Indigenizing Education with the Game
When Rivers Were Trails

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Abstract

When the Indian Land Tenure Foundation saw the need to actively respond to concerns regarding the lack of Indigenous-led land-centered knowledge in schools, they collaborated with Indigenous educators and knowledge carriers on the Lessons of Our Land curriculum. With the goal of supplementing this curriculum with an interactive way of engaging in knowledge, they collaborated with the Games for Entertainment and Learning Lab at Michigan State University to design and develop a game aimed at middle-school and high-school students in both public and tribally-owned schools. The resulting 2D adventure game When Rivers Were Trails has since been play-tested by middle-school and high-school youth across the United States during a pilot study. Results indicate best practices for implementation, including specific discussion topics as well as the role of the game as part of an Indigenization of education.

Introduction

“Education should be centered on land,” commented John, a former educator and a tribal leader from a reservation in Arizona, “because it’s the entirety of who we are” (personal communication, 2017). After eighteen years of teaching in both public and tribally-controlled schools, he understands issues involving teaching Indigenous histories. He has seen teachers who are not Indigenous attempt to teach about Indigenous cultures without Indigenous-led materials. In tribally-controlled schools, he has seen Indigenous teachers teach American histories that ignore Indigenous nations. In both types of schools, John has witnessed both a decline in and need for a land-centered curriculum.

Lack of Indigenous-led land-centered knowledge in commonly used curricula is similar to patterns in educational digital games used in classrooms. The classic educational games The Oregon Trail (1971 / 1993) and The Oregon Trail II (1995) adapt colonial westward expansion into gameplay. The games position Indigenous peoples only in relation to players who are not Indigenous and invoke interactions that focus on guiding the player and avoiding “misunderstandings” with Indigenous people so as to not be attacked by them violently (Bigelow 87). This misrepresentation of Indigenous peoples is paralleled in the way that the connected systems of land, including rocks, plants, waters, and animals,
are objectified as resources to be attained and used for the player’s purposes (Bigelow 87). These digital games, which proliferated throughout classrooms, reinforce colonial perspectives and false narratives regarding Indigenous peoples through visual representations, design, and the actions the player takes in order to win by reaching the West.

The Indian Land Tenure Foundation saw a need to actively respond to these concerns and initiated discussions with middle-school and high-school teachers in both public and tribally-owned schools in the United States. These ongoing discussions led to the idea of creating an educational video game aimed at telling Indigenous perspectives on history. The game is informed by the Foundation’s existing curriculum *Lessons of Our Land*, which addresses a gap in academic performance through standards-aligned lessons aimed at informing students about Indigenous history, culture, land recovery, and land management. The interdisciplinary curriculum, currently implemented in 381 schools, is fully adaptable to local cultures and histories. The *Lessons of Our Land* curriculum provides teachers and students with a more complete history of the United States while honoring tribal nations existing before its establishment. The game *When Rivers Were Trails* (Figure 1) was created to extend the practices of *Lessons of Our Land* through the development process, self-determined representations, and contributions to the Indigenization of education.

**Indigenous Digital Games in Education**

*When Rivers Were Trails* can be considered a social-impact game, a genre that aims to “unlock the potential of gameplay to teach or inform about social issues” (Ruggiero 597). Social impact games aim to create social awareness around a specific issue, educate players, change the attitudes and/or behaviors of players, and/or promote social engagement (Whitson and Dormann). Social-impact games have several character-
istics that inform the development process, design, and player experience. Generally, they facilitate learning through guided decisionmaking (Squire). They adapt real-world issues into gameplay for players to work through (Ruggiero), thus engaging players’ “natural curiosity,” which increases their interest and assists in building knowledge frameworks (Ray, Faure, and Kelle 63). Gameplay can also elicit empathy by immersing players in new perspectives, which contributes to “interest, motivation, and knowledge retention” (Ray, Faure, and Kelle 68). In this context, When Rivers Were Trails does not claim to be an all-encompassing educational game in and of itself, but is rather a way to engage students in the Lessons of Our Land curriculum. The game contributes to the field of social-impact games with its Indigenous-led development process, self-determined representations, and intention to Indigenize education.

