Cultural Repertoires: Indigenous Youth Creating With Place and Story

Kristin A. Searle, Utah State University, kristin.searle@usu.edu
Teresa Casort, Utah State University, teresa.casort@aggiemail.usu.edu
Breanne K. Litts, Utah State University, breanne.litts@usu.edu
Bryan McKinley Jones Brayboy, Arizona State University, bryan.brayboy@asu.edu
Sequoia Lynn Dance, Arizona State University, sdance@asu.edu
Yasmin Kafai, University of Pennsylvania, kafai@upenn.edu

Abstract: In this paper, we present an example of culturally-responsive making in the context of developing location-based community stories. Working with members of an Indigenous community in the Southwestern United States, we co-designed and implemented a two-week summer camp in which middle school youth used Augmented Reality and Interactive Storytelling (ARIS), a narrative-based programming tool, to create virtual community tours for the purpose of sharing the information they learned about tribally owned locations with others. We developed case studies of two groups of students who incorporated culture into their community tours of a tribally-owned golf course complex and stadium complex to address the following question: How did small groups of youth conceptualize culture and how did they integrate it into their community tours? In the discussion, we address what can we learn from youths' design processes and completed products about designing culturally responsive learning experiences.

Introduction

The increased interest in promoting the development of maker culture in education is strongly connected to a growing need to expand youth interest and knowledge in STEM disciplines and careers (Dougherty & Conrad, 2016). Maker activities are particularly promising alternatives to traditional STEM pathways, because they not only engage youth with authentic disciplinary knowledge by generating creative solutions to important problems, but also connect with a culture of entrepreneurship and manufacturing by bringing solutions to market (e.g., Peppler, Halverson & Kafai, 2016a; 2016b). Even though research on maker activities, technologies, and spaces has expanded significantly over the last few years, some have raised critical concerns about what types of maker activities are promoted, how maker technologies are used, and who participates in making (e.g., Calabrese Barton, Tan, & Greenberg, 2017; Vossoughi, Hooper, & Escude, 2016). With all the interest and promise of the maker movement, these shortcomings highlight the need for more intentional efforts toward equity, access, and broadening participation, in particular for indigenous communities who have complex histories and contemporary relationships with the cultures of schooling and technology.

One approach to address these shortcomings has been the development of culturally responsive computing and making, which grow out of the research on culturally responsive schooling (Ladson-Billings, 1995). At the most basic level, culturally responsive schooling connects youth's out-of-school cultural repertoires to academic content. While most curricular examples of culturally responsive schooling for Indigenous youth have been developed in the context of literacy and language education (Castagno & Brayboy, 2008), culturally responsive computing focuses on connecting computing content with heritage and vernacular cultural practices that are familiar to students (Eglash, Gilbert, & Foster, 2013). These cultural connections are also present in culturally responsive making which moves beyond the screen, with a particular focus on connecting to artifacts, activities, and spaces to improve educational experiences for indigenous youth and meet community needs (Searle & Kafai, 2015).

In this paper, we examine culturally responsive making in the context of developing location-based community stories. Working with members of an Indigenous community in the Southwestern United States, we co-designed and implemented a two-week summer camp activity using the Augmented Reality and Interactive Storytelling (ARIS) platform (Holden, Gagnon, Litts, & Smith, 2014.). In this context, ARIS was a promising fit because it allowed youth to engage in thinking about place and narrative, two central aspects of how Indigenous knowledges are located and transmitted (Brayboy, 2005). Knowledge is often connected to particular places and stories are used to communicate community history and values (Basso, 1996; Brayboy & Maughan, 2009; Smith, 2012). Middle school youth (12-14 years-old) visited important locations throughout their community and, with the assistance of a community relations tour guide to point out key features, documented the kinds of cultural

knowledge located at each site. Youth were then asked to create a virtual community tour to share the information they learned with others, with an ultimate goal of sharing their tours with the community's public relations department for their use. The sites youth visited varied in their cultural significance from a series of large metal sculptures designed by a local artist to a skydiving facility. For this paper, we developed case studies of two groups of students who incorporated cultural elements, such as signs with words in both English and the community's heritage languages, into their community tours of a tribally-owned golf course complex and stadium complex. to address the following question: How did small groups of youth conceptualize culture and how did they integrate it into their community tours in ARIS? In the discussion, we address what can we learn from youths' design processes and completed products about designing culturally responsive learning experiences.

