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**Cultural Awareness through Games: A Survey of Games Currently Used to Communicate
Cultural Awareness in Cooperation with the Foundation for Digital Games Culture**

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Abstract

In a time where UNESCO is calling for preservation of cultures and intercultural dialogue, video games such as *Never Alone* are finding themselves able to contribute to the cause by heightening players' cultural awareness. The Foundation of Digital Games Culture's (Stiftung digitale Spielkultur) Catalogue of Games with Pedagogic Potential, which includes *Never Alone* and other games geared towards teaching about social issues, provides players a resource for finding educational games. However, there is room for further additions to this catalogue in the field of cultural awareness. As entry to the catalogue is predicated upon the games' use in a workshop hosted by the FDGC partner, Medienboard Berlin-Brandenburg, this thesis will aim to find the recommendations for these workshops (and the FDGC catalogue) which best accomplish the goal of cultural teaching.

Using the database of game works provided by the group Indigenous Game Developers, this study identifies the best candidates through a successive elimination process. Considering accessibility for the foundations in question, mechanics utilized, effect on player cultural awareness, past accolades, and potential use cases, this study argues that the games *Growing Up Ojibwe*, *Mu Luodda*, *On the Path of the Elders*, *Rievssat*, *Thunderbird Strike*, and *When Rivers Were Trails* would make the best additions to the FDGC catalogue. The FDGC and MBB are encouraged to use the games suggested not only in workshops, but in the online catalogue, to provide players and educators with a resource for finding culturally educational games. Additionally, an argument is made for further research into the effectiveness of culturally educational mechanics on players, in the hopes of developing a framework for future game development.

Disclaimer: I am a white, German-American woman with no Indigenous roots. The games observed in this study shall only be judged through a game design lens: on the basis of their mechanics and educational potential. Their intrinsic emotional and cultural value is not for me, nor any non-Indigenous outsider, to judge.

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List of Abbreviations

FDGC: Foundation of Digital Games Culture

MBB: Medienboard Berlin-Brandenburg

IGD: Indigenous Game Developers

1 Introduction

1.1 Culture and Video Games

In a globalized society, a person's need to interact with people different from them is inevitable. Specifically differences in culture – beliefs, traditions, ways of living, etc. (UNESCO, 2001) – can trigger conflict not only on a regional scale, for example in the workplace (The Economist Intelligence Unit, 2015), but also on a global scale.

“In this new, turbulent international globalized landscape, a central message must be heralded: peace is more than the absence of war, it is living together with our differences [...] while furthering universal respect for justice and human rights on which such coexistence depends” (UNESCO, 2013).

The above quote stems from UNESCO's appeal for “intercultural dialogue” (UNESCO, 2013), a calling for mutual understanding between cultures to enable a life in harmony with one another. In addition to their Universal Declaration on Cultural Diversity (UNESCO, 2001), the organization has also taken the lead on the International Decade of Indigenous Languages 2022 – 2032 (UNESCO, 2022), proclaimed by the United Nations General Assembly. The aim of this decade is to raise awareness in hopes of preserving an estimated 6,700 Indigenous languages which threaten to go extinct, taking their culture and knowledge with them. (UNESCO, 2022)

The coexistence referenced in the call for intercultural dialogue relies not only upon an exchange of knowledge, but upon the preservation of the knowledge itself. Thankfully, this is something each and every person can contribute to for themselves.

Media such as documentaries and news reports can attempt to show the creator's culture, preserving it by way of allowing others to view and learn from it.

In a similar way, video games have also used their medium to shine, such as E-Line Media and Upper One Games' hit title *Never Alone (Kisima Ingitchuna)* (Upper One Games, 2014), henceforth called “*Never Alone*”. Here, players step into the role of a young Inuit girl, Nuna, who traverses the tundra with the help of a fox spirit in the wake of her village being ruined. The game is accompanied by Iñupiaq narration provided by one of the tribe's elders, features artwork from native artists, and includes educational interviews unlockable through gameplay which explore aspects of Inuit life and tradition.

“It looks to the future, both in finding new ways to share old information and adjusting to global changes to help the Iñupiaq culture carry on” (Williams, 2018).

Never Alone provides a prime example of how games can be used to not only give players exposure to and understanding for other cultures, but also how they can be used as a means of preserving old knowledge so that new generations can learn from it as well. In essence, how they can achieve the very goals of UNESCO noted above.

However, despite their potential for learning and the presence of many games that can teach about the subject of culture, a source that compiles such games specifically couldn't be found. As a result, players and educators who hope to raise the cultural awareness of themselves or their students through gaming have to search for such games themselves – individually and with no direct confirmation of their validity.

1.2 The Foundation of Digital Games Culture

The Foundation of Digital Games Culture (in German “Stiftung digitale Spielekultur”), henceforth referred to as FDGC, has provided a basis for solving this issue in their list of games with “pedagogic potential” (Stiftung digitale Spielekultur, 2023). In addition to *Never Alone*, the catalogue features a number of other sensitizing and educational games such as *Bury Me, My Love* (The Pixel Hunt et al., 2017) and *This War of Mine* (11 Bit Studios, 2014). The catalogue of 96 games and 19 game design tools is composed of games used in the workshops provided by their partner company Medienboard Berlin-Brandenburg (MBB), which teach gamers of all ages about a wide variety of topics such as history and social issues.

That said, the need for games which promote cultural awareness in this catalogue is not yet answered to the highest possible degree. More workshops would need to be held by the FDGC and MBB to provide more culture-focused additions to the catalogue. As stated above, however, resources for finding particularly educational games in the cultural field are few; this goes for companies just as much as for individual users.

1.3 Key Research Objective

To allow the FDGC to expand their catalogue, this thesis will aim to identify the games that best promote cultural awareness that would also be in keeping with the FDGC's Catalogue of Games with Pedagogic Potential. By expanding the catalogue, workshop participants, educators, and viewers of the catalogue alike will be afforded the chance to increase their cultural awareness.

1.4 Overview

In this study, a database of Indigenous-made media works cultivated by Indigenous Game Developers (IGD) (Indigenous Game Developers, 2023) was identified for analysis based upon the principles of self-representation laid out by Elizabeth LaPensée (LaPensée, 2018b), which among other things, helps to ensure accuracy in representation and a lack of foreign bias and stereotyping.

The IGD's Game Works database will be narrowed down to the most suitable options for the FDGC catalogue via a five-tiered analysis. The first tier identifies which works are not yet present in the FDGC catalogue. The second tier identifies works which fit with the current formats presented by the FDGC's catalogue, i.e. platform and availability.

Works which are identified as suitable in the first two tiers will then be examined by whether or not they are a game and show pedagogic potential. This analysis will be conducted based upon the Learning Mechanics – Game Mechanics (LM-GM) Model by Arnab et al. (Arnab et al., 2015).

Thereafter, the games which are found to have pedagogic potential will be examined for their ability to raise a player's cultural awareness. This will be determined by their mechanics' ability to address and increase a player's key qualities in cultural awareness, of which three are identified by this study.

Finally, games that fulfil all the above criteria will be examined in-depth regarding their past successes and potential use cases. Their full LM-GM analysis will be shown to provide context for understanding how they address key points of cultural awareness. Those which address all three key points will be identified as those most suitable for the FDGC catalogue.

This methodology of determining a game's culturally educational potential was chosen over a quantitative analysis of test persons, as defining a control group would have presented too many random variables (e.g. cultural background, experiences, prejudices, etc.) to ensure accurate measurement of growth and effectiveness of mechanics.

2 Literature Review

2.1 Definitions and perspectives

Many key words and phrases build the foundation of this thesis. Understanding their meanings is key to understanding the content and aim of this research.

2.1.1 Video Games and Pedagogic Potential

In order to identify games with pedagogic potential, it must be known what each of the terms imply.

Video games are very generally defined as “an electronic game in which players control images on a video screen.” (Merriam-Webster, 2023) This can include both entertainment games, which place more focus on fun, and serious games, which are developed with the intention to teach or prompt a change in behavior (Susi et al., 2015). As this study aims to identify games with pedagogic potential, more focus will inevitably be placed on serious games.

However, the definition of a video game in itself is quite vague – what constitutes a game? In order to answer this question, one must look at the mechanics employed.

Mechanics are defined in the Mechanics-Dynamics-Aesthetics model as “the various actions, behaviors and control mechanisms afforded to the player within a game context” (Hunicke et al., 2004). In simple terms, what the player can *do* in a game.

“For example, the mechanics of card games include shuffling, trick-taking and betting – from which dynamics like bluffing can emerge” (Hunicke et al., 2004).

This definition applies to what Arnab et. al (Arnab et al., 2015) describe as “game mechanics”, as opposed to what the same study dubs “learning mechanics”, which are observed not in game design but rather in pedagogic design. Through the logic of Hunicke et al.’s above definition, “learning mechanics” can be understood as educational elements that lead to educational dynamics, whereas “game mechanics” would be playful elements that lead to playful dynamics. Figure 1 provides a non-exhaustive list of game and learning mechanics identified in Arnab et al.’s 2015 study.

The dynamics which arise from these mechanics can be used in analysis of serious games’ learning effects and potential. A description of what each mechanic means has been detailed in a study by Lim et. al (Lim et al., 2013), with Lim having also worked on the 2015 study from Arnab.



Figure 1: An overview of learning and game mechanics (Arnab et al., 2015)

For the sake of understanding, some mechanics which will be referenced in this study will have their definitions from Lim et al. listed below. These are those whose terminologies are either not a part of or in-line with their everyday usage or whose definitions could easily be confused with those of other mechanics.

Learning Mechanics

- **Instructional:** An educator provides active support to learners within a given framework.
- **Guidance:** Helps students see the structure and direction of the learning material.
- **Participation:** Process of actively engaging with the task at hand, learning and internalizing it

- **Feedback:** Concrete advice on performance to help learners better understand values, standards, criteria, etc.
- **Assessment:** Measurement of the learner's progress and achievements (ex. quizzes, exams, projects).
- **Explore:** Uncovering relationships and new information via free exploration and experimentation, with less focus on specific didactic methods.
- **Discover:** The process of drawing on past experiences to form new learnings and inform problem-solving approaches.
- **Identify:** The process of identifying personally with a studied object.
- **Objectify:** The process of breaking down learning objectives into concrete, measurable outcomes.
- **Simulation:** Simulation specifically of cause-and-effect.
- **Ownership:** The process of internalizing what is learned and being able to construct new knowledge.
- **Accountability:** Learners take responsibility for their education by taking control of the direction and content of their learning. (Lim et al., 2013)

Game Mechanics:

- **Cascading Information:** Information revealed in small increments, in order to teach only what is needed in the present moment.
- **Behavioural Momentum:** "Used to give confidence and motivate players to continue the game" (Lim et al., 2013).
- **Role Playing:** Making success in-game dependent on a player's ability to adopt a virtual role.
- **Urgent Optimism:** Instilling a desire in the player to take immediate action while giving them reason to believe their action will be successful.
- **Status:** Accolades to be earned such as titles, levels, tiers, rank, etc. (Lim et al., 2013).
- **Assessment:** Defined in Arnab et al.'s work, not listed in the original list of definitions from Lim et al. Used as a game mechanic, as opposed to the Assessment learning mechanic, this can be understood as a measure of a player's in-game performance, rather than their learning performance (Arnab et al., 2015).

To solve the issue of video games' rather vague definition, this study will draw upon Arnab et al.'s game mechanics. Video games will be defined as any works of interactive media that make consistent and significant use of a variety of these game mechanics.