Digital games with Indigenous-informed design and self-determined representations have a propensity to Indigenize education. Never Alone (Kisima Ingitchuna) (2014), developed by E-Line Media in collaboration with the Cook Inlet Tribal Council, which formed into Upper One Games, and the Tlingit and Iñupiaq storyteller Ishmael Hope, was designed as a commercial game. However, it has been played frequently in classrooms ranging from elementary to college. One lesson plan written by Not Your Mama’s Gamer’s founder and host Samantha Nomkcalb relates how Indigenous stories include Indigenous knowledge that adapts well to gameplay (Learning, Education and Games Volume 3: 100 Games to Use in the Classroom & Beyond). Reinforcing the use of digital games to express Indigenous insights, Coyote Science (2017), envisioned by Cree Creative Director Loretta Todd, was designed as an informal Science, Technology, Engineering, and Math (STEM) education game based on Coyote’s Crazy Smart Science Show for youth, which is broadcast on the Aboriginal Peoples Television Network. Although it has not been formally implemented in classrooms by the network, the game invites youth to engage in Indigenous ways of knowing science through gameplay as an afterschool or extracurricular activity. In contrast, Spirit Lake (2013), developed in collaboration with Dakota educator Dr. Erich Longie, was designed specifically to Indigenize math education in third- to eighth-grade classrooms. The gameplay merges Dakota history with multiplication, division, and geometry within the context of cultural practices and stories. Other recent and forthcoming Indigenous-led digital games that blur the lines between entertainment and education include Kakwitene VR (2019), a virtual-reality game from Mohawk developer Monica Peters, who hopes to engage players in learning how to pronounce colors in the Kanien’kéha dialect, and Tipi Builder (Tipi Kaga) (forthcoming) by Oceti Sakowin developer Carl Petersen, who aims at representing the Lakota ceremony for the construction of tipis paired with voiceovers in his language. These games each genuinely and distinctly express Indigenous cultures through gameplay, art, language, music, characters, and stories.
Among these games, *When Rivers Were Trails* was designed specifically for middle-school and high-school classrooms and focuses on Indigenous perspectives on history, expressing cultures, encouraging land recovery, and conveying land-management practices. Players take on the role of an Anishinaabe who is displaced in Minnesota due to the impact of allotment acts on Indigenous communities and heads to California in the 1890s. The player character travels through Minnesota, the Dakotas, Montana, Idaho, Washington, Oregon, and California, interacting along the way with people from nations including Dakota, Lakota, Blackfeet, Apsáalooke, Nimiipuu, and many more, each with their own unique cultural representation. The journey changes from game to game as players encounter land, waters, minerals, stars, animals, plants, Indigenous peoples, and adversaries such as Indian Agents. Players are challenged to balance their physical, emotional, mental, and spiritual wellbeing with foods and medicines while making choices about contributing to resistances as well as trading, fishing, hunting, gifting, and honoring the life they meet. The game is a result of an Indigenous-led development process that included self-determined representations with the aim of Indigenizing education.

**Development Process**

The game development process for *When Rivers Were Trails* invokes sovereignty, relating to the right of Indigenous nations to be self-governed. As Batchewana First Nation elder Carol Nadjiwon describes in her wellness curriculum, “to be sovereign is to be in power” (personal communication, January 1, 2017). In the context of game development, this means Indigenous collaborators are included in the process as equals whose voices can influence meaningful change ranging from aesthetics to narrative to design. Sovereign game development calls for going beyond consultation roles and encourages developers to include more than one Indigenous person who may potentially be tokenized (LaPensée, “The Token Trap”). Indigenous collaborators should be involved from the very beginning of the game’s development, starting at the conceptual phase, should be given key and equal roles on the development team, and should be paid ethically for their work (LaPensée, “Collaboration for Inclusive Games”).

With sovereignty in mind, the San Manuel Band of Mission Indians provided support for the Indian Land Tenure Foundation to form a game-development partnership with Michigan State University’s Games for Entertainment and Learning Lab. The game brings together Anishinaabe and Métis game developer Elizabeth LaPensée, Tongva artist Weshoyot Alvitre, more than twenty Indigenous writers, and Apsáalooke musician Supaman with creative direction by Nichlas Emmons from the Indian Land Tenure Foundation. Programming, design, and audio were implemented by the Games for Entertainment and Learning Lab.
Lab with approval phases in place for the Indian Land Tenure Foundation to maintain sovereignty in relation to the game.