Background

During the last decade, indigenous scholars have argued for a broader view of technology as tools. Tools have always been adapted by Indigenous peoples and serve as vehicles in service of self-expression, as well as tribal sovereignty and self-determination (Bang et al., 2013; Duarte, 2017; Kawagley, 2005). Further contemporary Indigenous identities for individuals and communities are complex: economic success is often accompanied by pressure to prove cultural distinctiveness (Cattelino, 2008). As Deloria articulated in an interview:

> Everyone doesn't have to do everything the old Indians did in order to have a modern Indian identity. …We need a larger variety of cultural expression today. I don't see why Indians can't be poets, engineers, songwriters or whatever. I don't see why we can't depart from traditional art forms and do new things. Yet both Indians and Whites are horrified when they learn that an Indian is not following the rigid forms and styles of the old days. This is nonsense to me but it has great meaning to a lot of people who have never considered the real meaning of cultural change and national development" (qtd. in Warrior, 1995, pp.93-94).

In his analysis of this quote, Warrior highlights that "the real meaning of cultural change" refers to its adaptability to change. We also think it is important to consider what it means to be Indigenous in the 21st century, bringing notions of "modern Indian identity" into stark light.

Culturally responsive computing (Eglash, Gilbert, & Foster, 2013) is one promising approach to making connections across youths' multiple repertoires of practice by incorporating heritage and vernacular cultural practices into technological engagements. For example, the culturally situated design tools developed by Eglash and his colleagues connect practices from Shoshone beadwork to skateboarding to mathematical concepts. Each web-based design tool is accompanied by a page that describes its cultural origins and connections to math. In this example, the focus is on using culture as a way to engage youth in both identity work and school-based curriculum. Scott, Sheridan, & Clark (2015) have pushed theories of culturally responsive computing to include a more explicit focus on youth's intersectional identities and youth as creators rather than consumers of technology. Rather than close ties to school-based curricula, they suggest we would be better served to pay attention to "who creates, for whom, and to what ends" (p. 421). Technology in this vein serves as a vehicle for youth to investigate their intersectional identities. While such work can be challenging in formal schooling environments where teachers and students are held accountable to standards, out-of-school learning contexts provide opportunities to engage youth in more open-ended problems, such as designing a tour of important community sites for use by the community.

In the work we present here, we assume that technology is a tool of youth self-expression and community self-determination. Youths' ARIS games highlight aspects of heritage culture, but also culture's adaptability to new contexts as it is intertwined with economic development projects and youths' exploration of their own interests and intersectional identities. Research in the learning sciences recognizes that learning is culturally patterned and that individuals may acquire multiple, sometimes overlapping and even competing or conflicting repertoires of practice (Bell, Van Horne, & Cheng, 2017). By making connections between repertoires of practice valued in youth's lives (i.e., cultural artifacts and tools, community norms, division of labor, social relations, and historical development of individuals and communities) and the kinds of disciplinary approaches valued in science, technology, engineering, and math (STEM), research has shown that youth more easily identify with and persist in STEM disciplines. One approach to making connections across multiple repertoires of practice in youth's lives has been to develop culturally responsive learning environments. Often, such learning environments have relied upon a material connection to heritage culture (e.g., using beadwork to learn about Cartesian coordinates in math) or upon particular linguistic practices (e.g. hip-hop literacies). While these approaches have an important place especially in Indigenous communities in the United States where linguistic and cultural

revitalization are crucial (McCarty & Lee, 2014), they do not represent the whole spectrum of practices that Indigenous individuals and communities engage in today.

Methods

The work presented in this paper is part of a larger research project to understand how we co-design culturally responsive making activities and makerspaces with two distinct Indigenous communities in the Southwestern United States. This present paper presents findings from a two-week camp that took place during the summer of 2017 in a small Native American community (10,000 enrolled members) in the Southwestern United States and focuses on understanding (1) how small groups of youth conceptualized and documented cultural elements and (2) how they integrate these elements into their community tours using the ARIS platform. Summer camps like the one described here allow us to more fully explore youth's design processes as they work to create something meaningful for themselves and their communities over a more extended time period.

