. The sequence of the three projects with a growing relationship with own culture, which is built on students' engagement with other culture.

Reimagining the Adaptive Relationship

This series of remixing projects support the development of an adaptive relationship with culture. The adaptive relationship describes how learners relate to culture as a holistic system

(see examples in Chapter 3). In the San Juan Digital Story Project, students reimagined their relationship with Native culture through depicting Native land as the setting of the story (Evan) or perspective taking with Native people perspective taking (Savannah). In the Podcast Project, both Savannah and Jackson reimagined their relationship with own culture and ancient culture through recontextualizing ancient culture with their own cultural context (Savannah) or displacing own culture in an ancient cultural context (Jackson), which demonstrates their understanding of culture as a system.

For the Personal Culture Augmented Reality Project, students reimagined relationships with their own culture through highlighting some key changes in the relationship. Although both Annabelle and Shawn focus on their relationship with nature to symbolize their culture, they demonstrate different learning paths. During the process of designing this project, Annabelle reconnected with her previous family experience to identify her culture. In contrast, Shawn identified new relationships as his experiences with culture expanded. Both cases show the process of relating with one's own culture as an evolving system. These six cases show different ways that the relationship with culture is reimagined, which illustrates how these projects can support the development of an adaptive relationship with culture.

Discussion

This study focuses on how culturally centered multimedia projects mediate youth's relationship with culture, which informs how learning activities can be designed to (re)center culture in a formal learning environment. The design of these multimedia projects builds on our multiyear exploration as a broader team toward making visible that the learning environment is a

cultural space and toward centering culture to be more just and culturally thriving for all learners (Bang et al., 2020). In particular, I synthesize findings to articulate in this paper that culturally centered multimedia projects can (1) support symbolizing as a multimodal and relational process, (2) deepen youth's relationship with their own culture, and (3) develop an adaptive and expansive relationship with culture.

Symbolizing as Multimodal and Relational

In this study, I identified different forms of symbolizing from youths' remixing works, which demonstrate their learning as multimodal and relational. In the process of creating symbolizations of culture, youth created, repurposed, and remixed (Kafai & Peppler, 2011) multiple resources such as their multimedia tools (e.g., GarageBand and CoSpaces) and narrative resources (e.g., Indigenous storytelling). Symbolization demonstrates youth's learning and engagement with culture, as they translated culture across modes (e.g., Native land in Case 1) or failed to map out culture with a certain mode (e.g., Machu Picchu music in Case 3). In addition, symbolization demonstrates learning when youth identified usable parts from others' work (Kafai & Burke, 2013). For example, Annabelle in case 5 adapted the essay "River Girl" to symbolize her culture as a "forest girl". This identifying process is fundamentally relational (e.g., Kafai & Karel, 1991), which shows the start or expansion of youths' relationships with culture.

Deepening the Relationship with Own Culture as Learning Pathway

I identified that youth's relationships with their own culture deepen over time from the analysis of their remixing works, particularly through different forms of symbolization. Looking

across time, the culturally centered multimedia projects afforded the following learning pathway: experiencing culture that is different from one's own (the San Juan Digital Story Project), leveraging their relationship with their own culture to engage with other cultures (the Ancient Civilization Podcast Project), and creating sharable experiences of their own culture (the Personal Culture Augmented Reality Project). This learning pathway illustrates how youth's relationships with their own culture grow in a broader learning environment that creates culturally disruptive "zone of contact" (San Pedro, 2018, p. 1207) for new or deeper relationships to take hold. In particular, this learning pathway contributes to an empirical understanding of cultural learning pathways — a chain of personal consequential activity and sense-making (Bell et al., 2012) — in a formal learning environment.

The development of youth's relationship with own culture also demonstrates how we can center and sustain (Paris, 2012) youths' diverse connections of knowledges. The six cases illustrated how youth gradually brought their own culture into the learning environment, which ranges from experiential, perceptual, familial, to historical knowledges. Therefore, this work contributes pedagogical experiences for centering youth's constellar knowledges (Arada et al., 2023) through supporting the development of their relationships with their own culture.

Building an Adaptive Relationship as a Process to Desettle Expectations

Research on desettling expectations has identified the importance of designing learning environments to engage youth with diverse ways of knowing and being beyond the Western-oriented paradigm (e.g., Bang et al., 2012; Althaus, 2020; Solomon et al., 2020). In this work, I identify the development of an adaptive relationship as the key affordance of culturally centered multimedia projects, which supports youth's engagement with multiple ways of knowing and

being (e.g., Van Manen, 1977; Bang & Marin, 2015). In this study, students developed an adaptive relationship to engage with other cultures vertically through time from ancient to contemporary as well as horizontally across multiple perspectives. In particular, when looking at the cases from the San Juan Digital Story Project and the Personal Culture Augmented Reality Project, there is a learning trajectory that spanned from reimagining relationships with nature through other cultures to becoming able to represent their culture through their relationship with nature. This trajectory illustrates a path of engaging with multiple ways of knowing and being through reimagining nature and land as fundamentally cultural and relational (e.g., Medin & Bang, 2014; Styre, 2011; Luig et al., 2011), which mediates youth's relationship with their own culture.

As their adaptive relationship with culture developed, youth demonstrated emergent justice-oriented awareness of culture (e.g., Allen-Handy et al., 2021), particularly through representing technologies as cultural. In cases 3 and 4, Savannah and Jackson mobilized two symbols, the Machu Picchu shower and Captain American, into the cultural space of their ancient or modern counterparts. This symbolization demonstrates the (re)engagement of technology as cultural, which disrupts the settled relationship with technology in a formal learning environment. As the broader educational discourse is concerned with the dehumanization and violence of racist technologies (Arada et al., 2023; Garcia, 2016; Wright, 2002) that center on modern Western technology and culture as the normative, supporting the adaptive relationship with culture is imperative in designing future-oriented learning environments that center on culture.