Importantly, *When Rivers Were Trails* exemplifies how Indigenous contributors who do not have prior experience with game development can be involved in capacity-building collaborations which simultaneously provide opportunities and training. Weshoyot Alvitre was new to game art, although very experienced in illustrating for comics, while musician Supaman was new to the need for continuous loops in game music, although experienced with the process in another context, and all but a few of the writers were entirely new to writing for games but had experience as tribal historians, journalists, poets, and non-fiction and fiction authors. The Games for Entertainment and Learning Lab provided additional support in editing the text and audio to maintain Indigenous voices while also ensuring continuity across the game. While Supaman was able to provide music that looped due to his experience as a hip hop artist, Michael Charette’s flute playing, which provides background music throughout the game, was edited into looping audio clips by the Games for Entertainment and Learning Lab sound designers in order to fluidly transition music from scene to scene. Weshoyot Alvitre and Elizabeth LaPensée collaborated on the art process, mixing textures and merging art styles as inspired by input from Nichlas Emmons and scenarios determined by the writers based on community accounts and the *Lessons of Our Land* curriculum.

While Elizabeth LaPensée worked on user interface art, Weshoyot Alvitre prepared concept art, and the team from the Games for Entertainment and Learning Lab began structuring the gameplay (Figure 2), Indigenous writers, many of whom had no prior game-writing experience, conceptualized characters and scenarios. All writers either represented their own communities or communities they contribute to in ways that allowed them to speak with elders and language speakers to inform their scenarios for the game. Indigenous writers included

![Figure 2. Canoeing Minigame, When Rivers Were Trails (2019)]
Weshoyot Alvitre, Li Boyd, Trevino Brings Plenty, Tyrone Cawston, Richard Crowsong, Eve Cuevas, Samuel Jaxin Enemy-Hunter, Lee Francis IV, Carl Gawboy, Elaine Gomez, Ronnie Dean Harris, Tasha Hart, Renee Holt, Sterling HolyWhiteMountain, Adrian Jawort, Kris Knigge, E. M. Knowles, Elizabeth LaPensée, Annette S. Lee, David Gene Lewis, Korii Northrup, Nokomis Paiz, Carl Petersen, Manny Redbear, Travis McKay Roberts, Sheena Louise Roetman, Sara Siestreem, Joel Southall, Jo Tallchief, Allen Turner, and William Wilson, alongside guest writer Toiya K. Finley, who wrote scenarios for African American characters based on family stories and historical accounts, and guest writer Cat Wendt, who contributed Chinese characters and scenarios inspired by family stories. The game thus weaves together historical, familial, and personal insights regarding the impact of the process of colonization in the United States in the 1890s.

**Self-Determined Representations**

Self-determination refers to the right of Indigenous peoples (Smith 115) to exercise sovereignty and to determine their own political, economic, and cultural arrangements. It can refer to the efforts of Indigenous peoples to regain sovereignty after years of colonization, to restore the terms of broken treaties, or to prevent continued abuses. On an individual level, it refers to a person’s ability to exercise free will without interference. In the context of digital games, it refers to the direct involvement of Indigenous people to determine their own representations and inform design. As reinforced by Cree filmmaker Loretta Todd, Blackfoot scientist Dr. Leroy Little Bear emphasizes the ways in which multidimensional representations and connectivity akin to the internet have always been present in Indigenous communities (“Aboriginal Narratives in Cyberspace”). Thus, the participation of Indigenous peoples in game development should be expected rather than framed as new or rare.

Building on prior work, *When Rivers Were Trails* is an Indigenous spin on the educational game series *The Oregon Trail* merged with the narrative game *Where the Water Tastes Like Wine*, merging the tones of educational games with independent games and social-impact games. It adds to a growing body of self-determined Indigenous games and offers a unique model through its inclusion of numerous Indigenous voices. It exemplifies Indigenous representations not only in terms of visual and sound aesthetics but in design as well.

The game opens with a self-determined choice on the part of the player to select a clan (Figure 3). Clans inform the outcomes of actions chosen during encounters with Indian agents. For example, members of the Makwa (Bear) clan are more likely to succeed if they choose physical resistance, while the Ajijaak (Crane) clan should lean towards conversation as resistance for the best possible outcome in any given situation. The question “What clan are you?” will be recognized as a form of
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Amst 64.1 (2019): 75-93

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Following clan selection and the opening of the game, the player moves from node to node on maps which are an act of reclamation. There are a total of twelve maps in the game, which cover Minnesota, the Dakotas, Montana, Idaho, Washington, Oregon, and California. Each map is based on historically accurate maps from 1890, which focused on railroads and reservations, in large part because the settlers looking at these maps were mostly interested in how to transport goods and in where land was open for settlement (Figure 4). The navigable maps in When Rivers Were Trails instead encourage the player to look at land in relation to Indigenous nations by removing state names and borders. As the player progresses from the beginning of the game to the
very end, reservations on the maps become notably smaller and smaller, until the final map in California, which has no designated reservations. This design leads the player to gradually process the problematic loss of lands and how Indigenous nations in California were impacted by colonization.