Similarly – as an exact definition of “pedagogic potential” was not able to be obtained from points of contact within the FDGC – potential will be identified with the aid of Arnab et al.'s learning mechanics as a basis. For the purposes of this study, a consistent use of a variety of learning mechanics is needed to warrant a work being referred to as having pedagogic potential.

These definitions and their focus on variety will help to avoid effects of randomness, limiting works for examination to those which knowingly and meaningfully make use of game and learning mechanics, rather than having one appear in the work by chance.

As stated above, the list of mechanics provided by Arnab et al. is non-exhaustive. However, to achieve an objective analysis, these will be the only mechanics referred to in the course of this study. As the list of potential game mechanics can vary greatly depending on which of many taxonomies one draws upon, constructing a complete list would warrant a separate study with extensive research and validation. Leaving the pool of game mechanics open-ended could introduce bias, subjective judgement, or randomness into the analysis, undermining its objectivity. Narrowing the definition of “mechanics” down to those already defined by Arnab et al. allows a systematic and consistent analysis.

2.1.2 The Learning Mechanics – Game Mechanics Model

Pedagogic potential in video games requires more than good information and a will to teach it; the game design must also be suitable for teaching and playing both. A game that focuses solely on educating risks being so boring as to lose its players' attention, so that teaching cannot occur at all. Conversely, too much focus on playability can negatively impact the ability to teach. The Learning Mechanics – Game Mechanics (LM-GM) Model was developed as a means “to determine at which point game-play and pedagogy intertwine” (Arnab et al., 2015).

Arnab et al. developed the LM-GM Model (Arnab et al., 2015) as a tool for analyzing the relationship between learning mechanics and game mechanics in games. Having compiled a list of game and learning mechanics, they were able to draw a connection between the two – for example, linking

role-play and tutorials to participation and “Questions and Answers” – to provide aid in defining how they meaningfully support the gameplay experience.

An analysis with the LM-GM Model can be conducted with the help of a table, matching together each game mechanic with a learning mechanic, followed by analyzing its in-game implementation and resulting learning effect on players. For an example, see Table 1.

Table 1: An example of an LM-GM Model analysis

Game Mechanic	Learning Mechanic	Implementation (Game Design)	Usage (Pedagogy)
Time pressure	Action/Task	Countdown; limited time for each task	Highlights sense of urgency; Enhances activity and engagement

Though the exact execution of the analysis as seen in an example provided by Arnab et al. in the 2015 study shows occasional inconsistencies in the use of “implementation”, sometimes describing effects rather than concrete game elements, this study will focus on the latter, as it is the more common usage of “implementation” in Arnab’s examples.

With the help of the LM-GM Model, games analyzed in the course of this study will be able to have their game and learning mechanics brought into perspective in order to shine light on the learning effects they can prompt in players. Their mechanics that are conducive to pedagogy, or lack thereof, will give insight as to their “pedagogic potential”, while their game mechanics will qualify or disqualify them as “games”.

2.1.3 Culture and Cultural Awareness

As the games analyzed in this study must target pedagogic potential as it related to cultural awareness, it must first be defined what the term entails.

For the purposes of this study, “culture” can be understood by the definition used by Yosso in her discussion of community cultural wealth: “behaviors and values that are learned, shared, and exhibited by a group of people. Culture is also evidenced in material and nonmaterial productions of a people” (Yosso, 2005). UNESCO provides a further, more concrete list of cultural elements: “The

set of distinctive spiritual, material, intellectual and emotional features of society or a social group [...] It encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs” (UNESCO, 2001).

Use and definition of the term “cultural awareness” varies greatly. Definitions often overlap either completely or partially with those of intercultural competence (Guilherme, 2004), cultural competence (Kubokawa & Ottaway, 2009; Moule, 2011) or cultural sensitivity (Foronda, 2008).

“Cultural awareness” itself is defined in a book by Tomalin and Stempleski through three key aspects: “awareness of one’s own culturally-induced behavior, awareness of the culturally-induced behavior of others, [and] ability to explain one’s own cultural standpoint” (Tomalin & Stempleski, 1993).

However, as noted above, this particular definition sees much overlap with related terms.

Take for example, Moule’s definition of “cultural competence” (Moule, 2011): the ability to interact with those whose culture differs from one’s own through the successful gaining of cultural knowledge, skills, and sensitivity. By this definition, cultural competence is predicated upon a person’s ability to recognize differences between cultures and behave accordingly in interaction with others. Essentially, this definition covers that of Tomalin and Stempleski, while providing the helpful addition of how to achieve this understanding. The focus of the term is also broadened beyond simple behavior.

Kubokawa and Ottaway’s (Kubokawa & Ottaway, 2009) definition of the same term serves to complement the definition from Moule and lay the clear focus on culturally-induced behavior that Moule lacks. Here, a need for understanding that the behaviors, values, and perception of the self can differ from person to person on the basis of their cultural background is specified.

The understanding that is required as per these two definitions serve to further specify Tomalin and Stempleski’s focus on awareness of the self and others, but add the notable aspects of interaction, empathy, and an understanding for values and worldviews beyond simple behavior.

Though this study will lean most heavily on the definition provided by Moule, each definition above provides a valid point to the understanding of cultural awareness. Whether one refers to it as cultural awareness, (inter-)cultural competence, or cultural sensitivity, the definition remains based upon a person’s ability to:

- Recognize differences between one's own culture and another, [C1]
- Understand how these differences can affect lifestyle, values, and identity, [C2]
- Interact with people from various cultural backgrounds with sensitivity. [C3]

Therefore, this blended definition will be applicable throughout the course of this study. The three points listed above will be referred to as C1, C2, and C3 respectively.

With the basic knowledge for this study defined, one can then begin to develop a deeper understanding of the theory surrounding this study.

2.2 Prior Research in the Field

The field of video games for cultural pedagogy has been touched upon by multiple studies, two of which provide insights into effectiveness in the conveyance of information (Mortara et al., 2014) and in raising learner engagement (Crow, 2015).

A study by Crow (Crow, 2015) on the use of a virtual learning space to teach children the Māori language showed that learner engagement can be raised through the use of in-game, virtual spaces. After the iterative development and design of a low-tech language-learning game prototype, he conducted quantitative pre-tests and post-tests on students to evaluate vocabulary retention. The tests showed that students were, indeed, retaining learned vocabulary through the use of the game. Additionally, verbal feedback gathered from students during use of the software indicated high motivation and engagement among learners; initial iterations of the tool with few gamified elements were even found to be effective simply because students could move around within the virtual space. It was noted that the ability to explore was a key desire and a key motivator of learners. The results of this study imply that not only can theoretical knowledge, such as vocabulary, be successfully conveyed in a game environment, but also that exploration of a virtual space can be conducive to learning by way of increasing a learner's desire to engage with the material. This suggests that exploration in-world provides vital support in a good culturally teachable game.

On the topic of teaching cultural awareness specifically, a 2014 study by Mortara et al. (Mortara et al., 2014) on the game *Icura*, a game designed to teach players about Japanese culture, gives insight into the use of games to impact a player's cultural awareness. The study aimed to discover whether players were able to synthesize information about Japanese life and tradition learned through gameplay, and the results were overwhelmingly positive. Players, having been given a pre-test before

playing *Icura* and a post-test afterwards, each time answering theoretical questions about the culture of Japan, showed an increase in topical knowledge and an ability to compare and contrast Western and Japanese culture after playing – thus fulfilling the C1 point of cultural awareness. Players cited the immersive environment of *Icura* as a particularly helpful aspect in their learning, a noteworthy harkening back to Crow’s research and its resulting implication. However, here only an “immersive environment” is mentioned; while this may refer to an explorable game space, it is also possible that such immersion could have mechanics other than exploration at their core.

These studies confirm that games are a valid tool in the pedagogic field, capable of conveying theoretical knowledge to students – at the very least when presented in an immersive environment. Moreover, their value as a tool for teaching matters of culture is clear. However, theoretical knowledge is only one half of the matter.

It is necessary to examine how games function when targeting players’ emotional skills. While the studies above examined video games’ worth in teaching quantifiable knowledge such as language or factual information, their worth in teaching empathy and self-examination – both key factors in cultural awareness – remains to be discussed.

Anderton and King (Anderton & King, 2016) examined precisely this notion. Through qualitative documentation of students’ gameplay reflections and experiences in *Elder Scrolls IV: Oblivion*, they found that test students reported a sense of “culture shock”, which led them to link their in-game experiences to their real-life emotional responses. This ability to identify with in-game events ultimately led to self-reflection on their biases, beliefs, stereotypes, and prejudices, addressing the very basis of cultural awareness. Similarly to the immersion that is noted to occur through exploration by Crow, the findings of this study would seem to imply that the “identify” learning mechanic may be beneficial for cultural learning.

Despite this knowledge on using games as tools for learning, and even to a degree as tools for teaching cultural awareness, there is a distinct lack of cultural teaching frameworks that were able to be found in the course of this study. This makes it difficult to judge how a game, serious or entertainment, should be designed in order to convey cultural knowledge.

However, when researching this topic, the research of Elizabeth LaPensée, a prominent Indigenous game designer and academic writer, becomes highly relevant. According to her study on Indigenous self-representation (LaPensée, 2018b), one of the greatest benefits provided by video games for culture is the power they give Indigenous creators to represent themselves on their own terms,

rather than through a Western lens. These individual “terms” imply a uniqueness and a freedom from any enforced framework developed by a third-party. A similar sentiment can also be seen in William’s work detailing the significance of *Never Alone*:

“My first experience, which shaped each subsequent interaction, was one that occurred on their terms. [...] Here the Iñupiaq people rejected the concept of others speaking for them, and spoke for themselves. How they view themselves shaped my view of them, which went on to influence my readings of how others interpreted their culture” (Williams, 2018).

Williams very succinctly summarizes the importance of self-representation detailed by LaPensée. How a culture views themselves and how they represent themselves can influence how others view them. A game created by minority peoples as they see fit can provide an accurate point of entry into learning more about them, uninfluenced by outside perceptions, stereotypes, guidelines, or misinformation.

Therefore, despite a lack of clear framework, it is still logical to assume that the games with the highest potential for teaching culture are those made by members of the culture itself. Games rooted in self-representation provide a sovereign representation of a people, and avoid foreign stereotypes, allowing players the chance to learn from the cultural knowledge provided by the developers’ backgrounds.

Yet in spite of all the above knowledge, the FDGC Catalogue of Games with Pedagogic Potential contains few games geared towards teaching culture and cultural awareness. This can be due, in part, to a lack of resources examining which games achieve this goal particularly well, or a lack of publicity which would get such games noticed.

Therefore, this study will aim to fill this gap by determining which games currently able to teach cultural awareness are the best-suited for the FDGC catalogue. As no framework for determining cultural pedagogic potential could be found, this analysis will utilize the basic goals C1, C2, and C3 of cultural awareness combined in tandem with the LM-GM Model by Arnab et al. to determine pedagogic potential. The principle of self-representation will be relied upon in forming an analysis pool.

2.3 Hypotheses

Based upon the above research, the following hypotheses arise:

- The more learning mechanics and game mechanics used, the more cultural awareness goals will be fulfilled. **[H1]**
- The games that best teach cultural awareness will include the “explore” and/or “identify” learning mechanics. **[H2]**

H1 bases itself upon the simple logic that the more mechanics are used, the higher the probability is that a goal of cultural awareness will be fulfilled through one of them.

H2 bases itself upon the research of Crow and Mortara et al., who all found that the presence of an immersive game environment was beneficial to their learning, with Crow’s research citing the ability to explore as immersive. Additionally, the research of Anderton & King, who found that a player’s ability to identify with in-game events increased their inclination to self-examination.