Implications

This study has implications for future research that intends to center youth's relationships with culture in a multimedia learning environment. The findings of the study indicate that multimedia technologies are not only expressive tools of culture but also support the development of multiple relationships with culture, particularly through the process of symbolization. Future studies could focus on modes and symbols as cultural to further identify youth's diverse ways of meaning-making. Furthermore, this study has implications for designing curricular activities for engaging youth from diverse cultural backgrounds through centering their relationships with culture and (re) connecting knowledges across settings.

CHAPTER 5 CENTERING RELATIONSHIP WITH CULTURE: MULTIPLE PAPER DISSERTATION

Summary of Findings

As designed spaces, formal learning environments are bound by knowledge, practices, and values rooted in the dominant culture. In both educational research and practices, however, formal learning environments are assumed to be acultural spaces, which normalize the Western-oriented values and approach as the standards (Bang et al., 2012). For example, the discipline of science is built on Western-oriented ways of knowing, but is actually shaped by privileged cultural, political, and historical beliefs and values (e.g., McNeil, 2005). As a result, the field of STEM broadly is facing constant challenges of effectively engaging learners from minoritized communities (Bang & Marin, 2015), due to deep epistemological tensions (e.g., Bang & Medin, 2010). Furthermore, the pragmatic setup of disciplines in formal learning environments has been considered as standards, which is also rooted in certain cultural and historical contexts (Warren et al, 2020; Litts et al., 2020). Therefore, formal learning environments often fail to serve the goal of supporting diverse ways of knowing and being, even though we widely claim the necessity.

Working alongside a multicultural team of researchers, educators, and designers, I focus on a series of culturally centered learning activities for sixth-grade classrooms in this dissertation. I intend to develop an understanding of how youth develop relationship with culture in a culturally centered learning environment, capture the ways in which youth construct multimedia representations of these relationships, and inform the future design of culturally

centered learning environments. For the purposes of this dissertation, I focus on our work during the 2021-2022 school year and followed twelve sixth-grade participants guided by the case study approach. In particular, this dissertation addresses the following research questions in two separate papers: (1) How do youth develop relationship with culture in a culturally centered learning environment? (2) How do culturally centered multimedia representations mediate youth's relationship with culture?

In Chapter 3, I share how my analysis of participants' relationships with culture leads to the development of a Model of *Ti-Wu*. I explained key components of this model through describing participants' relationships with culture (nominal, group-oriented, historical, action-oriented, and adaptive relationship), own culture (limited, family-based, value-based, and leisure relationship), and other culture (difference-oriented and connection-oriented relationship). Furthermore, I identify how participants developed a more connected relationship with culture through illustrating two sets of moments of *Ti-Wu*: the changing distance with culture and developing the reciprocal relationship between one's own and other culture. This study contributes to an empirical understanding of youth's cultural learning and development in a culturally centered learning environment among the growing body of research that examines learning and learners as cultural. This paper has implications for the ways in which we can engage youth with culture in a formal learning environment and decenter Western-oriented research discourse on cultural learning and development.

Chapter 4 focuses on how participants reimagined their relationship with culture through the process of remixing. Using a combination of bi-directional artifact analysis and cross-case analysis, I identified three forms of symbolization that culturally centered multimedia projects supported: symbolizing other cultures, symbolizing own culture, and symbolizing own culture. I

presented six cases to illustrate how participants demonstrated an adaptive relationship with culture through reimagining. I identified developing an adaptive relationship as a key affordance across these multimedia projects. This study not only has implications for engaging youth with culture through multimedia technologies but also the ways in which we can center youth's relationship with culture for diverse futurities.

Discussion

Constructing Empirical and Conceptual Knowledge on Youth's Relationship with Culture

This dissertation contributes empirical knowledge on youth's relationship with culture and how culturally centered learning environments impact the development of diverse relationships. Joining the research across multiple disciplines that have established that learning and learners are cultural, this dissertation also contributes a conceptual exploration of youth's cultural development in a formal learning setting with the model of *Ti-Wu*.

The development of youth's relationship with culture shows how we can center youths' multiple funds of knowledge (Moje et al., 2004) in a formal learning environment. In Chapter 3, I share the diverse relationships and the changes in the relationship that youth demonstrated in a culturally centered learning environment. To further unveil the process of developing relationship with culture, I discussed how youth represent their relationship with culture through bringing in cultural experiences, reconnecting with family and ancestral cultures, and expanding relationships with other cultures in Chapter 4. These processes show the ways in which youth (re)connect and enrich their constellar knowledges (Arada et al., 2023) as their relationships with culture develop.

I identify learning and engagement with culture as a holistic process. Developing a holistic relationship with culture is often accompanied by justice-oriented awareness (Allen-Handy et al., 2021; Thomas et al., 2014) or critical consciousness (Carey et al., 2021). In both Chapter 3 and Chapter 4, I discuss the interdependent process of developing one's own culture and other culture, which takes the form of a reciprocal process in Chapter 3 and is portrayed as a process of developing an adaptive relationship with both other culture and own culture in Chapter 4. These holistic learning trajectories demonstrate that participants started to show justice-oriented awareness of culture as they developed a more connected relationship with culture. For example, Chapter 3 shows examples of how participants demonstrated respect and a deeper understanding of culture as they became more connected with culture. Meanwhile, in Chapter 4, I discussed examples of youth's emerging justice-oriented awareness, particularly on their understanding of technology. These findings have implications for how we can support justice-oriented engagement with culture in a formal learning environment.

Furthermore, the model of *Ti-Wu* contributes a conceptual and analytic exploration of the development of relationships with culture. The concept of *Ti-Wu* first contributes to how we can describe the changes in the relationship with culture, which expands the notion of psychological distance that focuses on the relationship to particular cultures (e.g., Medin et al., 2010; Trope & Liberman, 2003). Furthermore, the cultural form of *Ti-Wu* in the culturally centered learning environment in this study presents three forms of the reciprocal relationship between self and other: (1) enrich one's experience through the exchanges with the outside environment, (2) identify or articulate one's culture through the scaffolding process of representing other culture, (3) reflect or self-criticize through perspective taking. This model can also be applied to support learning and engagement with culture beyond formal learning settings.