As the player progresses across the maps via branching paths, they interact with characters through text scenarios which writers self-determined. Writers were given complete creative autonomy as long as the characters and interaction options were accurate to 1890 and acceptable for middle-school and high-school classrooms. In doing so, *When Rivers Were Trails* uniquely and openly addresses many Indigenous issues, such as land loss, loss of traditional medicinal and food practices, displacement, relocation, stolen children (Figure 5), boarding schools, weaponized illnesses, and government control. The player navigates these interactions with different action options which are unique to each scenario, including gifting, trading, asking questions, listening, fishing, and hunting. Unbeknownst to the player, particular actions earn or lose honor, which changes the perspective of historical stories displayed between the maps and some scenarios later in the game.

![Figure 5. Scenario by E.M. Knowles, *When Rivers Were Trails* (2019)](image)

Allowing the players self-determination in their choices is just as important as giving space to Indigenous collaborators to express themselves. This ensures a sense of autonomy for the players while allowing knowledge and perspectives from Indigenous peoples to come forward, which is especially important given the extent to which Indigenous perspectives are often erased, diminished, or misrepresented in education. *When Rivers Were Trails* facilitates varied experiences for players and encourages replayability, which can lead to dynamic discussions involving sharing and reflecting in educational contexts.
Indigenization of Education

_When Rivers Were Trails_ aims to Indigenize education, particularly in regards to Indigenous perspectives on history, expressing cultures, encouraging land recovery, and conveying land management practices. The game was not developed with the presumption that it is possible to decolonize education, meaning the complete restructuring of knowledge production (Gaudry and Lorenz 219), within inherently colonial institutions. Furthermore, the curriculum and classroom structure within which the game is played is integral to ensuring that it acts as an intervention to Indigenize education. That is, if _When Rivers Were Trails_ is paired with a colonial-centric curriculum that lacks Indigenous representations or misrepresents Indigenous perspectives, then it may offer a counterpoint to the latter but it merely focuses on reconciliation, which “locates indigenization on common ground between Indigenous and [settler] ideals, creating a new, broader consensus on debates such as what counts as knowledge, how should Indigenous knowledges and European-derived knowledges be reconciled, and what types of relationships academic institutions should have with Indigenous communities” (Gaudry and Lorenz 219). The pilot study conducted in classrooms resulted in findings indicating that, in order to genuinely Indigenize education, the colonial-centric curriculum needs to be replaced entirely by the Indian Land Tenure Foundation’s _Lessons of Our Land_ curriculum and taught alongside gameplay sessions of _When Rivers Were Trails_.

For this study, teachers of fifth- to tenth-grade students in public middle schools and high schools across the United States collaborated with the development team of _When Rivers Were Trails_ to conduct a pilot study to identify best practices for integrating the game into classrooms and to determine whether the game engages students in Indigenized education, with the goals of deploying the game more widely with a teacher’s guide and of designing future studies. Teachers in Florida, Michigan, Montana, and Oregon held gameplay sessions both in and outside of classrooms, determined whether or not to integrate the _Lessons of Our Land_ curriculum based on factors such as teaching style and time constraints, and asked students to respond to an optional online survey. Fifty-one student responses and four teacher reflections were collected, analyzed, and compiled into recommendations for a teacher’s guide with emergent themes.