3 Methodology

3.1 Approach

Before analysis could begin, the following principles and limitations to the scope of the project were necessary to define.

Lack of cultural teaching framework: As referred to above, research into the exact conveyance of culture is limited, and a scientific framework of best practices in teaching culture and cultural awareness was unable to be found in the course of this study.

Since this fact carries with it a lack of identified pedagogic aims when teaching culture, this study will instead lay its focus on cultural awareness as defined above, using its three aspects C1 - C3 as pedagogic goals. A sign that teaching culture can occur will be a player's ability to improve these three points via gameplay.

Principle of self-determination: This study will not attempt to develop a framework as referred to above (i.e. identifying and listing the most effective mechanics, the most important areas of culture to portray, or the best ways to discuss sensitive topics). The principle of "self-determination" (LaPensée, 2018b) stands at the heart of this study; the inherent cultural value or accuracy of cultural portrayals presented by the games in this study is not for an outsider to judge. The cultural portrayals in each analyzed game will be taken at face value.

Solely game and learning-based analytical framework: In light of the above, the analysis of culturally educational games in this study will be conducted solely based upon prior research into serious games, using the aforementioned LM-GM Model. While neither the games' cultural value nor their "proper" conveyance of a particular culture can be judged objectively, their potential for educational play coupled with their inclusion or lack of cultural content and ability to strive for goals of cultural awareness can be.

3.2 Data selection process

In order to address the research objective of which games currently able to teach cultural awareness are the best-suited for the FDGC catalogue, a selection of games needed to first be defined for analysis.

Catalogues such as those from Games for Change (*Game Directory - Games for Change*, 2023) and Peace Games (*Peace Games*, 2022) were considered as sources for building an analysis pool due to

their nature focused on social causes such as diversity and equality. However, in addition to their relative lack of culturally-focused games, the cultural backgrounds of their cultivators were unclear, thus perhaps leading to a bias towards games more palatable to a Western audience at the cost of accuracy. A selection pool that would've provided a fix to both these issues were prize winners at the imagineNATIVE Film + Media Arts Festivals (imagineNATIVE, 2022), which feature Indigenous-made media selected by an Indigenous-led organization. Unfortunately, no complete list of winning video games was able to be obtained from the organizers, and an incomplete list was only available from sources whose reliability could not be confirmed.

Many of the winners at imagineNATIVE were, however, noted in a database (Indigenous Game Developers, 2023) created by Indigenous Game Developers (IGD). This database provides an extensive list of Indigenous-created media works, cultivated by Indigenous developers. While entrance to this catalogue is not restricted by a quality threshold imposed by third-party judges, as would be the case with former suggestions, their adherence to key factors in this study (presence of game and learning mechanics in many of the listed works, compliance with principle of self-determination) leads them to be a suitable pool for analysis. The organization's website explicitly cites focus on self-determination, as discussed by LaPensée as well as a positionality in line with achieving the goals of cultural awareness:

“Games themselves should be positioned in order to articulate what worldview(s) they portray and recognize where design influences originate” (Indigenous Game Developers, n.d.).

As research showed that the creators of the works listed in their database were indeed Indigenous, as stated by IGD, it is a reasonable assumption that IGD did their due diligence in ensuring works listed comply with their other goals and views (i.e. self-determination and a desire to “articulate worldviews”). The games present in their database can therefore be believed to be suitable for this study, both in their use as tools for cultural awareness and in their self-determined creation.

3.3 Data evaluation process

From a total of $n = 91$ media works in the IGD Database, those most suitable for the FDGC will be identified using 5 criteria to successively narrow the pool of candidates down to those with the most suitability for the FDGC catalogue.

1. Is the media work absent from the FDGC catalogue?

The aim of this study is to expand the FDGC catalogue of games with pedagogic potential. Therefore, no works that are already present in the catalogue will need to be recommended. If any overlap is found between the FDGC catalogue and the IGD database, these overlapping works will not require analysis and will be removed from the data pool.

2. Is the media work playable on platforms already available in the FDGC catalogue?

This study aims to find the games most suitable for the FDGC. This takes into consideration not only pedagogic concerns, but also monetary concerns. As further contact with the FDGC could not be established, their openness to acquiring new, paid hardware or software for their educational workshops could not be clarified. With no confirmation of their openness to new purchases, any game which would require the purchase of new hardware or software to be usable will be assumed to be less suitable than those which make use of what is already at the foundation's disposal.

This will remove all works from the analysis pool which are not available on the following platforms:

- PlayStation,
- Xbox,
- Nintendo Switch,
- Web browsers,
- Desktop computers (Windows, MacOS and Linux), and
- Mobile devices (iOS and Android).

3. Is the media work a game in possession of pedagogic potential according to an LM-GM analysis?

Analysis here will base itself upon both the game and learning mechanics identified by Arnab et al.

The works remaining for analysis will need to be able to be considered "games" to fit with the FDGC catalogue's other entries. Video games have been defined in this study as works which make *consistent* and significant use of a *variety* of Arnab et al.'s game mechanics. Therefore a meaningful use of more than one game mechanic is necessary to qualify a work as a game.

Similarly, “pedagogic potential” has been defined as showing consistent use of a variety of learning mechanics. More than one learning mechanic will be necessary in order to qualify a work as educational.

As stated above, these definitions will help to avoid effects of randomness, limiting works for examination to those which knowingly and meaningfully make use of game and learning mechanics, rather than having one appear in the work by chance.

4. Can the game help players reach the goals of cultural awareness?

Having determined by this point that the remaining works are games with pedagogic potential, it remains to determine whether or not they can help players reach the goals of cultural awareness.

If an entry can address none of the three goals, it will be eliminated from the data pool in this step.

5. Which games can teach cultural awareness best?

At this stage of analysis, having determined that the remaining games with pedagogic potential which can help increase players’ cultural awareness, the final research objective can be addressed.

Those games which can address the most goals of cultural awareness (maximum 3) will be determined to be the best games to recommend to the FDGC.

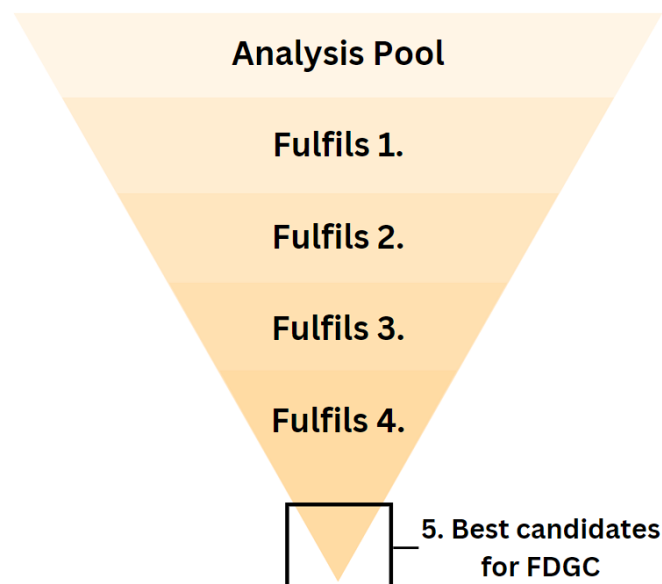


Figure 2: A visual representation of the analysis process

4 Analysis

4.1 Narrowing of the Analysis Pool

To begin, the candidates in the IGD database which display less suitability for the FDGC catalogue and workshops will be identified and removed from the analysis pool to sharpen focus on candidates with the most potential.

1. Is the media work absent in the FDGC catalogue?

Comparing the 91 media works in the IGD catalogue to the 96 already present in the FDGC catalogue, only 1 game was found to overlap: *Never Alone*.

The sample size is reduced to $n = 90$.

2. Is the media work playable on platforms already available in the FDGC catalogue?

This criterion eliminates a sizable portion of the analysis pool, as the IGD database includes many VR games and experiences that are either a) on-site experiences at museums, festivals, etc. or b) or require VR gaming equipment, which was unable to be confirmed in possession by the FDGC. Additionally, games that are unable to be accessed in Germany or found on any platform are eliminated here.

Table 2: IGD Media Works that are eliminated due to platform inaccessibility. (Indigenous Game Developers, 2023)

Additional hardware or software required	<ul style="list-style-type: none">• <i>Aisinai'pi (Writing on Stone)</i> - Urban Society for Aboriginal Youth (USAY), MAMMOTH XR• <i>Along the River of Spacetime</i> - Elizabeth LaPensée• <i>Finding Victor</i> - Urban Society for Aboriginal Youth (USAY), MAMMOTH XR• <i>Kilo Hōkū VR Simulation</i> - Kari Kēhau Noe, Patrick Karjala, Anna Sikkink, and Dean Lodes• <i>Ksistsikoom (Thunder)</i> - Randy Bottle, Michell Poundmaker, Christian Boulet, Uncredited USAY Youth, MAMMOTH XR• <i>Lost Memories</i> - Sami Game Jam 2018• <i>Thalu: Dreamtime is now</i> - Tyson Mowarin• <i>Jođus - On the Move</i> – Sami Game Jam• <i>Manito Ahbee Aki</i> – Louis Riel School Division's Indigenous Education Team
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<p>On-Site Experiences</p>	<ul style="list-style-type: none"> • <i>Digitizing Detours</i> - Kari Kēhau Noe • <i>!in:site;</i> - Taylor McArthur, Dallas Flett-Wapash, Curated by Cecilia Araneda • <i>Mataatua</i> - Kat Lintott, Tama Kawha • <i>Gathering Native Foods</i> - Elizabeth LaPensée • <i>Virtual Whadjuk</i> - Karla Hart, Brett Leavy • <i>~2700</i> - Travis Mercredi • <i>Biidaaban: First Light</i> - Lisa Jackson • <i>Kakwitene VR</i> - Monica Peters • <i>Wenazii K'egoke ; See Visions</i> - Casey Koyczan, Travis Mercredi • <i>Kanotaye</i> - Asha Veeraswamy • <i>Onkwehonwe Sky Travelers</i> - MoniGarr • <i>Whakakitenga</i> - Wiremu Grace
<p>Download unavailable (in Germany)</p>	<ul style="list-style-type: none"> • <i>Blood Quantum</i> - Renee Nejo • <i>Wheetago War VR Hourglass Experience</i> - Richard VanCamp (developed by Spotted Fawn Productions) • <i>BLOOM Indigenous Language Learning RPG</i> - Bri Alexander, Carey Flack • <i>Karihonniennihtshera (Teachings)</i> - Kahentawaks Tiewishaw-Poirier • <i>Skahìòn:hati: Rise of the Kanien'kehá:ka Legends</i> - SKINS 3.0 • <i>Wao Kanaka: I ka Wā Mamua, i ka Wā Mahope</i> - Ka Lei Milika'a Collective • <i>Brokenhead Bingo</i> – Darrick Baxter with Brokenhead Ojibway Nation Youth • <i>Invaders</i> – Elizabeth LaPensée, Steven Paul Judd • <i>Rez Bomb</i> – Darrick Baxter with Sandy Bay Ojibway First Nation Youth • <i>Gufihtara eallu</i> - Sami Game Jam • <i>Spirits of Spring</i> - Minority Media Inc.
<p>Otherwise inaccessible</p>	<ul style="list-style-type: none"> • <i>Dirt Farmer</i> - Hexe Fey • <i>Ekwehe:we: The Real People</i> - Waylon Wilson, Milo Jacobs • <i>Nationvaders</i> - Marcus deThouars, Indigenous Reprap • <i>Nu:ya! Nu:ya! A Tuscarora Exploratory Game</i> - Waylon Wilson • <i>Sealskin</i> - Meagan Byrne, Tara Miller • <i>Survivance</i> - Elizabeth LaPensée • <i>We Sing for Healing</i> - Elizabeth LaPensée

	<ul style="list-style-type: none"> • <i>Run Forest Run</i> - Clarity Smoke • <i>The Ink Flows</i> - Sofia Zappia • <i>Poi360</i> - Lanita Ririnui Ryan • <i>A Bipolar Journey</i> – Thirza (TJ) Cuthand
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In the category “Additional hardware or software required”, additional hardware most often refers to VR headsets, such as the Oculus, which is thus far not represented in the FDGC catalogue. In the case of *Jođus - On the Move* (Harrer et al., 2018), it refers to the need for a self-built, balance board-like controller. *Manito Ahbee Aki* (Manito Ahbee Aki, 2021) provides players with an immersive educational experience on Anishinaabe culture, but requires a license for Minecraft Education Edition. Contact to the FDGC’s workshop planner was not able to be established, and since no evidence of Minecraft Education Edition being used in their workshops could be found independently, this game also needed to be removed from the analysis pool.