Our research team worked with the community's education, cultural resources, and public relations departments, as well as staff from the American Indian program at the community college where the program took place, to co-design an activity in which youth visited a series of significant artistic and economic development sites in their community and used the ARIS platform to make location-based community tours that shared information about these places in a fun, interactive way (DiSalvo, Yip, Bonsignore, & DiSalvo, 2017). Ultimately, our goal was that the youths' games would become something used by the community's public relations department to share information with community visitors.

Over the course of a two-week summer camp, forty-seven Native American youth participated in our ARIS workshop and thirty eight (12-14 years old; 23 females, 15 males) fully consented to be part of the research. ARIS is an open-source, location-based programming platform. Individuals with no prior programming experience can use ARIS to create narratives with interactive characters, items, and media placed in real-world locations. We met with our participants over seven days, with each day consisting of 1-2 sessions of 1-2 hours each. After introducing the project to the whole group on day 1, we randomly divided the youth into 15 small groups (2-4 students). On day 2, youth visited their community sites using iPads and a paper and pencil "investigation checklist" to document their site visits in words, photos, and videos (see Figure 1). Five groups went on each field trip: Groups 1-5 visited a series of large metal sculptures created by a local artist, groups 6-10 visited a tribally-owned golf facility and raceway/virtual reality facility, and groups 11-15 visited a tribally-owned stadium complex and an indoor skydiving facility located on tribal lands. On day 3, participants began a paper and pencil storyboarding process, with youth continuing to add to their storyboards in an iterative fashion as they built out their games in the ARIS editor (see Figure 2). Days 4-7 were devoted to translating their storyboards into digital form in the ARIS editor, iterating on their storyboards, and play testing their own games and those of other groups.

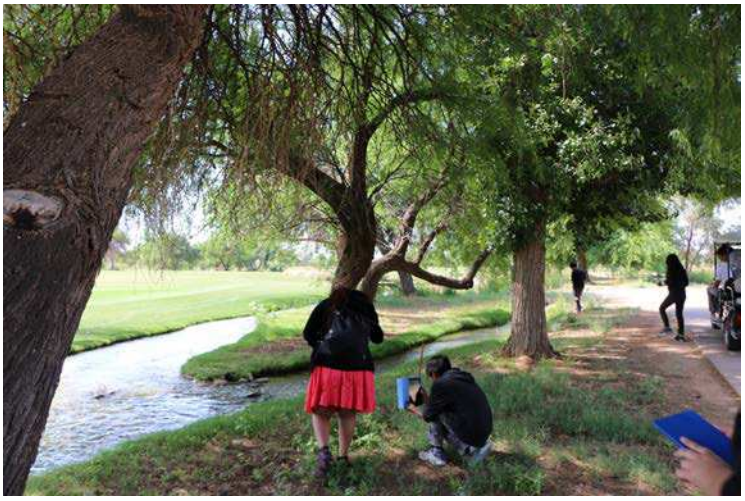

Figure 1. Youth using iPads to document the golf course during the field trip on Day 2.

Data collection and analysis

The research team collected a range of qualitative data, including field notes, final reflective interviews, photographs documenting the groups' making processes, and artifacts produced by each group (storyboards, in-process screenshots, and completed games).

To demonstrate the range and variation in how youth conceptualized cultural elements and integrated them into their community tours, we developed two case studies (Stake, 1995): Groups 6 and 11. We selected these groups because of the distinct ways in which culture was incorporated into their tours, from very little in the case of group 6 to a lot in the case of group 11. Both of these cases also illustrate how locations that might not be immediately deemed culturally responsive within a narrow framing of culture as material culture or heritage culture are, in fact, cultural. Group 6 consisted of two girls and one boy, Hope, Carla, and Eddie, who explored the community golf course and raceway. Group 11 was comprised of two girls, Selma and Tess, and a third individual who was not part of the research. On their field trip, they visited the stadium complex and indoor skydiving facility. All participant names are pseudonyms.