Most notably, results suggested that teachers should interweave the _Lessons of Our Land_ curriculum with gameplay sessions of _When Rivers Were Trails_ and engage students in themed discussions. Due to its cultural and historical depth, students should play the game with a better understanding of how the game’s characters, scenarios, and gameplay fit within history by also engaging in the _Lessons of Our Land_ curriculum. Teachers may assign gameplay by playing as an entire class, playing in groups in class, playing individually in class, or playing individually
outside of class. Across all gameplay approaches employed by teachers, survey responses indicated that students primarily recalled their own emotions while playing the game or their interpretation of the emotions and experiences of game characters and animals. They retained broader themes regarding the impact of allotment on Native peoples, such as “lack of food,” as well as cultural practices, such as how “cutting hair is a sign of loss.” When students played the game without also engaging in the Lessons of Our Land curriculum, they retained less specific information that they would be conventionally evaluated on in colonial-centric education, such as remembering the names of nations, locations, and titles of historical moments of importance. Whether the game was played independently of the curriculum or alongside the curriculum, survey responses suggested implications for further studies looking specifically at the ways in which the game facilitates empathy for Indigenous experiences and perspectives in students who are not Indigenous and self-identification in Indigenous students. In all classes, teachers gravitated towards discussions as a pedagogical approach. The following themes emerged, offering structure for future discussions in middle-school and high-school classrooms using both When Rivers Were Trails gameplay and the Lessons of Our Land curriculum side by side.

History of Allotment

The United States government began the policy of allotting Native land as early as 1798. Several treaties with Indian tribes included provisions that stated land would be divided among their individual members; however, Congress declared in 1871 that no further treaties would be made and that all future dealings with Native peoples and tribal nations would be conducted through legislation.

There were many reasons why allotment proponents supported the policy. First, many of them considered the traditional Indigenous way of life and collective use of land to be uncivilized. They also saw the individual ownership of property as an essential part of civilization that would give Native peoples a reason to stay in one place, cultivate land, disregard the cohesiveness of the tribe, and adopt the habits, practices, and interests of the American settler population. Furthermore, many thought that Native people had too much land and were eager to see Indian lands opened up for settlement as well as for railroads, mining, forestry, and other industries.

The Allotment advocates eventually succeeded in convincing the federal government to adopt the policy nationally. In 1887, Congress passed the General Allotment Act, which authorized the U.S. President to survey Indian tribal land and divide it into partitioned land for individuals and families. The Allotment Act (also known as the Dawes Act, named for Senator Henry Dawes of Massachusetts, the Act’s lead proponent) was applied to reservations whenever, in the president’s
opinion, it was advantageous for particular tribal nations. Members of
the selected tribe or reservation were either given permission to select
pieces of land—usually around 40 to 160 acres in size—for themselves
and their children, or the agency superintendent assigned the tracts. If
the amount of reservation land exceeded the amount needed for dis-
bursement, the federal government could negotiate to purchase the land
from the tribes and sell it to settlers who were not Native. As a result, 60
million acres were either ceded outright or sold as “surplus lands” to the
government for homesteaders who were not Native and for corporations.

**Allotment Discussion**

Although the General Allotment Act was the first major piece of
legislation designed to break up reservations across the United States,
there had already been forms of allotment implemented. Following the
major legislation, many tribes were separated and distributed under both
this act as well as special legislation that was unique to their tribe or
reservation with special provisions.

In *When Rivers Were Trails*, you are an Anishinaabe who has just
returned to his*her land following allotment. Your land has been given
away without your knowledge and you are run off by settlers (Figure 6).
You are supposed to head to White Earth Reservation, but you make
your own choices about where to go. This poignant opening is based on
a true family story from Vern Northrup, a Fond Du Lac Band of Ojibwe
band member who protected land as a firefighter for many years and who
now expresses Anishinaabe relationality with land as a gallery-exhibited
photographer.

Discussion prompts include: What was the General Allotment Act
and when did it occur? Who had a say in how the act was applied? How
did it impact Indigenous lands and nations? How was it used to inform
later allotment?

*Figure 6. Scenario by Elizabeth LaPensée, When Rivers Were Trails (2019)*
Land Loss and Recovery

Land is a critical base for spiritual practices, beliefs, and worship, and can be a keeper of memories, a portal to the spirit world, or a place to go for guidance and strength. Land also supports cultural practices such as hunting, fishing, farming, and harvesting wild foods. Maintaining strong cultural and spiritual ties to the land is necessary for preserving traditional practices and Native religious beliefs for future generations.

Approximately 90 million acres of tribal lands were taken out of Native ownership and control after the allotment process officially began in the late 1880s. From 1887 to 1934, 60 million acres of Indigenous lands were sold or transferred to settlers. Another 30 million acres were lost due to the 1906 Burke Act, which sped up allotments and forced sales and other types of takings. These lands remained within original reservation boundaries but were no longer under Native ownership and control. In the end, land that had been held in common by the entire tribe was divided into a mix of trust lands, fee lands, and lands owned by the tribe, individual Native peoples, and settlers.