Designing Culturally Centered Learning Environments

This dissertation presents a series of culturally centered learning activities that the broader team collaboratively designed and constructed over the 2021-2022 school year. Culturally centered learning in this work took the forms of local field experience, campus-based activity, long-distance field trip, multimedia design project, and classroom-based sharing. In particular, I drew from three culturally centered multimedia design projects for Chapter 4. Although Chapter 3 and Chapter 4 did not give equal account to all the culturally centered learning activities, this range of learning activities and exchanges demonstrates how activities can be designed and potentially adapted to different learning settings with the shared goal of engaging learners with culture.

This dissertation intends to understand the impacts of culturally centered learning environments by examining learners' relationships with culture. Through building empirical knowledge on how these relationships change, I identify that a culturally centered learning environment has the potential to support culturally expansive learning (Van Horne & Bell, 2017). In our work as a culturally disruptive research partnership (Litts et al., 2020), we intended to create "ruptures" that "counter the normalization of Whiteness" and design a culturally centered learning environment as "zone of contact" for the budding of new knowledge and identities (San Pedro, 2018). In this dissertation, I show how youth developed new relationships with culture through *Ti-Wu*. This process is culturally expansive as the learning environment supports youth's meaningful and transformative agency and sense-making with culture as well as developing relationships with culture as part of future identities that they draw from and connect to lives outside of school (Van Horne & Bell, 2017). Specifically, the culturally centered

learning environment supports the beginning, expansion, and reconnections with multiple relationships with culture, which results in more connected relationships with culture, own culture, and other culture.

Furthermore, this dissertation serves as an example of how to center personal relationships with culture to engage youth with culture in a formal learning environment. In both research and practices, we tend to equate the boundary of a culture as bound by a nation, particularly in terms of cultural competence and cross-cultural communications in a globalized context (e.g., Nieto & Zoller Booth, 2010). In this dissertation work, the focus on the personal relationships with culture paves a path for addressing challenges of meaningful engagement with culture, particularly in response to the tendency of treating a cultural group as homogenous (Medin et al., 2010). Taking cultural learning as personally relational advances inclusiveness in that it potentially dissolves boundaries of engaging with cultures that are often politically constructed.

Multimedia Technologies for Materializing *Ti-Wu*

This dissertation, particularly Chapter 4, explores the role of multimedia technologies in mediating youth's relationship with culture. I presented and discussed how participants reimagined their relationship with culture through remixing in three projects (San Juan Digital Story, Ancient Civilization Podcast, Personal Culture Augmented Reality). The series of culturally centered learning activities demonstrate a range of technologies that could be leveraged to support youths' cultural learning and engagement across modality and immersiveness. These cases can serve as design examples that can be adapted to different

learning environments, depending on the specific technology ecosystem within each learning setting.

Looking across the two papers, I (re)identify creating representation with multimedia technologies as a process to materialize *Ti-Wu*. Representation is a cultural circuit (Hall, 1997), in which youth engage and recreate meanings of their cultural forms of *Ti-Wu*. Chapter 4 presents and discusses how youth represent their relationships with culture through three forms of symbolization of culture that the multimedia projects supported. Multimedia technologies materialize *Ti-Wu* through different modes, layering, and genres (Hafner, 2015). As shown among the six cases, participants remixed different multimodal resources to foreground a cultural perspective, constructing humorous contrast between cultural layers using different genres, and foregrounding certain relationships with culture to create an experience for others. The process of materializing *Ti-Wu* both facilitates the process of identifying their knowledge of and relationship with culture, as well as limitation of their cultural knowledge, which leads to new *Ti-Wu*.

Relationships with Culture as Movements in Learning and Research

This dissertation study centers on two movements: (1) take the definition of culture as in the making and (2) take youth's relationship with culture as on the move. These movements of culture is my response to reimagining learning and research for speculative futures (Lizárraga, 2022; Becker & Gutiérrez, 2022). Learning scientists have articulated the notion of movements versus non-movements for disrupting power in our research:

Non-movement is a historically accumulating bias that serves the long trajectory of powered struggles in western knowledge systems and societies ontological assertions of human exceptionalism and supremacy. Mobilities, migrations, and places — how we see them, how we make them, how we dream them and how we story them — are consequential. (Bang, 2020).

These two movements demonstrate how I pause (Patel, 2015) and learn about culture in this work. Throughout the process of this dissertation, particularly the process of having conversations with participants and conducting data analysis, I acknowledge that how we identify culture is not only bound by our own experiences and beliefs but also by what we internalize from broader systems that create unbalanced power. To join the collective efforts in the field of learning sciences to recenter culture, I share in this work my pause on who defines culture and who assigns relationships with culture.

Future Research Directions

This dissertation study has implications for future research that intends to desettle expectations and recenter culture in formal learning environments. This dissertation focuses on multimodality based on digital technology, as the technology ecosystem of the two sixth-grade classes centers on iPads. In future work, we can apply an inclusive definition of technology to further understand youths' meaning making with culture. Moreover, we can also explore youth's relationship with other modes of representation that mediate their relationship with culture, such as dancing (e.g., Solomon et al., 2022). As part of this dissertation, I propose a framework of *Ti-*

Wu, based on data from 12 sixth-grade participants from the Mountain West. The framework can be further refined through research conducted in different sociocultural settings. As part of the broader project that values interdisciplinary and community-based knowledges, this dissertation focused on a series of culturally centered learning activities that spanned across math, science, English language arts, and social studies. Future research could continue to explore ways to disentangle disciplines as a settled expectation (Warren et al., 2020) and decolonize learning for centering multiple ways of knowing and being (e.g., Van Manen, 1977; Bang & Marin, 2015).