Findings

Culture as backdrop: World politics at the tribal golf course

Based on an idea by group member Eddie, Group 6 configured their community tour as a game where world politics play out on the community-owned golf course. Though they did not name their game, the opening screen describes it as "has something to do with World War 3, Kim Jong-un, Donald Trump, and a hero guy named Robert." In a reflective interview, Eddie described the freedom to design their own narrative as his favorite part of the task, "I would say that the best part of this project, as of right now, is that we—it's not a full straightforward thing where you have to choose your particular topic. We just got to choose the weirdest thing. Yeah" (06/13/17, p.6). Here, we see Eddie and his group members taking advantage of the opportunity to exercise design agency (Eglash & Bennett, 2009) over their community tour, something which more than likely would not have been possible within their day-to-day formal school environment. Choosing the weirdest thing is rarely the option available to them in school.

Like other groups, Group 6 began their design process by visiting the golf course and raceway on a field trip, where they took 66 photos and 13 brief video recordings. The majority of the photos and the two videos Group 6 took at the community golf course document natural phenomena (22 photos). Group members snapped 14 pictures of the water features and both videos capture footage of running water. Overall, this group documented the water features the most (second only to selfies and goof off pictures), but they also took photos of waterfowl, trees, and the greens. Moreover, Group 6 took several pictures of the signs indicating the name and number of each hole on the two golf courses at the site, which included names in the community's two heritage languages. At the raceway, they took 11 photos and 11 short videos of the raceway demonstration and 1 photo of a virtual reality suit. They also documented their peers holding racing trophies. To the best of our knowledge, this group did not make use of their paper and pencil investigation checklist.

When it was time to begin storyboarding on day 3, Group 6 struggled to come up with a narrative that would set their community tour apart from the others and, in reflective interviews, both Hope and Carla noted that they struggled to come up with unique ideas and "figuring out a good storyline" (Int., Hope, 06/15/17, p.5) was one of their biggest challenges. As Hope elaborated in her reflective interview, "[W]e didn't wanna be like everybody else with the characters and with all pictures. We wanted to figure out something different" (06/15/17, p.5). Additionally, group members did not want to make themselves characters in their game so they "decided to make other characters to be different" (Int., Hope, 06/15/17, p.2), ultimately choosing two controversial world leaders and a classmate, Robert, as characters. At the end of day 3, their storyboard was hardly built out at all, with only two characters (Trump & Jong-un) and one item (the VR suit) that could be acquired by a player in the game. Over days 4-6, they added one character (Robert), one quest, two informational plaques, two conversations, and three items. Interestingly, while group members expressed in reflective interviews that creating the dialog between the world leaders was one of their favorite parts of storyboarding, they did not develop extensive conversations on the paper cards and only one substantive conversation in their game. As Carla refelcted, "Fun parts were probably trying—fun parts would be making your character's own conversations with another character, because you can be creative in your own mind that way. A few weeks ago, I would have never thought that I would be making a game with Donald Trump, Kim Jong-un, Robert, and at [tribally owned] Golf Course" (6/13/17, p.7). Time and again, member of Group 6 stressed that the creative aspects of the project were what made it fun. From a programming standpoint, most youth also found conversations to be the easiest narrative element to program.

Ultimately, the group developed their narrative to include a main character named Robert, after a summer camp classmate. In the game, players help Robert get Donald Trump to specific locations at the community golf

course to meet Kim Jong-Un. They used media downloaded from the Internet for each of these characters. In their final reflective interviews, group members collectively described three quests that comprised their game: (1) Robert meets Donald Trump and takes him to the golf course to discuss peace, (2) the player must navigate Trump to Hole 15 on the golf course where Kim Jong Un and Donald Trump get into a fight about golfing things and must come to an agreement, and (3) a quest where Robert must acquire a virtual reality suit. This third and last quest did not make it into their ARIS game due to time constraints. Further, the group only incorporated one photo that we might describe as having heritage cultural elements, a photo of one of the hole signs from the golf course. The other photo they took themselves was of their classmate, Robert, holding a trophy. and the conversation they detailed in their game consists of a brief exchange with little content. Generally speaking, Group 6's game remains somewhat undeveloped as they neglected to incorporate elements from their storyboard in the ARIS editor. In this game, what is compelling is the overall narrative and the way in which community cultural elements (the hole sign with heritage languages) and economic development projects (the golf course) serve as a backdrop against which youth were able to explore their interest in world politics and their desire to make "the weirdest thing" (Eddie, Int., 06/13/17, p. 6). Their mere foray into world politics runs counter to popular narratives about Indigenous youth as disengaged in school or uninformed about the world around them (McCarty, Romero-Little, Warhol, and Zepeda, 2009; McCarty & Wyman, 2009; Quijada Cerecer, 2013).