Today, the loss of tribal lands and the mixed ownership patterns within reservation boundaries pose serious challenges for the sovereignty and self-determination of tribal nations. Loss of access to sacred and cultural sites makes it harder for each successive generation to remain rooted in Native culture. The checkerboard ownership pattern creates jurisdictional challenges and makes it very difficult to use reservation land for economic development. Billions of dollars in income are derived from these alienated lands, but the money goes off the reservation instead of to the tribal communities that need it most. Returning lands to Native ownership and control is important to ensure that Native peoples have access to the financial and natural resources within their own reservations. To do so, tribes must develop plans to reacquire reservation lands, including land and natural resource-management plans that identify the future use and benefits of recovered lands. These plans are critical as tribes negotiate for the transfer of federal, state, and municipal lands to Native ownership and control and seek loans to purchase lands.

Land Loss Discussion

Although land loss occurred prior to Allotment becoming federal government policy in the late 1880s, the vast majority of Native land loss happened as a result of Allotment policies passed between 1887 and 1934. Approximately 60% of all lands found within the original boundaries of reservations were sold to settlers and corporate interests (Figure 7). This decline in land ownership reduced the ability of Native peoples to use the land to nurture their economic development and cultural practices.

Discussion prompts include: How did land allotment impact Indigenous people? With reservation boundaries still intact, how might the
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**Resistance Discussion**

Resistance can be defined in a variety of ways and through many actions. In the late 1800s, some tribal nations were much more aggressive in resisting American encroachment on their lands while others held land through assertive but non-violent means.

In the game, attention is drawn to the multitude of strategies from Red Lake (Figure 8), whose Anishinaabeg banded together, held land, and coordinated in selecting contiguous allotments in order to avoid checker-boarding the land. You are called on to participate in holding the land near the lake, for which you must exchange Wellbeing, since the path of resistance is not an easy one.
Discussion prompts include: Did you participate in resistance? If so, which resistances? What were the outcomes? What is your perception of how resistance relates to land recovery?

Cultures

Indigenous cultures must be recognized as unique from one another, with their own community structures, traditions, practices, languages, and stories. As observed and commented on by community partners who contributed to the Lessons of Our Land curriculum, a colonial-centric curriculum typically obscures differences between tribal nations and generalizes Indigenous peoples. Community partners and Indigenous curriculum writers collaborated closely with the Indian Land Tenure Foundation to develop a tribally-approved curriculum that honors the uniqueness of the many cultures across the lands represented in the lessons. When Rivers Were Trails mirrored this process by including over twenty Indigenous writers who worked with elders, language speakers, and storytellers to validate their characters, scenarios, and representations of land. Traditions and stories are particularly emphasized throughout the game due to the design.

Traditions Discussion

Traditions and histories vary greatly across the many tribal nations established within what has been referred to as the North American continent since colonization. For example, languages and ceremonies are intricately tied to the specific environments from which they originated. These types of interactions recognize the importance of the peoples’ connections to the land and other natural resources. When Rivers Were Trails highlights many cultural traditions as indications of how to interact, such as cut hair implying mourning, the importance of not making direct eye contact out of respect, and gifting tobacco as a form of support or when in need of knowledge (Figure 9).

Discussion prompts include: What cultural traditions did you come across? How did the cultural traditions influence your interactions?

Storytelling Discussion

Storytelling remains one method for passing along both physical and cultural histories of a tribal nation’s sense of place. As both a traditional and a contemporary way of communicating, storytelling passes on cultural and moral values to the next generation, thereby ensuring the next generation’s ability to pass along a community’s cultural worldview. When Rivers Were Trails includes collecting stories along the way (Figure 10).
Discussion prompts include: How many stories did you collect? Which stories did you collect? What are the differences between historical and personal stories? Which stories do you recall most?