While the games represented certainly maintain merit as cultural teaching tools, the significant additional expense and/or effort that would likely be incurred in order to procure the means to play them is seen as making them less suitable options for the FDGC catalogue than those which make use of what the foundation already possesses.

In the category “Download unavailable”, the majority of games are mobile apps not available in the German App Store. As the FDGC runs in Germany, their access to these games would be impeded, making such games unsuitable for their catalogue.

The category of “otherwise inaccessible” games is composed of games for which no download link could be found or the website which hosted them was undergoing construction at the time of the study. Their contents were therefore unable to be analyzed in the course of this study.

This reduces the analysis pool by 43 unsuitable games, bringing the pool to n = 47.

3. Is the media work a game in possession of pedagogic potential according to an LM-GM analysis?

In this phase of analysis, the remaining 47 games were analyzed on the grounds of both their game mechanics and their learning mechanics in accordance with the LM-GM Model.

This eliminated a section of works as potential candidates for the FDGC Catalogue of Games with Pedagogic Potential in two separate groups:

- Games which lack the game mechanics to be considered a game, and
- Games which lacked the learning mechanics to be considered educational as defined in the scope of this study.

If any game had no more than one of either mechanic, it was removed from analysis.

Table 3: IGD Media Works that are eliminated due to lack of game or learning mechanics. (Indigenous Game Developers, 2023)

Lack of learning mechanics	<ul style="list-style-type: none"> • <i>Hill Agency</i> - Achimostawinan Games • <i>Innchanted</i> - DragonBear Studios • <i>Line of Sight</i> - Taylor McArthur • <i>A Night Call</i> - Meagan Byrne • <i>Button City</i> - Shandiin Yazzie Woodward • <i>Mîkiwâm: Chapter One</i> - Keara Lightning, Caeleigh Lightning • <i>Treachery in Beatdown City</i> - Manuel Marcano/HurakanWorks • <i>Umurangi Generation</i> - Veselekov • <i>DON'T WAKE THE NIGHT</i> - Santo Aveiro-Ojeda • <i>Full of Birds</i> - Sarah Biscarra Dilley, Ashlee Bird • <i>Hold My Hand</i> - Nathan Powless-Lynes • <i>Terra Nova</i> - Maize Longboat, Ray Caplin • <i>Waskwetin Pahkwesihkan (Bannock Bounce)</i> - Dallas Flett-Wapash • <i>1870 -- CYBERPUNK FOREVER</i> - Santo Aveiro-Ojeda • <i>Brawlygons</i> - Nathan Powless-Lynes • <i>One Small Step</i> - Ashlee Bird • <i>Neofeud</i> - Christian Miller • <i>Swapbox</i> - Nathan Powless-Lynes • <i>Child of Light</i> – Red Haircrow • <i>Maori Pa Wars: Indigenous Tower Defense</i> – Metia Interactive
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	<ul style="list-style-type: none"> • <i>Wanisinawin/Lost</i> – Meagan Byrne • <i>Otsi!: Rise of the Kanien'kehá:ka Legends</i> – SKINS 1.0
Lack of game mechanics	<ul style="list-style-type: none"> • <i>Skahìòn:hati: Legend of the Stone Giant</i> - SKINS 2.0 • <i>On the Land with Noah Piugattuk</i> - Zacharias Kunuk • <i>TETEPISKAT</i> - Natasha Kanapé Fontaine • <i>The Cache</i> - Bonnie Ammaaq • <i>What Brings Us Here</i> - Katherena Vermette • <i>Midden</i> - Jenny Fraser • <i>Fafswagvogue.com</i> - Morgan Waru • <i>XINONA</i> – Walter Kaheró:ton Scott

Of the games lacking learning mechanics, many did depict Indigenous characters and/or culture without directly attempting to teach the player about it. Prime examples here are *Hill Agency* (Achimostawinan Games, 2022) – which focuses on an Indigenous-owned detective agency in an alternate future where Indigenous culture is widely normalized and thriving – or *DON'T WAKE THE NIGHT* (*DON'T WAKE THE NIGHT*, 2019) – which features an original narrative heavily influenced by Guaraní teachings. Such games will be addressed in the discussion portion, but are disqualified from analysis as their pedagogic effects are subjective, unable to be objectively quantified with learning mechanics.

Of the works lacking game mechanics, all but two (*Skahìòn:hati: Legend of the Stone Giant* and *On the Land with Noah Piugattuk*) were photo and art essays which, while considered interactive media, do not feature enough of the necessary mechanics to be considered games by the definition used in this study. *On the Land with Noah Piugattuk* (*On the Land with Noah Piugattuk*, 2020) featured an interactive map with videos and voice clips that told users about Inuk life at the turn of the 20th century. While highly educational, this work also lacked the proper mechanics to be considered a game. Although *Skahìòn:hati: Legend of the Stone Giant* (*SKINS 2.0*, 2011) would have been a prime candidate for analysis in a completed state, the version made during the SKINS 2.0 workshop contained only basic movement controls in addition to the 3D environment. The extended gameplay version completed during the SKINS 3.0 workshop, *Skahìòn:hati: Rise of the Kanien'kehá:ka Legends* (*SKINS 3.0*, 2012), was unavailable at the time of the study due to construction being done on the SKINS workshops website.

This reduces the analysis pool by 30 unsuitable games, bringing the pool to n = 17.

4. Can the game help players reach the goals of cultural awareness?

The games eliminated in this portion of analysis are those which do contain both game and learning mechanics, but the combination of these do not serve the purpose of teaching about culture.

The pool of educational games that do not teach culture form a small but intriguing group of four.

Table 4: IGD Media Works that are eliminated due to lack of effect on cultural awareness. (Indigenous Game Developers, 2023)

Educational, but do not teach culture	<ul style="list-style-type: none">• <i>Katuku Island</i> - MSH Limited• <i>Takaro 3D Puzzle Coding Concepts Game</i> - Metia Interactive• <i>Count My Cube</i> - Metia Interactive• <i>Coyote Quest</i> - Elizabeth LaPensée, Loretta Todd
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Three out of four entries in this group are produced in connection with Māori culture. The fourth, *Coyote Quest* (Silverstring Media, 2017) was designed by Elizabeth LaPensée, upon whose study of Indigenous self-determination key points of this study are based.

Each of these games attempts to foster learning in an Indigenous-inspired environment. *Katuku Island* (Callaghan, Dr. P., 2022), for instance, presents lessons on literacy skills in a dystopian, Māori-inspired environment. While these games' lessons in literacy skills, coding concepts, counting, and science (respectively) are only "tangentially" (Arnab et al., 2015) educational on the culture itself, it perhaps speaks to efforts being made to incorporate Indigenous culture into everyday life. More on this in the discussion section.

This reduces the analysis pool by 4 unsuitable games, bringing the final pool for analysis to $n = 13$.

5. Which games can teach cultural awareness best?

The following 13 games are the final pool for analysis: games that teach culture, which can help users become culturally aware. Each will be analyzed in-depth in regard to their past successes (and use cases, where applicable), potential use cases, and ability to address the three goals C1 – C3 of cultural awareness with the help of a basic LM-GM Model to visualize content. To build context, each game's platform and the types of culture ("art, literature, lifestyles, ways of living together, value systems, traditions and beliefs") according to UNESCO's 2001 definition will be listed before each analysis.

The best recommendations for the FDGC will be those games which can help players reach the most goals of cultural awareness and can have a potential use case in a workshop environment. This will be determined by analysis of their contents with the help of the basic LM-GM Model.

Analysis will be conducted in alphabetical order.

4.2 In-depth examination of candidates

Biskaabiiyaang: the Indigenous Metaverse from *Maya Chacaby and UniVirtual*

Platform: Desktop computers (Windows and MacOS)

Culture Depicted: Anishinaabe – lifestyles, traditions, beliefs



Figure 3: A screenshot of Biskaabiiyaang. The player character makes a tobacco offering at a shrine. Self-made screenshot. Game source: (Chacaby, 2023)

Biskaabiiyaang, an Anishinaabe word for reaching the point of returning home from a long journey, has become a phrase associated with cultural resurgence. Such resurgence is the very goal of this game. (*Biskaabiiyaang - Home*, n.d.)

Currently available as a demo only, *Biskaabiiyaang: the Indigenous Metaverse* (Chacaby, 2023) provides an environment for players to learn about Anishinaabe traditions, life, and language through quests, learning games, and in-game activities. By stepping into a post-apocalyptic setting as a researcher who has lost their memory, the player is sent on a journey to learn about what has happened to the world, with Anishinaabe knowledge guiding their way.

“Explore post-apocalyptic ruins and learn how Indigenous history and culture plays a part in returning magic and beauty to this virtual world” (*Demo Biskaabiiyaang Today*, n.d.).

The game is being developed as a part of UNESCO’s aforementioned International Decade of Indigenous Languages 2022 – 2032 (“Biskaabiiyaang Joins Global Community for UNESCO[...],”

2022). The game has additionally received a grant to the sum of \$40,000 USD from York University’s Academic Innovation Fund (*Press Area*, n.d.). With combined funding and a reputable platform, this game has a foundation for success upon its full release. However, it is currently only available as a demo.

More mechanics are planned for the release version of *Biskaabiiyaang*, such as online connectivity in a multi-user platform. However, for this study, only the single-user demo can be analyzed.

Table 5: An LM-GM Analysis of *Biskaabiiyaang*: the Indigenous Metaverse. Game source: (*Chacaby*, 2023)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> Tutorials 	<ul style="list-style-type: none"> Tutorial Instructional 	“Blue light” guides the player between key locations; Tutorials guide the player through basic mechanics	Assists learning experience by preventing players from getting lost or confused on a gameplay level.
<ul style="list-style-type: none"> Cascading Information Story Goods/Information 	<ul style="list-style-type: none"> Explore 	Story details and their implications for gameplay come slowly as the player interacts with the environment	Promotes motivation for continuing through the guided tutorials; encourages interaction with and immersion in the world
	<ul style="list-style-type: none"> Identify 	Players choose their own avatar to control as they navigate the world. Narrations posed as though coming from the avatar.	
	<ul style="list-style-type: none"> Accountability Incentive 	Optional and non-optional info dialogues about Anishinaabe culture	Players are rewarded for exploration with new knowledge and facts
<ul style="list-style-type: none"> Movement 	<ul style="list-style-type: none"> Action/Tasks 	3 rd person control of an avatar in a 3D space	Promotes player engagement and interaction with content

In keeping with the game’s part in UNESCO’s International Decade of Indigenous Languages, the language of the Anishinaabeg is shown throughout the course of *Biskaabiiyaang* in the form of mini language lessons. Eventually, the game will incorporate further Indigenous storytelling practices, such as “active oral and visual teachings, and quests involving legends” (*Biskaabiiyaang - Home*, n.d.). However, as it stands, no oral elements are incorporated yet.