Conclusion

In this work, I examine how youth develop relationship with culture in a culturally centered learning environment. Specifically, I focus on developing youth's relationship with culture to reject the settled relationship with culture, which formal learning environments often operate on. I posit relationality as key to how we can design a culturally centered learning environment. In tracing how youth develop and represent relationships with culture, I identify how youth mobilize their cultural knowledges and experiences to interact with culturally centered learning environments. Their learnings and imaginings also teach us how we can distance ourselves from Western-oriented approaches and continuously (re)engage with research as cultural.

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APPENDIX
INTERVIEW PROTOCOLS

Cultivating Connections Interview Protocol

Time 1

[Hey, I'm [name], what's your name? How old are you? Cool. So, I just want to chat with you. That cool?] Also, for our research, we are not going to use your real name later. Is there a name you would like us to use?]

1. [Skip if the interview is after the trip] Are you going on the San Juan River Trip?
2. What do you know about the San Juan River?
 - a. Have you been to that part of Utah before? (If no) What do you imagine it is like?
(If yes) What do you recall about it?
3. [Skip if not going on trip] What are you most excited about the San Juan River Trip?
 - a. Have you heard about the trip before? What did you hear? OR
 - b. What have you learned from the trip?
4. What do you think of when you hear the word culture?
5. Can you tell me a little bit about your culture?
 - a. How connected do you feel to your culture?
 - b. What do you want to know more about your culture?
 - c. Who would you go to to learn more about your culture?
 - d. How do you share your culture?
6. What have you learned about culture in 6th grade so far?
7. What have you learned about culture from your family?
 - a. What is the culture of your parents and grandparents? (Optional)
 - b. Does your name have some cultural meaning? How do you know? (Optional)

8. Do you know anybody whose culture is different from yours?
 - a. How do you know?
 - b. Does that change how you interact with them?
 - c. What are the things you want to know before you talk to people from a different culture? How would you find that out?
9. What would you like to learn more about culture? How?
 - a. What would you like to learn more about other people's culture?
10. What do you know about Native Americans? Why/Where did you learn that from?
 - a. What do you know about Native Americans from around Utah?
 - i. What about this area (Cache Valley)?
 - b. What do you know about Native Americans from other parts of the country?
 - c. (If they don't say anything about contemporary perspectives) What do you know about Native Americans living today?
 - d. What have you learned about Native Americans in school?
11. What do you think of when you hear the word technology?
 - a. What kind of technologies do you use every day?
 - b. What kinds of things do you do with these technologies?
 - c. Have you ever made anything with technology?
 - d. (If yes) What does the process look like?
 - e. (If yes) How confident are you in making things with technology?
 - f. (If no) What do you think the process of making things with technology looks like?
 - g. (If no) How do you feel about making things with technology for the first time?

- h. Do you see yourself as a designer of technology? Why/why not? [designer of technology = as someone who can/should make things with technology]

12. Is there anything else you would like to share?

Cultivating Connections Interview Protocol

Time 2

[Hey, I'm [name], what's your name? How old are you? Cool. So, I just want to chat with you. That cool?] Also, for our research we are not going to use your real name later. Is there a name you would like us to use?]

1. Did you go on the San Juan River trip? (If NO, go to b)
 - a. How did your experience on the San Juan River Trip connect to what you learned this year?
 - b. (If they did not go on the trip) What are some things that you heard about the trip that connected to what you learned this year?
2. Your teachers told me about your hero's journey assignment. Can you tell me more about that? [looking at the story together]
 - a. Could you give me an overview of the story?
 - b. How did you come up with the idea?
 - c. Did you draw/take the pictures in the story yourself? Can I know more about them?
 - d. How does your story show your river trip experience?
 - e. What have you learned from the process of creating a digital story?
 - i. What have you learned about storytelling in the process?
3. What do you think of when you hear the word technology?
 - a. How do you use technology in your daily life?
 - b. Have you ever made/created anything with technology?
 - c. (If yes) What does the process look like?

- d. Do you see yourself as a designer of technology? Why/why not? [designer of technology = as someone who can/should make things with technology]
4. I remember you had a podcast project. Can I know a little bit about that?
 - a. What do you want people to know from your podcast?
 - b. Why did you choose this topic ?
 - c. I noticed that the music/commercial in your podcast is really interesting. How did you pick that music/commercial?
 - d. How would you describe the process of making a podcast?
 - e. What have you learned from the process of making a podcast?
 - i. What have you learned about using technology to tell stories about culture through this process?
 5. What do you remember about the Bear's Ears Rally?
 - a. Whose group did you present? Did you agree or disagree with that perspective?
 - b. What do you think of the other two perspectives?
 - c. How did the Bear's Ears rally change your perspective of the San Juan River?
 - d. What have you learned about culture from the process?
 6. What do you think of when you hear the word culture? Why?
 7. What have you learned about culture in 6th grade so far?
 8. Can you tell me a little bit about your culture?
 - a. How connected do you feel to your culture?
 - b. Have you learned about your own culture from your family? What have you learned?
 - c. Does your name have some cultural meaning? How do you know? (Optional)

- d. What would you like to know more about your culture? And how would you like to learn more about your culture?
 - e. How do you share your culture?
 - i. What are the things that you want people to know about you and your culture?
9. Do you know anybody whose culture is different from yours?
- a. How do you know?
 - b. Does that change how you interact with them?
 - c. What are the things you want to know before you talk to people from a different culture? How would you find that out?
 - d. What would you like to learn more about other people's culture?
10. What do you know about Native Americans? Why/Where did you learn that from?
- a. What do you know about Native Americans from around Utah?
 - i. What about this area (Cache Valley)?
 - b. What do you know about Native Americans from other parts of the country?
 - c. (If they don't say anything about contemporary perspectives) What do you know about Native Americans living today?
 - d. What have you learned about Native Americans in school?
11. Is there anything else you would like to share?

Cultivating Connections Interview Protocol

Time 3

[Hey I'm [name], what's your name? How old are you? Cool. So, I just want to chat with you. That cool?]