**Land Management Practices**

As the General Allotment Act was implemented on Indigenous lands across the United States, the lands perceived to be the most valuable were typically declared as surplus and therefore sold or transferred to settlers (*Lessons of Our Land*). And, while much of the land that remained in Native control is still productive, the fractionated ownership of trust lands and the excessive federal bureaucracy involved in managing these interests make it difficult for Indigenous peoples to use these lands themselves. The emergent trust relationship between the United States and tribal nations began to more fully delegate control over Native lands to the federal government. Additionally, the vast majority of
agricultural lands on reservations are leased to ranchers who are not Na-
tive, oftentimes at less than fair-market value. Some tribal nations have
access to valuable natural resources, but the federal government, acting
as trustee, has allowed energy, mining, and other extractive industries to
exploit tribal nations by routinely shortchanging them on royalties from
oil, gas, timber, and other purchase or lease agreements on Native land.
*When Rivers Were Trails* reveals the history from which these contem-
porary issues arise and reroutes to land-based education, particularly in
connection with food practices and medicinal teachings.

**Food Practices Discussion**

Food was gathered through many practices, including hunting
(Figure 11), fishing, foraging, gardening, and trading. There are several
instances in which you are invited to come along to hunt, fish, or for-
age. You may meet people who are gardening and willing to share or
trade food. You may also come across people who are in great need of
food with nothing available to trade in exchange. Your ability to give
gifts and care for other people is dependent on how well you have bal-
anced your choices and what has happened randomly out of your control
throughout your journey.

![Figure 11. Hunting Minigame, When Rivers Were Trails (2019)](image)

Discussion prompts include: What foods did you come across? Did
you mostly trade, gather, receive foods as gifts, give foods as gifts, hunt,
or fish? What foods did you gather? What foods were gifted to you?
What foods did you gift? How did you gain foods from hunting? What
foods did you gain from hunting? How did you gain foods from fishing?
What foods did you gain from fishing? What were notable differences
between gathering, setting traps, hunting, and fishing? What is your
perception of the value of foods in Indigenous communities?
Medicine Teachings Discussion

While foods are also considered a form of medicine in regards to the nourishment and benefits they provide, including vitamins and prevention of illnesses, there are also practices involving gathering, making, and using medicinal plants. In the game, you may come across plants and only be able to gather the leaves for medicinal purposes, rather than gathering the berries for food (Figure 12). These instances are randomized throughout your journey and balanced based on your needs and the state of your Wellbeing.

![Image of a plant with leaves and a raspberry]

Discussion prompts include: What medicines did you come across overall? Did you mostly trade, gather, receive medicines as gifts, or give medicines as gifts? What medicines did you gather? What medicines were gifted to you? What medicines did you gift? In what ways were medicines helpful? What knowledge did you gain about medicines? What is your perception of the value of medicines in Indigenous communities?

Conclusions and Future Work

Throughout When Rivers Were Trails, players are welcomed to engage in Indigenous perspectives on history, recognize the vastness of Indigenous cultures, enact land recovery, and participate in land-management practices. These important interventions in education are made possible through a game because of an Indigenous-led development process which led to informed design decisions. Playing When Rivers Were Trails helps to facilitate engaging students in education through interaction, but should be integrated into the Lessons of Our Land curriculum if teachers want students to retain specific details such as names, locations, and titles of historical moments of importance.
When Rivers Were Trails offers a model for sovereign game development, self-determined representations in games, and possibilities for Indigenizing education. Digital games have the potential to rectify concerns regarding the teaching of Indigenous issues in classrooms in dynamic interactive ways when the development process and game content deeply involve Indigenous collaboration. Through When Rivers Were Trails, educators can address Indigenous perspectives on history, cultural expression, land recovery, and land management practices. If the game is used in conjunction with the Lessons of Our Land curriculum, teaching with Indigenous perspectives can be interactive and result in students retaining informational details about Indigenous history and land practices.

Currently, assessment of the game is preliminary, as only one pilot study designed in collaboration with community partners and teachers has been conducted. Future studies will include a closer analysis of whether and how When Rivers Were Trails informs students about Indigenous perspectives on history, Indigenous cultures, land loss and recovery, and land management when it is played by students in classrooms in conjunction with lesson plans from the Lessons of Our Land curriculum. Unexpectedly, the pilot study indicated that the game facilitates empathy for Indigenous experiences from students who are not Indigenous, which suggests the need for future in-depth studies on its role as a social-impact game. Overall, the pilot study results also indicate that there is a role for future games which carry on sovereign-game development practices to generate self-determined Indigenous games with the hope of Indigenizing education.

**Resources**

Lessons of Our Land. https://www.lessonsofourland.org/.

Land Tenure History. https://iltf.org/land-issues/history/.

Land Tenure Issues. https://iltf.org/land-issues/issues/.

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