Potential use in workshops: A true metaverse of Indigenous culture and teachings would provide opportunities for teamwork, communal discovery, friendly competition, and group discussion if implemented in a workshop. However, with a roughly 10-minute playtime, the demo in its current

state offers little potential for use in a classroom setting beyond serving as supplementary educational material.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another,

The second point – “understand how these differences can affect lifestyle, values, and identity” – cannot be reached due to lack of elaboration on the recognizable differences in-game. The third point – “interact with people from various cultural backgrounds with sensitivity” – could potentially be impacted in further development through further information sharing or a multiplayer platform but lacks potential in the game's current demo state.

Growing Up Ojibwe: The Game from Eleanore Falck

Platform: Web browsers, Desktop computers (Windows), Mobile devices (Android)

Culture: Anishinaabe: Ojibwe – traditions, value systems, lifestyles



Figure 4: A screenshot from Growing Up Ojibwe. The player's grandmother introduces the "asemaa"/tobacco mechanic. Self-made screenshot. Game source: (Falck, 2020)

Growing Up Ojibwe (Falck, 2020) puts players in the position of an Ojibwe youth who, over the course of the seasons, must complete tasks for their grandmother in order to learn important

knowledge that is being lost to time. Players explore the forests and lakes of Northern Wisconsin through quests which focus on topics such as harvesting methods and tribal sovereignty. Paying tribute to spirits using asemaa (tobacco) grants players knowledge about the tribe’s history and traditions, which they can pass on to knowledge-seeking NPCs in a quiz format.

The game was developed by Eleanore Falck as part of a two-year internship for the Great Lakes Indian Fish and Wildlife Commission. The contents were based off of children’s books from the commission as well as further informational material about the Ojibwe tribe. (Havranek, 2021)

Falck spoke about the game at the 2021 Games for Change Festival in a panel focused on “Reframing Education Games Through Indigenous Lenses” (2021 Games for Change Virtual Festival, 2021), and the game has since been incorporated into Games for Change’s catalogue of recommended games for Racial Equality and Environmental Impact (Growing Up Ojibwe - Games for Change, 2022).

Table 6: An LM-GM Analysis of Growing Up Ojibwe. Game source: (Falck, 2020)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> Tutorial 	<ul style="list-style-type: none"> Tutorial 	Tutorial cutscenes	Guides player through basic mechanics in a story context
	<ul style="list-style-type: none"> Guidance Objectify 	Introductory text by Grandmother	Provides player with a task overview (guidance) and learning objectives (objectify)
<ul style="list-style-type: none"> Story 	<ul style="list-style-type: none"> Identify 	Grandmother speaks to player directly, while other NPCs speak to player-chosen avatar.	Encourages immersion in the game world and learning activities
<ul style="list-style-type: none"> Questions and Answers 	<ul style="list-style-type: none"> Question and Answer Participation 	NPCs’ quizzes	Knowledge found by seeking out spirit helpers is tested, encourages retention of information
<ul style="list-style-type: none"> Information 	<ul style="list-style-type: none"> Discovery 	Spirit info dialogues	Players must use learned mechanics to freely seek out information
<ul style="list-style-type: none"> Movement 	<ul style="list-style-type: none"> Action/Tasks 	Platformer environment	Promotes immersion and interaction
<ul style="list-style-type: none"> Selecting/Collecting 		Gathering food, fish, syrup	Promotes feeling of progress, aids behavioral momentum (see below)

<ul style="list-style-type: none"> Behavioral Momentum 	<ul style="list-style-type: none"> Repetition 	Levels	Allows players to enter a “flow”, cover a wide variety of themes with the same basic mechanics
<ul style="list-style-type: none"> Assessment 	<ul style="list-style-type: none"> Reflection Feedback 	End of level summary	On task failure: provides explanation behind learning objectives and what failure entails in the real world

With around 40 minutes of gameplay, *Growing Up Ojibwe* provides players with a well-rounded introduction to Ojibwe history and culture. Historical insights into government treaties can provide a starting point for discussion among students about oppression and marginalization. Bits and pieces of the native language can be learned from the opening dialogue from the grandmother in her use of Ojibwe language. Players are also introduced to the concept of “mino-bimaadiziwin”, an understanding of well-being which encompasses spiritual, emotional, and physical wellbeing.

Additionally, the sense of value in the community and in sustainability is particularly well-demonstrated in a level about spearfishing. Players are warned against overfishing, as it could leave less food for others in the community and negatively impact the fish population.



Figure 5: A screenshot from *Growing Up Ojibwe*. The player's in-game performance is assessed, and the level's lesson reinforced. Self-made screenshot. Game source: (Falck, 2020)

That said, the modern context the game takes place in also provides a view of Ojibwe life persisting to the present day, allowing players to see them as a modern and sovereign people rather than a relic of the past.

Potential use in workshops: Designed in a way that fulfills of the so-called Wisconsin Act 31 (Barnes, 2021) – a required curriculum for public school education on the history, culture and tribal sovereignty of the state of Wisconsin’s Indigenous tribes (*State Statutes for American Indian Studies in Wisconsin, 2012*) – *Growing Up Ojibwe* naturally suits an educational environment. Wisconsin First Nations recommends it for grades 3 through 8 (Barnes, 2021), while Games for Change rates it E for Everyone (*Growing Up Ojibwe - Games for Change, 2022*).

In a potential workshop environment, younger learners could have their learnings concretely measured with the game’s quiz mechanic. This mechanic also provides a basis for competition, while the high relevance to modern-day life and nature provides a basis for discussions about both Ojibwe culture and sustainability.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players’ cultural awareness can be impacted in the following areas:

- Recognize differences between one’s own culture and another,
- Understand how these differences can affect lifestyle, values, and identity.
- Interact with people from various cultural backgrounds with sensitivity.

In learning about Ojibwe culture, players are given the opportunity to recognize its unique elements and understand how these elements interact with the values and lifestyle of the Ojibwe people. In understanding their history and customs, players can also potentially interact with members of the culture with increased sympathy and respect for their values.

Guardian Maia: Episode 1 + Episode 2 from Metia Interactive

Platform: Mobile devices (iOS and Android)

Culture: Māori – value systems, traditions, beliefs

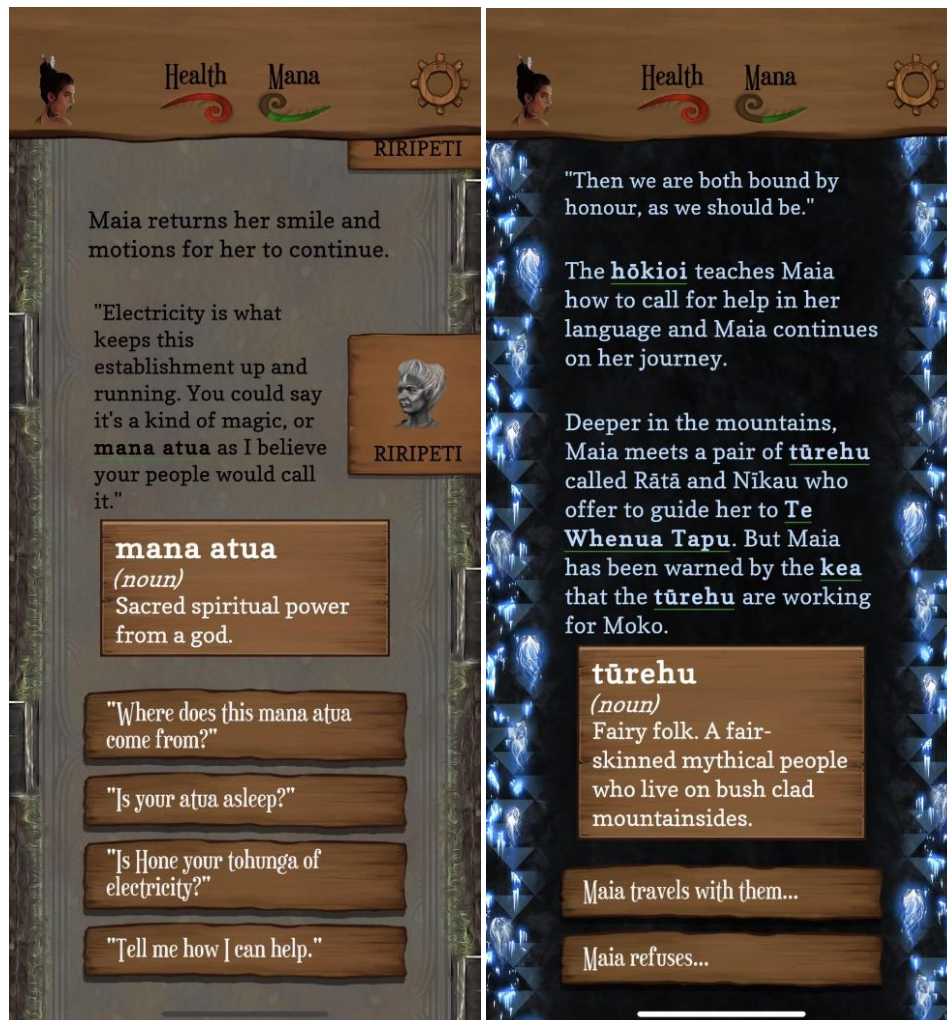


Figure 6: Two screenshots from Guardian Maia Ep 2. Players choose their own adventure and learn vocab along the way.

Self-made screenshots. Game source: (Guardian Maia Ep 2, 2021)

Guardian Maia Ep 1 (*Guardian Maia Ep 1*, 2018) and *Ep 2* (*Guardian Maia Ep 2*, 2021) form a duology of free to play games for mobile devices in the “choose your own adventure” genre. Both Episodes 1 and 2 are featured in the IGD Database. Due to their similar mechanical structure as a duology, they will be analyzed together, however players need not play both. Starting in Episode 2 allows players to play a recap of what they missed in Episode 1, complete with the most important player choice moments.

Players step into a Māori-inspired historical/science-fiction story, set in Aotearoa (New Zealand) far in the future. Through an interactive narrative, players guide main character Maia on a quest to “The Forbidden Land”, Te Whenua Tapu, to save her friend, who has been kidnapped by the malevolent

monster Moko. Along the way, she is both helped and hindered by gods, creatures, and supernatural beings from Māori mythology. The gamebook duology plays in the same universe as an adventure game of the same title, currently being developed in Unreal Engine (*Guardian Game - Maori Heroine - Maia*, 2023).

Producer and Metia Interactive Founder Maru Nihoniho, 2018's Māori Entrepreneur of the Year, created Guardian Maia with the intention of exposing outsiders to Māori culture (Newman, 2018).

Table 7: An LM-GM Analysis of the Guardian Maia duology. Game source: (Guardian Maia Ep 1, 2018; Guardian Maia Ep 2, 2021)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> • Story 	<ul style="list-style-type: none"> • Guidance 	Interactive narrative	Uses story as a means for teaching language and cultural aspects
<ul style="list-style-type: none"> • Roleplaying 	<ul style="list-style-type: none"> • Identify 	First-person player experience	Promotes immersion by putting players in Maia's position
	<ul style="list-style-type: none"> • Simulation • Incentive 	Mana Points, Health, multiple story outcomes	Gives players control over learning experience: Points accumulate based on players' choices, better story outcomes for better choices
<ul style="list-style-type: none"> • Information 	<ul style="list-style-type: none"> • Instructional • Accountability 	Vocabulary pop-ups, glossary	Provides definitions of Māori words if players choose to click them/view the glossary

While not based upon modern or historical facts, *Guardian Maia* incorporates many aspects of Māori culture through its use of vocabulary and mythology in the story. Other cultural aspects such as greetings, dances, or traditions are also woven into the story, providing players a chance to learn about Māori culture through an environment of fantasy.