1. What have you learned about culture in sixth grade so far? What surprised/impressed you most?
 - a. What do you think of when you hear the word culture? Why?
 - b. How does your idea change over the school year? (if they cannot say anything, refer to the printed student sheet to give them some prompts)
2. What have you learned about other cultures in sixth grade so far?
 - a. Do you know anybody whose culture is different from yours?
 - i. How do you know?
 - ii. Does that change how you interact with them?
 - iii. What are the things you want to know before you talk to people from a different culture? How would you find that out?
 - iv. What would you like to learn more about other people's culture?
3. Tell me a little bit about your culture wheel? (looking at the printed assignment together)
 - a. What would you like to change on this first culture wheel? (if only have culture wheel 1) OR
 - b. What changes did you make? (if only have culture wheel 2)
 - c. What changes did you make? (if have both)
4. What have you learned about your own culture in sixth grade so far?

- a. How would you describe your own culture? OR Can you tell me more about your own culture?
 - i. How does your idea about your own culture change over the school year?
(if they cannot say anything, refer to the printed student sheet to give them some prompts)
 - ii. How connected do you feel to your culture?
 - iii. Have you learned about your own culture from your family? What have you learned?
 - iv. Does your name have some cultural meaning? How do you know?
(Optional)
 - v. What would you like to know more about your culture? And how?
5. What do you think of when you hear the word technology?
 - a. Have you made/created anything with technology in the sixth grade?
 - b. Do you see yourself as a designer of technology? Why/why not? [designer of technology = as someone who can/should make things with technology]
6. I learned that you have worked on a lot of digital projects this year, such as the hero's journey, ancient civilization podcast, and the AR merge cube project. Which one do you like most? Why?
7. Can you tell me a little bit about the AR merge cube project? What do you have on each side of the cube?
 - a. Tell me more about your playground poem? What do you want people to know from your playground poem?
 - b. How would you describe the process of making an AR merge cube yourself?

- c. What have you learned about using technology to talk about yourself in the process?
 - d. How did the merge cube assignment change the way you understand your own culture?
8. What have you learned about Native Americans in the sixth grade?
- a. What do you know about Native Americans from around Utah?
 - i. What about this area (Cache Valley)?
 - b. What do you know about Native Americans from other parts of the country?
 - c. (If they don't say anything about contemporary perspectives) What do you know about Native Americans living today?
9. How would you describe your experience at the Bear River Massacre Site yesterday?
- a. What have you learned during the visit?
 - b. How does the Massacre site change how you think of Native Americans?
10. Is there anything else you would like to share?

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EDUCATION

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Utah State University (USU), Utah, USA
 Dissertation title: Reimagine Culture with Youth: Relationship and Representation in Culturally Centered Learning Environments
- M.A. in English Language Literature** 06/2015
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 Thesis title: “Animals R Us” — A Study of the Question of the Animal in Margaret Atwood’s *The Year of the Flood*
- Exchange Graduate Student** (01/2015-03/2015)
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 Coursework: Colorblindness across the Disciplines; Cultural Psychology
- B.A. in English Education** 06/2012
Jiangsu Normal University, Jiangsu, China
 Thesis title: Secularization in *Winesburg, Ohio*

AWARDS & HONORS

- AERA SIG Design & Technology Best Research Paper Award**, *American Educational Research Association, SIG-Design & Technology* 2023
- CADRE Fellow**, *National Science Foundation (NSF), Education Development Center* 2022
- CSCL Naomi Miyake Best Student Paper Nomination**, *The International Society of the Learning Sciences Annual Meeting* 2022
- Outstanding Doctoral Student of the Year**, *ITLS, Utah State University* 2022
- Legacy of Utah State**, *ITLS, Utah State University* 2021
- Doctoral Scholar Fellow**, *ITLS, Utah State University (USD 20,000/year)* 2019-2023
- Graduate Fellow**, *Center for Intersectional Gender Studies and Research (USD 1500)* 2021-2022
- 2019-2020

HASTAC Fellow, Humanities, Arts, Science, and Technology Alliance and Collaboratory (USD 300/year)	2015
Outstanding Graduate Thesis of the Year, Soochow University	2013
Outstanding Graduate Student of the Year, Soochow University	

RESEARCH EXPERIENCE AND ACADEMIC WORK

Research Manager & Lead Graduate Research Assistant 08/2019-present
Cultivating Connections Project, Utah State University
 PIs: Dr. Breanne Litts, Dr. Melissa Tehee

Support partnership building with K-12 teachers, grant and project management
 Co-lead data collection (fieldnotes, interviews, design works) and data analysis
 Mentor undergraduate and graduate research assistants, especially in areas of data collection and analysis
 The project has received funding from *the Spencer Foundation* and USU.

Lead Graduate Research Assistant 05/2020-present
Daigwade Project, Utah State University
 PI: Dr. Breanne Litts

Support community-driven research with a tribal nation
 Co-lead data collection and data management for the five-year project
 Co-lead data analysis
 Mentorship of undergraduate and graduate research assistants, specifically in developing research plans, data analysis, and writing
 The project is funded by *the National Science Foundation (NSF)*.

Graduate Research Assistant 08/2018-present
Learn Explore Design Lab (The LED Lab), Utah State University

Support students-led projects, mentorship, and community building
 The LED Lab has secured over \$25, 000 for students' independent projects.