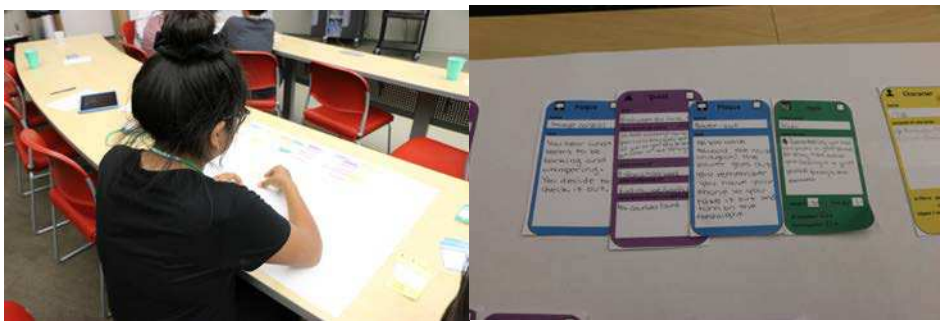

Figure 2. Youth engaged in the paper and pencil storyboarding process and close-up from Group 11's storyboard.

Culture as key: Escaping the stadium through knowledge

Group 11 created a fantastical narrative in which players were locked in the tribal stadium complex and, with a dog named Milo (depicted by a photo of a German Shepherd downloaded from the Internet) as their guide, had to acquire various pieces of cultural knowledge in order to escape the stadium and their official, evil tour guide. As Tess explained, "We could've just left it as a boring thing, like, 'Okay, go here, and you'll learn this.' We added stuff that we had in our imagination. Just adding off each other's ideas until we got this whole story and plot" (Int., 6/15/17, p. 4). In their desire to make their community tour more exciting, the group members highlight an important point about culture, and especially material culture. Culture matters in context, when it is lived, and this is what the members of Group 11 work towards when they integrate the cultural knowledge embedded in signage at the stadium complex into a fantastical game of their creation (Hermes, 2005).

Group 11 began their game design process with a visit to the tribally-owned stadium complex where two Major League teams conduct spring training and an indoor skydiving facility, both of which are located on tribal lands. The members of this group made extensive use of their investigation checklist, writing several sentences for each question, and identifying picture taking as a favorite part of their field trip experience. Group members took 20 photos at the stadium complex and none at the skydiving facility, reasoning that "there wasn't that much cultural" there (Selma, Int., 6/15/17, p.4). Later, in her reflective interview, Selma expressed that her least favorite part of the field trip was visiting the stadium complex because, "we weren't really having that much time to go around and try to get [the] pictures that we needed cuz there was only certain places where they had most of the cultural elements" (Int., 6/15/17, p.1).

In their photo documentation, group members took pictures of signs that had community meaning, either through the use of specific symbols or tribal languages. Examples include a wall-mounted sign displaying basketwork from the community, a series of symbols on the scoreboard, and bathroom signs with "male" and "female" written in both heritage languages used in the community, each of which became the central feature of a knowledge quest in their game. As Selma described the bathrooms signs, "It's just like—it looks like a regular one, and then on the bottom of it, it has restrooms male or whatever, and then on the bottom it has the different

languages with the language on the side" (Int., 6/15/17, p.1). They also took more general establishing shots, including section markers, the bullpen, and dining options. In their investigation checklist, group members collectively reflected, "Pictures we took were of the important ^culture designs of the interior and exterior. We'll use these pictures to try explaining/showing parts of the culture using the locations." In addition, group members were aware of the economic significance of the site, writing, "[A]t games/spring training, many people come to watch the teams play. The money that is earned then goes into economic growth/development." In the pictures they took and their reflections written on the investigation checklist, Selma and Tess make evident that they are aware of both the cultural and the economic significance of the stadium complex.