Potential use in workshops: The individual nature of the narrative, as it can be different for each player depending on their choices, lends itself to discussion. Players have a chance to compare story outcomes, events, and information that they learned on their own individual playthroughs. The glossary of Māori terms, which is accessible from the game's homepage, can also serve as a helpful basis for vocabulary learning activities.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another,
- Interact with people from various cultural backgrounds with sensitivity.

Through learning key phrases and other parts of the language and through being exposed to various aspects of Māori culture, players can identify differences between the Māori and their own cultures. The language-learning aspect especially helps players learn to interact with the Māori with heightened understanding and sensitivity. However, as the game is set in a far-off future and not based on modern and historical facts, little information can be gleaned on how these differences affect the modern-day Māori peoples' values and identities.

He Ao Hou from Nā 'Ane Mahiki (Skins 5.0)

Platform: Desktop computers (Windows and MacOS)

Culture: Hawai'i – beliefs, traditions

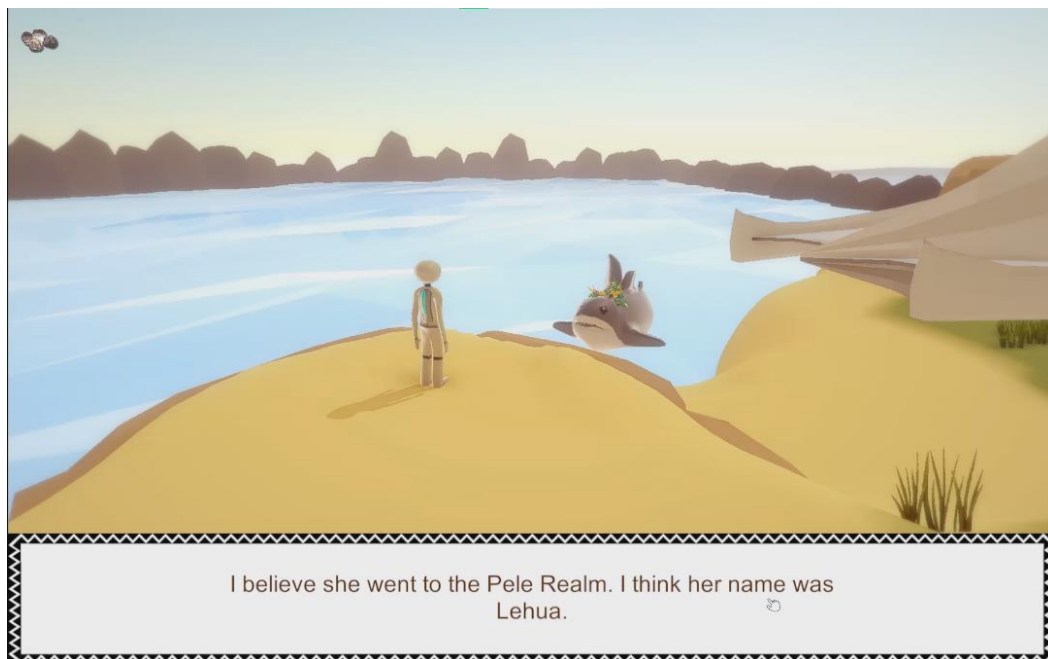


Figure 7: A screenshot from He Ao Hou. The player is told their lost sister is waiting in the fiery Pele (Hawai'ian volcano goddess) Realm.
Self-made screenshot. Game source (He Ao Hou, 2017)

He Ao Hou (A New World) (Nā 'Ane Mahiki, 2017) is a 3D adventure game which tells the story of a young man on a journey through the cosmos to find his lost sister, Lehua. Like the previous entry *Guardian Maia*, *He Ao Hou* is set in a far-off future with Indigenous influences and folklore. In a spaceship that navigates to different locations among the stars, players have a console that relays

“Stories” to them – bits of Hawai’ian folklore and tradition. These often include deities or concepts that players have encountered in gameplay, such as the volcano goddess Pele or the beliefs surrounding the kukui nut.

The game was designed as part of the SKINS 5.0 workshop – a three-week intensive experienced for teaching youth how to make video games in a cultural context (*Past Future Forward*, n.d.).

Table 8: An LM-GM Analysis of He Ao Hou. Game source: (Nā ‘Aanae Mahiki, 2017)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> • Story • Tutorial 	<ul style="list-style-type: none"> • Guidance 	Overarching narrative	Provides context for learning, introduces structure of learning material
<ul style="list-style-type: none"> • Information • Reward 	<ul style="list-style-type: none"> • Incentive 	New stories unlocked after each level	Rewards players for successful level completion with new folklore
	<ul style="list-style-type: none"> • Accountability 		Learners are responsible for accessing the theoretical knowledge earned, or choosing to take in the surface-level knowledge provided via gameplay only
<ul style="list-style-type: none"> • Movement 	<ul style="list-style-type: none"> • Action/Tasks 	3 rd person control of an avatar in a 3D space	Promotes player engagement and interaction
<ul style="list-style-type: none"> • Levels 		New levels/environments	Creates distinct, memorable settings for teaching a wide variety of topics

He Ao Hou provides learners with a diverse environment to learn about multiple different aspects of Hawai’ian culture. The Hawai’ian language is featured in a voiced introductory cutscene as well as in written dialogues, or the entire game’s dialogue if the Hawai’ian language option is selected. While the original, futuristic narrative presents a slight disconnect from the traditional mythologies and teachings presented across the game, the playful atmosphere provides a unique and memorable context for learning the well-established folklore that is woven into the narrative.

The bulk of the knowledge that can be applied in the real world, however, is found in a machine accessible in the player’s spaceship – the main hub between levels. This feature is easy to miss and would benefit from explicit mentioning by a workshop leader if implemented in an educational

setting. Alternatively, as stated in the LM-GM analysis, players still have the option of skipping this knowledge, choosing to only busy themselves with what is shown in the gameplay levels – mythological stories acted out, deities interacted with, hula dance moves learned, etc.

Potential use in a workshop: Overall, the 20-minute gameplay time combined with the sci-fi/historical take on Hawai'ian culture provides a unique learning experience about the Hawai'ian culture. However, depending on how the game is played, the learning effect can fall somewhat flat. For use in an educational workshop environment, stronger guidance by a workshop leader and additional learning materials would be necessary in maximizing the educational value of the game.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another.

Through being exposed to various aspects of Hawai'ian culture, players can identify differences between the Hawai'ian culture and their own. However, the purely mythological and futuristic contexts of the game teach players little about interacting with modern-day Hawai'ians or understanding their lifestyle and values.

Honour Water from Elizabeth LaPensée and Pinnguaq

Platform: Mobile devices (iPad)

Culture: Anishinaabe – art, traditions, beliefs

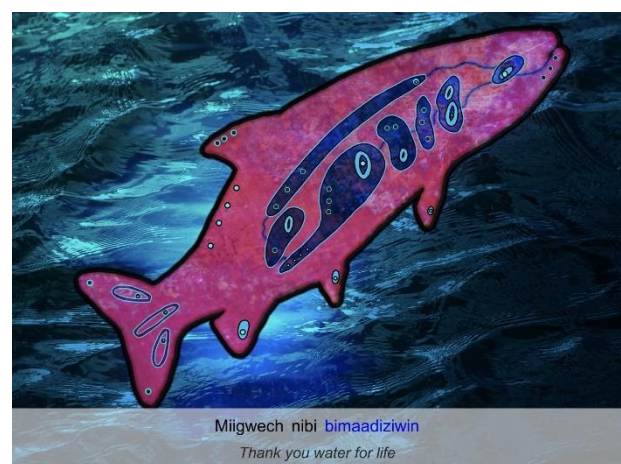


Figure 8: Two screenshots from Honour Water. Players can sing Anishinaabe songs with Indigenous art for a backdrop. Self-made screenshots. Game source: (Pinnguaq, 2016)

Honour Water (Pinnuguaq, 2016), designed by Elizabeth LaPensée and developed by the tech advocacy corporation Pinnuguaq, is a singalong app that passes on Anishinaabe songs and water teachings. Through three songs sung in Anishinaabemowin (the Anishinaabe language) by the group Oshkii Giizhik Singers, players are exposed to this concept of healing water.

“The Anishinaabek Peoples believe water is alive, it provides life and can take life, that women are the keepers of the waters because we carry babies in water and that water can heal. Many Anishinaabek Peoples also believe that water carries our ancestor’s memories and those memories are transferred from mother to child when the baby is in the water in the mother’s womb” (Lapell, 2020).

These beliefs are explored through the overviews and translations provided to the songs “Miigwech Nibi” (Thank You, Water), “Gii Bimoseyan” (I Walked) and “Gizaagi’igonan Gimaamaan Aki” (We Are All Loved by Mother Earth). Each of their accompanying info dialogues refers to a different lesson to keep in mind while singing.

Honour Water was inspired by the Nibi Walks (LaPensée, 2018a) – an extended Indigenous-led ceremony to pray for the water (*NibiWalk – Every Step Is a Prayer*, n.d.) – and is partnered with them as well. The game is finding use in contexts such as both Anishinaabe and intermixed community gatherings, public university events, and private intergenerational gatherings (LaPensée, 2018a). It was also exhibited at the imagineNATIVE Film and Media Arts Festival in 2016, shortly after its launch (*Honour Water - Journal*, 2017).

Table 9: An LM-GM Analysis of Honour Water. Game source: (Pinnuguaq, 2016)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> Levels 	<ul style="list-style-type: none"> Demonstration 	Listen/Practice/Record multiple songs	Practice to build good pronunciation and retain knowledge.
	<ul style="list-style-type: none"> Objectify 		Separates learning into manageable steps in a structured “loop”
<ul style="list-style-type: none"> Information 	<ul style="list-style-type: none"> Accountability 	Info page, word definitions and etymology	Ability to decide learning content: singing, language learning, further information; increases agency (LaPensée, 2018a)

	<ul style="list-style-type: none"> • Ownership 	Record your own version and share it with contacts	Once the song is known, players can sing it in a style of their own without penalty
	<ul style="list-style-type: none"> • Participation 		Encourages active engagement with material beyond passive learning

Players can teach themselves a bit of Anishinaabemowin by clicking on song lyrics as they are displayed. Through this process, they can eventually sing the song themselves and share their recording with friends.

While the share mechanic could be considered a virality feature that might enrich the gameplay through competition, this would be secondary to the game’s main purpose and is not encouraged by the game itself. In fact, competition is actively discouraged through the lack of a scoring mechanic, which was decided upon during the design process. On the subject, LaPensée writes:

“The game very purposefully does not calculate a score based on a player’s singing because elders who offered feedback [...] felt internal and cross-player competition would detract from the purpose of singing”
(LaPensée, 2018a).

This being known, the share mechanic neither impacts the gameplay through effects of virality, nor does it correlate to any learning mechanic. Therefore, it has been left out from the LM-GM analysis.

Potential use in a workshop: In total, *Honour Water* contains comparatively fewer game mechanics, placing a heavier focus on pedagogy over play. While it accomplishes its goal of teaching through a multitude of learning mechanics, its lack of game elements may make it unsuitable for game-based workshops. Incorporating group singing into an educational environment promises for high engagement and group participation, but the game itself will likely not be able to hold up a central role in a workshop.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players’ cultural awareness can be impacted in the following areas:

- Recognize differences between one’s own culture and another,
- Understand how these differences can affect lifestyle, values, and identity.