Graduate Research Assistant 09/2018-08/2020
Science Learning Game Project, Utah State University
 PI: Dr. Jina Kang

Lead data analysis for log data and textual data generated by the game system designed for classroom learning
 Organize and cleaned quantitative data

Lead mixed methods inquiry and research design about learners' gaming trajectory

Graduate Research Assistant

02/2020-12/2021

The Data Literacy in Science Education Project, Utah State University

PIs: Dr. Jina Kang, Dr. Hillary Swanson

Support literature review and co-lead sections on critical data literacy

Support pilot interview data analysis

This project is funded by an internal grant at USU

Cross-Institute Research Co-Lead

05/2019-present

Designing Technology-Enabled Embodied Learning Environment

Collaborating Researchers: Dr. Jina Kang and Dr. Xinhao Xu

Evaluate the design affordances in current technology-enabled embodied learning environments (TEELEs)

Co-develop conceptual framework for designing TEELEs by identifying key factors, using a systematic review approach

Co-develop design framework for collaboration in immersive learning environments (AR & VR)

Independent Research

04/2019-present

Project: Reality Media and the Anthropocene

Lead a systematic review of the rhetorical affordances of immersive technologies designed for experiencing the Anthropocene

Lead a grant proposal about how youth represent their understanding of the Anthropocene using digital technologies, including AR and VR

GRANTS, SCHOLARSHIPS, AND FUNDING SECURED

Graduate Student Research Funds

10/2021-05/2023

Emma Eccles Jones College of Education and Human Services, Utah State University

Project: Dissertation work

Funding amount: USD 3000

Teaching Research Project for Early Career Faculty

01/2016-10/2018

Shanghai Municipal Education Commission (Project Number: ZZTH16003)

Project: A Study of EAP Teaching Strategy in Chinese Private Colleges on the Basis of Need Analysis

Principle Investigator: Lili Yan
 Funding Amount: RMB 35,000 (≈USD 5000)

03/2013-09/2013

Funded Graduate Project of the University

School of Foreign Languages, Soochow University

Project: An Interpretation of ‘To Build a Fire’ from the
 Perspective of Biosemiotics

Principle Investigator: Lili Yan

Funding Amount: RMB 2000 (≈USD 286)

Scholarships

Tuition Scholarship, *ITLS, Utah State University* (USD 1000) 2018

National Scholarship for Graduate Students, *Ministry of Education of
 the People’s Republic of China* (≈USD 3174) 2017

National Scholarship for Undergraduate Students, *Ministry of
 Education of the People’s Republic of China* (≈USD
 1270) 2010, 2009

First Tier Scholarship of Jiangsu Normal University, *Jiangsu Normal
 University* 2009, 2010, 2011

Zhujingwen Scholarship for Undergraduate Students, *Jiangsu Normal
 University* 2009, 2010

LEADERSHIP ROLES**President**

Instructional Technology Student Association 04/2020-05/2021
 Department of Instructional Technology and Learning Sciences
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Co-organizer

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PUBLICATIONS

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Peer Reviewed Journal Articles

Yan, L., Isaacs, D., Litts, B.K., & Tehee, M. (under revision). Learning with the land: How sixth graders restory interactions with the land through field experiences. *Learning, Culture and Social Interaction*.

Yan, L., Na, C., & Kang, J. (under review). Examining the Impact of Sixth Graders' Team Synchrony on Argument Making and Scientific Knowledge in a Science Learning Game. *The British Journal of Educational Technology*.

Kang, J., Diedrich M., Na, C., Swanson, H., & **Yan, L.** (under review). Designing for scientific data literacy: A systematic review of applications of approaches to engaging students in data practices in science education. *Review of Educational Research*.

Xu, X., Kang, J., & **Yan, L.** (2021). To embody and how to embody – Understanding embodied immersion in technology-enabled embodied learning environments. *Journal of Computer Assisted Learning*, 1-17. **AERA SIG Design & Technology Best Research Paper Award (2023)**.

Litts, B.K., Tehee, M., Baggaley, S., Jenkins, J., Isaacs, D., Hamilton, M., & **Yan, L.** (2020). Culturally disruptive research: A critical (re)engagement with research processes and teaching practices. *Information and Learning Sciences*, 121 (9/10), 769-784.

Yan, L. (2018). A Review of mixing metaphor. *Foreign Language Teaching and Research*, 02 (2018), 314-318. (in Chinese)

Yan, L. (2016). Review: Chloe Harrison, Louise Ntall, Peter Stockwell and Wenjuan Yuan. 2014. *Cognitive Grammar in Literature*. Amsterdam and Philadelphia: John Benjamins Publishing Company. *Journal of Tianjin Foreign Studies University*, 2, 33-37. (in Chinese)

Refereed Conference Proceedings

Yan, L., *Griffinpowers, M., Litts, B.K., Tehee, M., Jenkins, J., & Baggaley, S. (accepted). Culturally centered curriculum: Sixth graders' learning paths of developing knowledge about Native American cultures. *Proceedings of the International Conference of the Learning Sciences – ICLS 2023*. Montréal, Canada.

*Quayle, K., *Morgan, C., Litts, B.K., **Yan, L.**, & *Haws, D. (accepted). Community-driven design: A reorientation to designing tools for learning with communities. *Proceedings of the International Conference of the Learning Sciences – ICLS 2023*. Montréal, Canada.