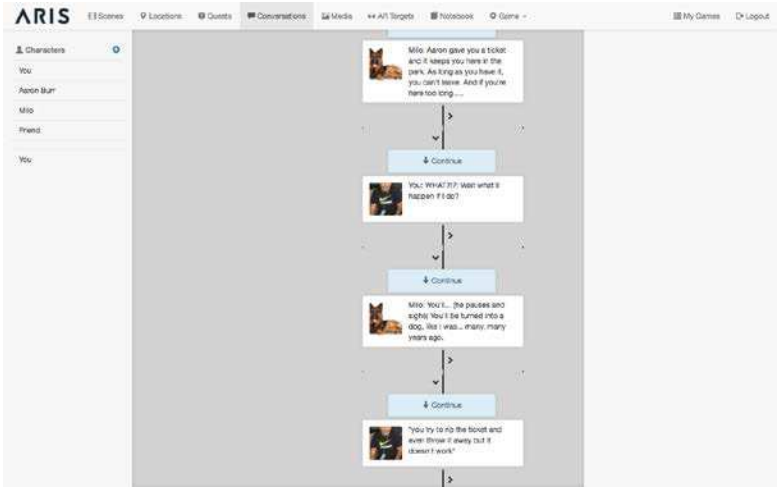

Figure 3. A conversation from Group 11's game, where the players meet their guide Milo.

Group 11 went on to develop one of the most robust storyboards of the entire camp, with 16 cards on their storyboard at the end of day 3 and 31 cards at the end of the camp. These cards included the full complement of game elements available to them, including 3 characters, 8 conversations, 12 informational plaques, 5 quests, and 3 items that had to be picked up by the player in order to escape the stadium. Their robust storyboard then translated into a fully-developed game with a beginning, middle, and end. Of the 5 quests, 4 involve demonstrating some sort of cultural knowledge, such as learning heritage language words by visiting the restrooms, reading the captions on the basketwork display, and deciphering the symbols on a sign for the stadium complex. Ultimately, players in the game, upon acquiring three knowledge points by completing the various quests, are given a key that will let them out of the stadium complex. If they don't use the key to escape, they risk getting turned into dogs like Milo, their tour guide in acquiring the various knowledge items needed to escape the stadium and win the game. In contrast to Group 6, members of Group 11 were primarily focused on learning about the cultural elements at their designated sites from day 1 so that they could create a virtual tour that would teach others. At the same time, they couched this cultural knowledge within a fun, fantastical game with a magical dog as a tour guide. Thus, while culture was a key element, it is not the only element, providing space for youth to explore multiple aspects of their identities.

Discussion

Often, when we think about designing culturally responsive learning spaces, we focus on heritage cultural practices, particularly as they are instantiated in material culture and the act of making, such as weaving a basket or a rug (Dewhurst et al., 2013). While there is meaning in the completed artifact (Hill, 1997), there is also meaning in the process of making. As Tess from Group 11 described, "It was pretty cool, because … you're like, I'm making this. I'm helping to make this. Then when you actually see the final product, it's really cool because you're like, 'I made that'" (Int., 6/15/17, p.5). In this quote, we see Tess taking ownership of her own learning. Similarly, when Eddie guided his group to make "the weirdest thing." (06/13/17, p.#), we see them collectively exercising agency and taking ownership over their own learning, as well as narratives about Indigenous peoples. In other words, we see youth exercising both self-education and self-determination (Brayboy & Castagno, 2009), two of the three pillars of how sovereignty is exercised (Wilkins & Lomawaima, 2000).

In the workshop described here, we began from two central tenets of many Indigenous Knowledge Systems (Barnhardt & Kawagley, 2005) and emphasized the process of learning and creating. First, we began

with the idea that knowledge is connected to particular places and we tasked youth with visiting, learning about, and documenting places that community members had identified as important. Sites like the tribally-owned golf course and stadium complex speak to both the community's present and future, but also to its past, as evidenced in the cultural details that both members of Group 6 and Group 11 incorporated into their games. Second, we designed the ARIS workshop and community tour assignment from the premise, central to most Indigenous Knowledge Systems, that stories matter. They are used to communicate community history and values (Basso, 1996), but they are also how we build relationships and connect with one another (Williams, 1997). Indeed, youth not only learned stories about the cultural significance of various symbols or places, but they also worked with other community members, some of whom they did not know at the beginning of the camp, to author their own stories about what it means to be young people in an Indigenous community in the Southwest who are interested in world politics and also like fantastical stories about magical creatures. Further, they authored these stories not using pencil and paper, but through programming a computer to create interactive games/tours.