Honour Water allows users to understand the Anishinaabe value of water, even noting this value in light of present ecological crises such as pollution. Players are not taught to use this knowledge to interact with people from various cultural backgrounds with sensitivity, though the effect could arise with further discussion or research after gameplay.

Mu Luodda from *Sami Game Jam* (Miikka Junnila, Ivan Notaroš, Sauli Sarre and team)

Platform: Desktop computers (Windows)

Culture: Sami – lifestyles

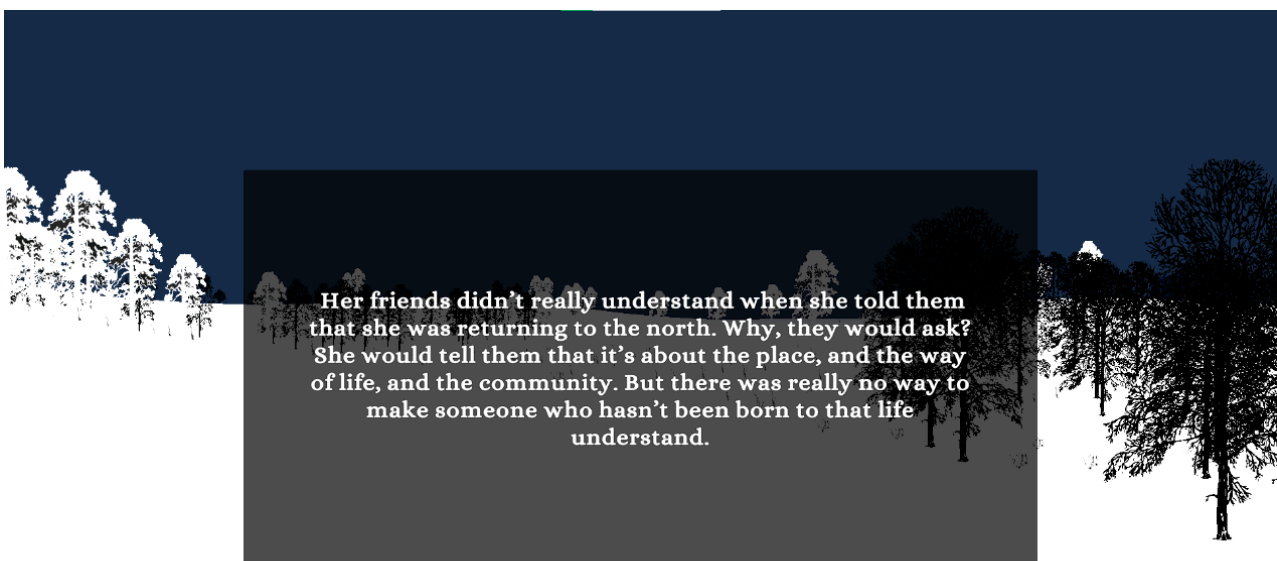


Figure 9: A screenshot from *Mu Luodda*. Narrative excerpts reveal the inner complexities of being Sami in the modern world. Self-made screenshot. Game source: (Junnila et al., 2018)

Mu Luodda (My Path) (Junnila et al., 2018) was created as a collaborative effort during the 2018 Sami Game Jam event, organized by Anna-Kaisa Kultima and Outi Laiti. (*Mu Luodda*, 2018) Players travel in first-person through a barren landscape of “Ultima Thule” -- “A distant unknown region; the extreme limit of travel and discovery” (*Saami Game Jam*, n.d.) – which the game uses metaphorically as a term for the Sápmi region in the Arctic (*Mu Luodda*, 2018). While exploring, players are confronted with story bits that tell of the daily difficulties Sami people face in a world where they are torn between their traditional homeland and the world beyond it. For example:

“Looking at myself in the mirror. I’ve only lived in the north for three years now. It’s difficult to feel like I belong, that I’m Sami enough. My friends don’t really mind – they’re cool with me.”

“When I hear my child speaking Sami, he knows less words than I do. I know less words than my parents. How far can we go on like this?”

“I’m waiting for the bus – for four hours. Back in the south, buses would run every five minutes. I’m getting really cold”
(Junnila et al., 2018).

Many of the clips feature narration in the Sami languages by different people, showing the player the diversity of the community and also the united feelings of difficulty and alienation.

Table 10: An LM-GM Analysis of *Mu Luodda*. Game source: (Junnila et al., 2018)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> • Movement 	<ul style="list-style-type: none"> • Action/Tasks 	1 st person control of an avatar in a 3D space	Encourages player engagement and interaction
<ul style="list-style-type: none"> • Information • Story 	<ul style="list-style-type: none"> • Explore 	Open space, new bits of narrative to find in different corners	Encourages interaction with the world and learning material
	<ul style="list-style-type: none"> • Identify 	Narrative pop-ups, short and voiced	In combination with 1 st person perspective, promote immersion and empathy
	<ul style="list-style-type: none"> • Reflection 	Incremental presentation of story	Allow for digestion and consideration of information

While *Mu Luodda* has comparatively fewer mechanics and a lower playtime than other games analyzed (roughly 10 to 15 minutes), the density of cultural teachings does not suffer for it. Diverse viewpoints are represented –addressing the positives of life in both the North and the South – and the struggles that come from being Sami in the modern world are made clear through poignant story bits. The simple mechanics work to encourage a deeper understanding of the Sami, their lifestyle, and how they wish to be treated.

Potential use in a workshop: *Mu Luodda* provides a solid basis for emotional discussion and learning in a workshop setting. The open exploration will give each player a different selection of story bits that they can discover in a set amount of time, which can foster discussion if each participant can be given the chance to report and reflect upon their individual experience.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another,
- Understand how these differences can affect lifestyle, values, and identity,
- Interact with people from various cultural backgrounds with sensitivity.

Through the diverse nature of the story bits presented, players can address all necessary points of cultural awareness. Differences between Sami and outsiders are brought up, the effects of identity confusion and lifestyle choices are reflected upon, and hurtful stereotypes and behaviors from non-Sami are addressed.

On The Path of the Elders from *Mushkegowuk Cree Nation, Carleton University, BlackCherry Digital Media, and Pinegrove Productions*

Platform: Web browsers

Culture: *Mushkegowuk and Anishinaabe –ways of living together, traditions, beliefs, value systems*



Figure 10: A screenshot from On the Path of the Elders. Interacting with NPCs provides learning and testing opportunities.

Self-made screenshot. Game source: (Path of the Elders, 2010)

On the Path of the Elders (*Path of the Elders*, 2010) is a browser game that is part of a larger educational website. The site and the game both have the goal of teaching users about Treaty No. 9 (*Path of the Elders - About Us*, n.d.), which was signed between the Crown and many Indigenous peoples of Ontario in 1905. It negatively impacted the lives and rights of the tribes involved (*After the Treaty Signing*, n.d.) – circumstances which *On the Path of the Elders* addresses in a historical setting. Players take on the role of an Indigenous youth, playing mini-games and speaking to NPCs to learn about different aspects of Indigenous life including healing, culture, economy, security, education, and self-government.

Development of the *On the Path of the Elders* website was a collaborative effort supported by the Department of Canadian Heritage through the Canadian Culture Online Strategy, Indian and Northern Affairs Canada, the Inukshuk Fund, and the National Research Council of Canada. (*Path of the Elders - Blog*, 2020) Its initial launch took place in 2008 (*Path of the Elders - Blog*, 2020) with the launch of an updated and complete website in 2010 (*Path of the Elders - News*, n.d.).

Table 11: An LM-GM Analysis of *On the Path of the Elders*. Game source: (*Path of the Elders*, 2010)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> Movement 	<ul style="list-style-type: none"> Action/Tasks 	3 rd person control of an avatar in a 3D space	Promotes player engagement and interaction
<ul style="list-style-type: none"> Information 	<ul style="list-style-type: none"> Accountability 	Informative NPC dialogues; interactions with environment in mini-games	Players can determine order and breadth of content learned
	<ul style="list-style-type: none"> Discover Explore 		Players must use learned mechanics and facts to seek out new information (discover) through exploration
	<ul style="list-style-type: none"> Tutorial 	Historical/Practical knowledge offered before minigames	Provides context and tips for gameplay; establishes a connection between gameplay and historical context
<ul style="list-style-type: none"> Story 	<ul style="list-style-type: none"> Objectify 	Chores and tasks for the player; “paths” to explore	Provides player with a task overview and learning objectives
<ul style="list-style-type: none"> Levels 			

<ul style="list-style-type: none"> • Rewards • Status 	<ul style="list-style-type: none"> • Incentive 	6 self-governance elements	Provides visible symbols of learning progress to strive for
<ul style="list-style-type: none"> • Roleplay 	<ul style="list-style-type: none"> • Simulation 	Success/failure based on dialogue choices	Encourages players behaving in line with values taught/promoted by the game
	<ul style="list-style-type: none"> • Identify 	NPC interactions directed at player avatar, player dialogue choices	Encourages identification with player character and immersion in game events

On the Path of the Elders provides a strong example of culturally teachable games. The diverse use of gameplay mechanics supports a wide variety of learning mechanics, providing a learning environment that is both fun and deeply informative.

As stated above, the game is only part of an entire website dedicated to education on the topic of Indigenous culture and Treaty No. 9. The game provides direct links via NPCs to galleries of historical photos, a collection of over 100 videos recorded by Indigenous peoples in their native languages talking about their everyday lives and cultures, and an interactive map detailing the historical chronology of Treaty No. 9. In addition, teachers can find learning materials for grades 4 through 10 (including lesson plans and worksheets) which are based around gameplay, as well as detailed walkthroughs of each game level to assist use of the game in an educational environment.

The greatest downside of *On the Path of the Elders* is its age. In-game tutorials, which explain the rules and controls of the minigames, no longer appear. However, this problem can be mitigated through the use of the tutorials uploaded for teachers as PDFs. What is not solvable is that players are no longer able to save their progress. To do so, a verified account is needed, although emails for verifying one's account are no longer sent (or at least no longer arrive, as was tested by multiple email accounts during this study). Contacting support over the link provided on the website also yielded no answer. This leads to the impression that maintenance is no longer being conducted on the game, resulting in the loss of helpful mechanics.

Potential use in a workshop: All in all, *On the Path of the Elders* still provides a thorough learning experience in a playful atmosphere. It provides additional learning resources, which combined with its use competent use of game and learning mechanics lead it to be a reasonable recommendation for use in a workshop environment. The game can stand as a centerpiece for learning, while the

multitude of additional learning resources can support learning to a degree of the workshop leader's choosing.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another,
- Understand how these differences can affect lifestyle, values, and identity,
- Interact with people from various cultural backgrounds with sensitivity.

On the Path of the Elders introduces many individual aspects of Anishinaabe and Mushkegowuk culture and does a thorough job of explaining their implications on their people's ways of living and their values. This in addition to the understanding provided about the tribes' history in regard to Treaty No. 9 can also afford players a greater ability to interact with people of these tribes with sensitivity and understanding for the circumstances that have shaped them.

Rievssat from *Sami Game Jam* (Samuli Jääskeläinen and team)

Platform: Desktop computers (Windows)

Culture: Sami – value systems



Figure 11: A screenshot from Rievssat. "They made our homeland feel scary. Hostile. We were the strangers in our own land."

Self-made screenshot. Game source: (Jääskeläinen, 2018)

Another entry from the 2018 Sami Game Jam, *Rievssat* (Jääskeläinen, 2018) was developed with two topics in mind: “strangers in their own land” and “people of the eight seasons” (Laiti et al., 2021).