- Na, C., **Yan, L.**, & Kang, J. (2022). Exploring the role of prior knowledge and group action synchrony in sixth graders' game-based collaborative learning. In Weinberger, A., Chen, W., Hernández-Leo, D., & Chen, B. (Eds.). *Proceedings of the International Conference of the Learning Sciences - CSCL*. Hiroshima, Japan. **Best Student Paper Nominee.**
- Litts, B., Pacheco, R., Timbimboo-Madsen, P., Davis, G., **Yan, L.**, Martinez, A., & Morgan, C. (2022). Designing for technological sovereignty: Forms of relating with culture and technology through community workshops. In Chinn, C., Tan, E., Chan, C., & Kali, Y. (Eds.). *Proceedings of the International Conference of the Learning Sciences – ICLS 2022*. Hiroshima, Japan.
- Yan, L.**, Litts B. K., *Colleni M., Issacs D., Tehee, M., Baggaley, S., & Jenkins J. (2021). (Re) presenting nature: sixth graders' place-based field trip experience through restorying. In de Vries, E., Ahn, J., & Hod, Y. (Eds.). *Proceedings of The International Society of the learning sciences (ISLS) annual conference* (pp. 693-696).
- Litts, B. K., Timbimboo-Madsen, P., Smiley, M., Davis, G., Pacheco, R., **Yan, L.**, Nguyen, M., & Sherlock, A. (2021). How community-driven design research endures when the world is on fire. In de Vries, E., Ahn, J., & Hod, Y. (Eds.). *Proceedings of The International Society of the learning sciences (ISLS) annual conference* (pp. 1085-1086), June 1-11, 2021.
- Yan, L.**, *Colleni, M., & Litts, B.K. (2020). Exploring the rhetorical affordances of augmented reality in the context of the Anthropocene. In *Proceedings of 6th International Conference of the Immersive Learning Research Network (iLRN)* (pp. 109-116). IEEE.
- Yan, L.**, Litts, K., & *Na., C. (2020). Learning in the more than human world: A conceptual analysis of posthuman pedagogy. In *Proceedings of the International Conference of the Learning Sciences* (pp. 2313-2316). June 2020.
- Yan, L.** (2020). Final Paper as Portfolio: A study of academic writing assessment for incipient college student writers. In *Proceedings of the 1st Annual Conference of Asia ESP*. Beijing, China. October 2017.
- Kang, J., An, D., **Yan, L.**, & Liu, M. (2019). Collaborative problem-solving process in a science serious game: Exploring group action similarity trajectory. In Collin F. Lynch, Agathe Merceron, Michel Desmarais, & Roger Nkambou (eds.). *Proceedings of the 12th International Conference on Educational Data Mining (EDM 2019)* (pp. 336 – 341).

Book Chapter

- Yan, L.**, *Colleni M., & Litts, B. (2020). Interacting across contexts: Augmented reality applications for developing the understanding of the Anthropocene. In V. Geroimenko (Eds), *Augmented Reality in Education* (pp. 367-385). Springer, Cham.

Other Publications

- Clark-Stallkamp, R., Herman, K., Marcelle, P., Walters, K., & **Yan, L.** (2021). The critical theories we need now: A perspective from the CLT Graduate Student Working Group. *TechTrends*, 1-3. <https://doi.org/10.1007/s11528-021-00641-5>
- Yan, L.** (2016). A study of idiom translations in *A Dream in Red Mansions* from the perspective of eco-translatology. *English Square*, 1, 3-5. (in Chinese)
- Yan, L.** (2015). A critical analysis of the choice of metaphor in inaugural addresses of American presidents. *Journal of Language and Literature Studies*, 11, 17-19 &55. (in Chinese)
- Yan, L.** (2014). SF imagination in ‘Other Worlds’: A review of *In Other Worlds: SF and the Human Imagination* and *Oryx and Crake*. *Masterpieces Review* 06, 15-16. (in Chinese)
- Yan, L.** (2013). Confused by the lack of belief: Secularization in *Winesburg, Ohio*. *Masterpieces Review* 04, 98-100. (in Chinese)

PRESENTATIONS

- Yan, L.**, Baggaley, S., Jenkins, J., Litts, B.K., Tehee, M. (2023). Representing culture: Exploring the development of youth’s relationship with culture through culturally centered learning activities. Round table session at *American Educational Research Association Annual Meeting*, Chicago, IL, April 2023.
- Kang, J., Xu, X., **Yan, L.**, Zhang, J. (2023). A systematic review on immersive technologies in collaborative learning at K-12 settings. Poster session at *American Educational Research Association Annual Meeting*, Chicago, IL, April 2023.
- Yan, L.**, Litts, B.K., Tehee, M., Jenkins, J., & Baggaley, S. (2022). Towards a hard re-set for culturally disruptive research during the pandemic. *American Educational Research Association Annual Meeting*: San Diego, CA, April 2022.
- Litts, B.K., Pacheco, R., Madsen, P.T., Davis, G., Martinez, L., Morgan, C., & **Yan., L.** (2022). Technology sovereignty: The reciprocity of culture and technology in culturally sustaining/revitalizing family workshops. *American Educational Research Association Annual Meeting*: San Diego, CA, April 2022.
- Yan, L.**, *Nguyen, M., *Slater, E., & *Dawkins, A. (2021). Re-imagining culture in digital learning environments: A review of literature. Round Table Session at *Association for Educational Communications & Technology (AECT) International Convention*: Chicago, IL & Virtual, November.
- Litts, B.K., Tehee, M., Hamilton, M., Jenkins, J., Isaacs, D.S., Baggaley, S., & **Yan, L.** (2021). Culturally disruptive design research: An ethical and cultural methodological shift to support partnership work. *American Educational Research Association Annual Meeting*: Virtual Conference, April 2021.

- Yan, L.**, Isaacs, D., *Colleni, M., Jenkins, J., Baggaley, S., Litts, B.K., & Tehee, M. (2021). Connecting with the land: The human and nature relationships emerged from sixth graders' field trip experience. *American Educational Research Association Annual Meeting: Virtual Conference*, April 2021.
- Isaacs, D.S., **Yan, L.**, Tehee, M., Litts, B.K., Baggaley, S. & Jenkins, J. (2021). Beyond the field trip: multimodal, place-based learning enhances learners' experiences with Indigenous land. *American Educational Research Association Annual Meeting: Virtual Conference*. April 2021.
- Kang, J., Na, C., Diedrich M., **Yan, L.**, & Swanson H. L. (2021). Examining current data practices in science education: A systematic review. *American Educational Research Association Annual Meeting: Virtual Conference*. April 2021.
- Yan, L.**, & Kang, J. (2020). Investigating learning processes with argumentative writing in a science learning game: A content analysis. *Association for Educational Communications & Technology (AECT) International Convention: Virtual Conference*.
- Litts, B.K., Tehee, M., Justis, N., **Yan, L.**, Baggaley, S., & Jenkins, J. (2020). Debating the bears ears: Employing culturally disruptive pedagogy for curriculum redesign. *Association for Educational Communications & Technology International Convention (AECT) International Convention: Virtual Conference*.
- Litts, B.K., Tehee, M., Hamilton, **Yan, L.**, Isaacs, D., Jenkins, J., & Baggaley, S. (2020). Toward a culturally disruptive framework in partnership-based research and design. *Association for Educational Communications & Technology Annual Conference (AECT) International Convention: Virtual Conference*.
- Xu, X., Kang, J., & **Yan, L.** (2020). Empower bodily interactions with technologies: The design, assessment, and technologies in embodied interactive learning. Oral Presentation at *Association for Educational Communications & Technology (AECT) International Convention: Virtual Conference*.
- Yan, L.**, Litts, B., & *Colleni, M. (2020). Augmenting local understanding through technologies: A systematic review of place-based learning with mobile technologies. Poster accepted by the *American Educational Research Association Annual Meeting (AERA) 2020 Annual Meeting: San Francisco, CA, United States*. (Conference canceled due to COVID-19 Pandemic).
- Yan, L.**, & *Colleni, M. (2020). Exploring the role of mobile technologies in place-based learning-a review literature. Student Research Symposium 2020 at Utah State University, Logan, Utah, United States.
- Yan, L.**, & Kang, J. (2019). Collaborative problem-solving in computer-based learning environments: A review of literature on issues and methods. Presentation at 2019