Another aspect of making the ARIS workshop culturally responsive was in providing youth with an authentic, community-based audience for their virtual tours (Magnifico, 2010). As Scott, Sheridan, and Clark (2015) remind us in their conception of culturally responsive computing, it is important to consider "who creates, for whom, and to what ends" (p. 421). In her final reflective interview, for instance, Selma expressed that making her group's virtual tour was different than other video game kinds of things, which she wasn't really into, "because it had actual knowledge, and it had real-life things into it instead of just playing a game that has some made-up stuff in it and stuff like that" (Int., 6/15/17, p.6). Similarly, youth who participated in visiting a series of large metal sculptures created by a local sculptor, many of which had stories associated with them, felt tremendous responsibility to get "the facts" right (Searle et al., 2017).

In conclusion, we suggest designing computational making activities that focus not only on the completed artifact, but also on the process of making and on the less tangible ways of knowing, being, and valuing that undergird how cultural communities operate, such as beginning with the significance of narrative and place. While here we focus on these principles as they relate specifically to Indigenous communities and Indigenous Knowledge Systems, place and narrative are significant to most, if not all, cultural communities. In future work, we hope to also explore the pedagogical choices made in culturally responsive computational making activities like the one described here.

References

Bang, M., Marin, A., Faber, L., & Suzokovich, E., III. (2013). Repatriating Indigenous technologies is an urban Indian community. Urban Education, 48(5), 705-733.

Barnhardt, R. & Kawagley, A.O. (2005). Indigenous Knowledge System and Alaska Native Ways of Knowing. *Anthropology & Education Quarterly*, 36(1), 8-23.

Basso, K.H. (1996). Wisdom Sits in Places: Landscape and Language Among the Western Apache. Albuquerque: University of New Mexico Press.

Bell, P., Van Horne, K. & Cheng, B.H. (2017). Special issue: Designing learning environments for equitable disciplinary identification. *Journal of the Learning Sciences, 26*(3), 367-375.

Brayboy, B.McK. J. (2005). Toward a Tribal Critical Race Theory in Education. *The Urban Review, 37*(5), 425-446.

Brayboy, B. McK. J. & Castagno, A.E. (2009). Self-Determination through Self-Education: Culturally Responsive Schooling for Indigenous Students in the U.S. *Teaching Education 20*(1), 31-53.

Brayboy, B.M.J. & Maughan, E. (2009). Indigenous knowledges and the story of the bean. *Harvard Educational Review, 79*(1), 1-21.

Calabrese Barton, A. Tan, E., & Greenberg, D. (2017). The Makerspace Movement: Sites of Possibilities for Equitable Opportunities to Engage Underrepresented Youth in STEM. *Teachers College Record, 119*(6), 1-44.

Castagno, A.E. & Brayboy, B.M.J. (2008). Culturally responsive schooling for Indigenous youth: A review of the literature. *Review of Educational Research, 78*, 941-993.

Cattelino, J.R. (2008). *High stakes: Florida Seminole gaming and sovereignty*. Durham, NC: Duke University Press.

Dewhurst, M., Keawe, L., MacDowell, M., Okada-Carlson, C.N.K., & Wong, A.K. (2013). Ka ulana 'ana i ka piko (In weaving you begin at the center): Perspectives from a culturally specific approach to arts education. *Harvard Educational Review, 83*(1), 136-146.

DiSalvo, B., Yip, J., Bonsignore, E., & DiSalvo, C. (Eds.). (2017). *Participatory Design for Learning: Perspectives from Practice and Research*. Taylor & Francis.

Dougherty, D. & Conrad, A. (2016). *Free to make: How the Maker Movement is changing our schools, our jobs, and our minds*. Berkeley, CA: North Atlantic Books.
Duarte, M.E. (2017). *Network Soverignty.* Seattle, WA: University of Washington Press.
Eglash, R. & Bennett, A. (2009). Teaching with hidden capital: Agency in children's explorations of cornrow hairstyles. *Children, Youth, and Environments, 19*(1), 58-73.
Eglash, R., Gilbert, J., & Foster, E. (2013). Broadening participation: Toward culturally responsive computing education. *Communications of the ACM, 56*(7), 33-36.
Hermes, M. (2005). "Ma'iingan is just a misspelling of the word wolf": A case for teaching culture through language. *Anthropology & Education Quarterly, 36*(1), 43-56.
Hill, S.H. (1997). *Weaving new worlds: Southeastern Cherokee women and their basketry*. Chapel Hill: University of North Carolina Press.
Holden, C. L., Gagnon, D. J., Litts, B. K., & Smith, G. (2014). ARIS: An Open-Source Platform for Widespread Mobile Augmented Reality Experimentation. In *Technology Platform Innovations and Forthcoming Trends in Ubiquitous Learning* (pp. 19-34). IGI Global.
Kawagley, O. (1995). *A Yupiaq Worldview*. Prospect Heights, IL: Waveland Press.
Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal, 32*(3), 465-491.
Magnifico, A. (2010). Writing for whom? Cognition, motivation, and a writer's audience. *Educational Psychologist, 45*(3), 167-184.
McCarty, T.L. & Lee, T.S. (2014). Critical culturally sustaining/revitalizing pedagogy and Indigenous education sovereignty. *Harvard Education Review, 84*(1), 101- 124.
McCarty, T. L., Romero-Little, M. E., Warhol, L., & Zepeda, O. (2009). Indigenous youth as language policy makers. *Journal of Language, Identity, and Education, 8*(5), 291-306.
McCarty, T. L., & Wyman, L. T. (2009). Indigenous youth and bilingualism – Theory, research, praxis. *Journal of Language, Identity, and Education, 8*(5), 279-290.
Peppler, K., Halverson, E.R., & Kafai, Y.B. (2016a). *Makeology: Makerspaces as learning environments* (Vol. 1). New York: Routledge.
Peppler, K., Halverson, E.R., & Kafai, Y.B. (2016b). *Makeology: Makers as learners* (Vol. 2). New York: Routledge.
Quijada Cerecer, P. D. (2013). The policing of native bodies and minds: Perspectives on schooling from American Indian youth. *American Journal of Education*, *119*(4), 591-616.
Scott, K.A., Sheridan, K., & Clark, K. (2014). Culturally responsive computing: A theory revisited *Learning, Media & Technology.* DOI: 0.1080/17439884.2014.924966
Searle, K.A., Casort, T., Litts, B.K., & Benson, S. (2017). Connecting Space and Narrative in Culturally Responsive Making in ARIS with Indigenous Youth. In *Proceedings of 2017 FabLearn Conference on Creativity and Fabrication in Education.* ACM.
Searle, K.A. & Kafai, Y.B. (2015). Culturally responsive making with American Indian girls: Bridging the identity gap in crafting and computing with electronic textiles.In *Proceedings of the Third Conference on Gender and Information Technology* (Gender IT '15), pp.9-16. Philadelphia, PA: ACM.
Smith, L.T. (2012). *Decolonizing Methodologies: Research and Indigenous Peoples* (2nd ed.). Auckland: Zed Books.
Stake, R. (1995). *The art of case study research*. Sage Publications Inc.
Vossoughi, S., Hooper, P., & Escude, M. (2016). Making through the lens of culture and power: Towards transformative visions for educational equity. *Harvard Educational Review, 86*(2), 206-232.
Warrior, R.A. (1995). *Tribal secrets*. Minneapolis, MN: University of Minnesota Press.
Wilkins, D.E. & Lomawaima, K.T. (2001). *Uneven ground: American Indian sovereignty and federal law*. Norman, OK: University of Oklahoma Press.
Williams, R.A. (1997). Vampires Anonymous and critical race practice. Michigan Law Review, 95(4), 741-765.

Acknowledgments

This work was supported by a collaborative research grant (#1623453/1623404) from the National Science Foundation to Bryan Brayboy, Kristin Searle, Breanne Litts, & Yasmin Kafai. Any opinions, findings, and conclusions or recommendations expressed in this paper are those of the authors and do not necessarily reflect the views of the National Science Foundation, Utah State University, Arizona State University, or University of Pennsylvania.