Association for Educational Communications & Technology (AECT) International Convention: Las Vegas, NV, October 2019.

Yan, L., & *Colleni, M. (2019). Designing harmony: A review of augmented reality for learning the Anthropocene. Presentation at *Future Memory: Mapping the Anthropocene*: Logan, UT, April 2019.

Yan, L. (2015). The question of *the animal and the Anthropocene* in *The Year of the Flood*. Presentation at UCSB Interdisciplinary Humanities Center, Approaching the Anthropocene: Perspectives from Humanities and Fine Arts: Goleta, CA, May 2015.

INVITED PANELS

The Critical Theories We Need-A Graduate Student Perspective 06/21/2021
Association for Educational Communications & Technology (AECT), the Culture, Technology, and Learning Division (CLT)

“Graduate Student Voices” Intersections on Inclusion: Critical Conversations about the Academy 10/17/2021
Utah State University

PROFESSIONAL DEVELOPMENT

AERA SIG LS/ATL Mentoring Program 04/16/2023
American Educational Research Association, SIG-Learning Sciences & SIG Advanced Technology for Learning

TEACHING EXPERIENCES

Instructor, ITLS, Utah State University 05/2021-08/2021

ITLS 6390 Transformative Uses of Technology for Learning
(Graduate Level)

Lecturer, EAP Program Co-Director, Shanghai Normal University 09/2015-06/2018
Tianhua College

A Brief History of American Literature
Academic English (I-IV)
College English (I-IV)
Thesis chair for 4 undergraduate students

Part-time lecturer, Soochow University, Wenzheng College 09/2013-06/2014

College English (I & II)

Part-time lecturer, *College of Adult Education, Soochow University*

02/2013-12/2013

College English
English for Adult Learners

Teaching Certification

Higher Education Teaching Certificate (Subject: English Language and Literature) issued by *the Ministry of Education of the People's Republic of China*, January 2016.

High School Teaching Certificate (Subject: English) issued by *the Ministry of Education of the People's Republic of China*, June 2012.

MENTORSHIP

Mentoring on Lab Projects

Graduate Students

Madison Griffinpower, *USU, Psychology, PhD student* (Summer 2022)
Christina Morgan, *USU, ITLS, PhD student* (Fall 2021 – Present)
Alicia Martinez, *USU, ITLS, Master student* (Spring 2022 – Summer 2022)
Ravi Sinha, *USU, ITLS, PhD student*, (Fall 2022 – Present)
Prasina Parameswaran, *USU, ITLS, PhD student* (Spring 2021 – Present)
Minah Nguyen, *USU, Teacher Education and Leadership, Master student* (Fall 2021 – Spring 2021)
Kenden Quayle, *USU, ITLS, Master Student* (Spring 2020 – Fall 2022)
AILisia Dawkins, *USU, ITLS, PhD Student* (Fall 2021– Present)
Emily Slater, *USU, ITLS, PhD Student* (Fall 2021 – Present)

Undergraduate Students

Mckay Colleni, *USU, Mechanical Engineering* (Fall 2018 – Summer 2021)
Chase Mortensen, *USU, Computer Science* (Spring 2020)
Collin Tso, *USU Speech-Language Pathology* (Summer 2021 – Fall 2021)
Brayden Gulso, *USU, Biochemistry* (Fall 2021)
Kameica Yazzie, *USU, Health Education & Promotion* (Spring 2019)
Ella Olson, *USU, Animal Science* (Spring 2021 – Summer 2021)
Cedric Mannie, *USU, Computer Engineering* (Spring 2019)
Kamaehu Matthias, *USU, Biology* (Fall 2018 – Spring 2019)
Daniel Robinson, *USU, Economics and Finance* (Fall 2018 – Spring 2019)

Undergraduate Thesis Supervision

Qian Zhang, *Shanghai Normal University Tianhua College, English* (2016)
Juan Fang, *Shanghai Normal University Tianhua College, English* (2016)

Wei Zhang, *Shanghai Normal University Tianhua College, English* (2017)
 Jiali Zhang, *Shanghai Normal University Tianhua College, English* (2017)

ACADEMIC SERVICES

Reviewer	2022-2023
IEEE Transactions on Learning Technologies	
Session Moderator	2022
Association for Educational Communications & Technology (AECT) International Convention	
Reviewer	2022-2023
International Conference of the Immersive Learning Research Network (iLRN)	
Reviewer	2020-2023
The International Society of Learning Sciences (ISLS) Annual Meeting	
Reviewer	2021-2023
American Educational Research Association Annual Meeting (AERA)	
Co-host	2021
Rising Education Scholars Helping Advance Partnerships and Equity (RESHAPE) Forum	
Search Committee Member	2021
The Inaugural Director of the Center for Intersectional Gender Studies and Research at USU	
Reviewer	2020
Association for Educational Communications & Technology (AECT) International Convention	