Players take control of a willow ptarmigan – or *riekko*, a pheasant-like bird native to Northern Europe – and fly across the Sami land in search of food. Levels are found in the form of the eight seasons (a concept of the Sami people, including the four standard seasons and four bridge seasons, i.e. winter-spring) (Jonsson, n.d.), with human influence on the environment growing and presenting more and more difficulties over time.

“Trees are being cut down, new buildings rise, taking up the bird’s space and applying new rules to its natural habitat. As if the bird doesn’t belong in its own homeland” (*Rievssat*, 2018).

The game includes voiceovers in the Sami language, which provide context and cultural insights for each level. Players can also use an innovative pedal control system to navigate the game’s landscape, or the traditional WASD controls.

Table 12: An LM-GM Analysis of *Rievssat*. Game source:(Jääskeläinen, 2018)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> • Movement 	<ul style="list-style-type: none"> • Action/Task • Identify 	Flying through 3D world	Encourages player engagement with the environment
<ul style="list-style-type: none"> • Collect 		Hunt for food	Encourages engagement, makes difficulties mentioned in narrative tangible through gameplay
<ul style="list-style-type: none"> • Levels 	<ul style="list-style-type: none"> • Reflect • Explore 	Short narration, longer levels	Narration makes difficulties clear, while levels help players visualize them. Players have time to reflect on what they’ve heard as they explore what they see.
<ul style="list-style-type: none"> • Story 			
<ul style="list-style-type: none"> • Information 		Ever-changing open world environment	Provides information about Sami history through narration, players can see this

			info mirrored in the world via exploring
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While the mechanics for *Rievssat* are simple, the combination of the voiceovers and the level design provide the player with a poignant view of Sami oppression in their own home and resilience in the face of hardship. The more houses are built and fields are mined, the harder the levels become to navigate, the harder it becomes to find the food needed to progress to the next level. In spite of this rise in difficulty, players hear not only of the Sami’s struggles on their land (“They built houses on top of our home. No room for us anymore” (Jääskeläinen, 2018).) but of the love that can be held for it (“Here is where we were born. And here is where we will stay” (Jääskeläinen, 2018).).

Potential for use in a workshop: The playing time of this game is short, roughly 10 minutes. However, used in tandem with other games on the topic, such as the aforementioned *Mu Luodda*, it can be a powerful tool in a lengthier workshop for understanding the modern Sami people.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players’ cultural awareness can be impacted in the following areas:

- Recognize differences between one’s own culture and another,
- Understand how these differences can affect lifestyle, values, and identity,
- Interact with people from various cultural backgrounds with sensitivity.

The use of Sami voiceover and the level setup in 8 seasons provides a very basic understanding of some differences between one’s own culture and Sami culture. The value of *Rievssat* to cultural awareness is more evident in its ability to help the player understand the values and identity of the Sami and be more sensitive to their background, struggles, and points of pride.

Sáivu from Sami Game Jam (Robin Baumgarten, Petri Autio and team)

Platform: Desktop computers (Windows), Mobile devices (Android)

Culture: Sami – art

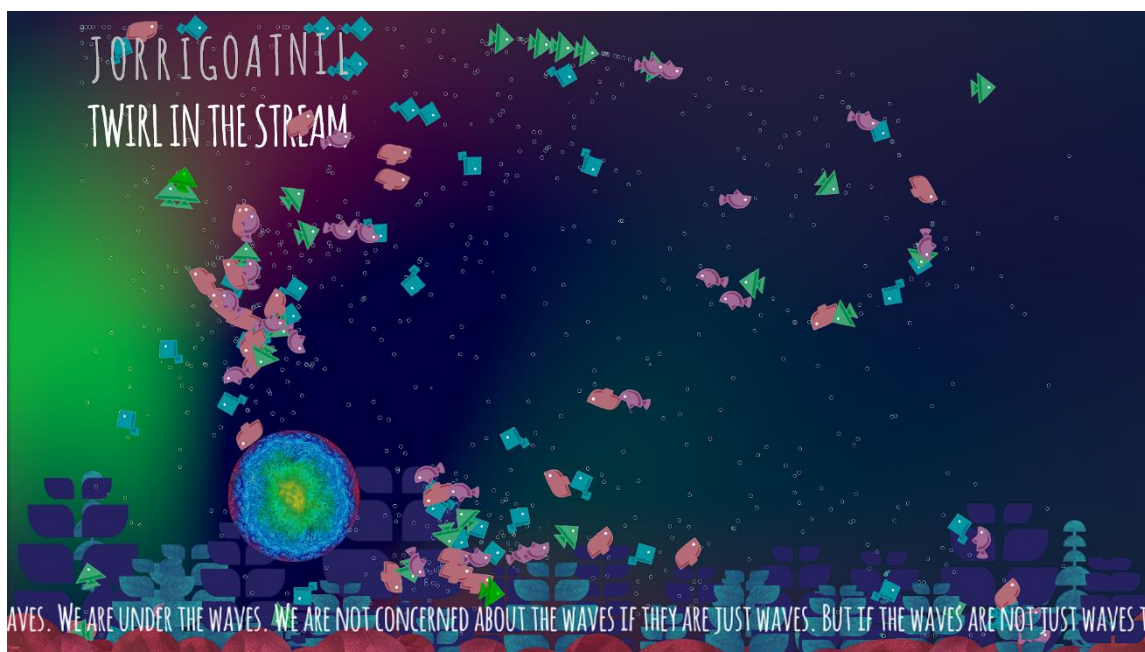


Figure 12: A screenshot from Sáivu. The player gathers the letters to build the Sami work for "twirl in the stream". Self-made screenshot. Game source: (Baumgarten & Autio, 2018)

Sáivu (Baumgarten & Autio, 2018) is the third and final game in this analysis from the Sami Game Jam 2018. This game aims to teach players Sami words while providing interpretative, culturally relevant narration in multiple different Sami dialects (such as Northern, Inari, and Skolt Sami), changing each time the player goes through the game.

Whether on PC or mobile devices, the game functions with a swiping mechanic, with which players can generate currents to pull letters to a destination and build words out of them. Mixed among the letters are fish, which the player must keep alive by routing their currents around dangers in the world. The end goal is to “teach the fish to follow the right currents and maintain ongoing balance” while also learning new vocabulary (*Sáivu*, n.d.).

Table 13: An LM-GM Analysis of Sáivu. Game source: (Baumgarten & Autio, 2018)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> Collecting 	<ul style="list-style-type: none"> Instruction 	Gather letters from the playing field, full word listed at top of screen	Encourages active attention to the new vocabulary as players much search to build each

			word, must build the whole from the parts
<ul style="list-style-type: none"> • Time pressure 	<ul style="list-style-type: none"> • Action/Task 	Rapid decay of fish	Promotes a sense of urgency, tangibility of the feelings of dread expressed in narration
<ul style="list-style-type: none"> • Behavioral momentum 		Levels	Allows players to achieve a “flow”; reinforces suddenness of difficulty, in line with the confusion conveyed in the narration

While there are multiple mechanics employed in *Sáivu*, the problems arise in the fact that these mechanics, as they are implemented in gameplay, compete with one another.

The narrations contain messages that provide insights into the culture, though they compete with the gameplay, rather than complement it. Diverting currents away from dangers in the world requires much attention, and the player’s fish die very rapidly if not diverted accurately. As noted in the LM-GM analysis, one could interpret this effect as metaphoric and in support of the accompanying narration (“This is distressing. Water is different, heavy to breathe. Gills choking, we lose our breath!” (Baumgarten & Autio, 2018)). However, unless one understands the spoken Sami, lacking the time to read the subtitles can be detrimental to the learning effect. The narration becomes little more than background noise as the gameplay intensifies.

A similar effect can be triggered while learning the vocabulary. While the behavioral momentum generated through the levels does encourage heightened attention to gameplay and a symbolic sharp adjustment period once dangers are introduced to the field, it leaves little headspace left to absorb the translations provided for the words one has just collected the letters for. Time to reflect upon the learned vocabulary would be beneficial.

Potential in a workshop: Seeing as much of the cultural education depends on this narrative and vocabulary, which is ultimately undercut by the gameplay, *Sáivu* proves to be a more difficult recommendation for use in a workshop environment. It may serve well as a supplement to the other Sami entries, *Mu Luodda* and *Rievssat*, but would not provide sufficient teaching for a workshop on its own.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another,
- Understand how these differences can affect lifestyle, values, and identity,

The use of Sami voiceover and teaching of new vocabulary provides a basic ability to recognize Sami culture and compare it with one's own. The narrations also provide insight into cultural values and identity, such as the value of equilibrium. However, the mechanical execution makes it comparatively difficult for these lessons to come across.

Thunderbird Strike from *Elizabeth LaPensée*

Platform: *Mobile devices (iOS and Android)*

Culture: *Native American – value systems*



Figure 13: A screenshot from Thunderbird Strike. The player destroys an oil rig using lightning gathered from the sky. Self-made screenshot. Game source: (LaPensée, 2017)

Thunderbird Strike (LaPensée, 2017) is a side-scrolling game for mobile devices. Players take control of the Thunderbird, a creature from the mythology of multiple Native American tribes, in order to save the Earth from pollution caused by oil drilling. Players can charge attacks by gathering thunder for the Thunderbird and using it to strike at oil rigs and pipes, earning points for clearing the land. Alternatively, they can use it to restore local animal populations. Both alternatives earn points, without judgement from the game. The final boss, fought in the Straits of Mackinac, is the Enbridge Line 5 pipeline in the form of a snake. (Dubé, 2017)

The game was released in 2017, in the wake of major protests over the Dakota Access Pipeline (Hersher, 2017). While it advocates against the oil industry in general, the Enbridge Line 5 pipeline takes the center stage. The game won the best digital media award at the ImagineNATIVE festival in 2017; however, it generated harsh backlash from Minnesota state legislation and executives of the oil industry (*Video Game Prompts Charges of “Eco-Terrorism,”* 2017).

Table 14: An LM-GM Analysis of *Thunderbird Strike*. Game source: (LaPensée, 2017)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> Quick Feedback 	<ul style="list-style-type: none"> Action/Task 	Visual and audio feedback for destruction and restoration	Encourages frequent and active use of mechanics
<ul style="list-style-type: none"> Assessment 		End of level summary	Shows how much destruction or healing was caused; brings player methods to light for potential reflection
<ul style="list-style-type: none"> Cutscenes Story Roleplaying 	<ul style="list-style-type: none"> Identify 	Cutscenes and map before each level	Aids player understanding of gameplay objectives by showing the cultural context of actions; promotes identification with Thunderbird’s objectives

While *Thunderbird Strike* leans more in the direction of a purely entertainment game, lacking many learning mechanics, the context in which the gameplay takes place is critical.

Cutscenes in between levels provide players with knowledge on why they are fighting as the Thunderbird, which simultaneously provides them exposure to current concerns facing the Indigenous tribes. The protests against oil pipelines are addressed directly, as are the Indigenous people taking part in them.

Even with this taken into consideration, the game alone is not enough to constitute the basis of an educational workshop. While “Thunderbird Strike” certainly prompts players to engage with the topic of oil pipelines and learn how they can affect Indigenous land, the learning effect would be minimal without this further research.

However, the official website for *Thunderbird Strike* provides numerous resources and plans of action for players. A list of key pipelines to learn about, art resources for protest posters and

Indigenous-designed symbolic figures, and ways to personal divert funds away from dangerous projects are included on the Act page (*Thunderbird Strike - Act*, n.d.), while questions to encourage reflection can be found on the Reflect page (*Thunderbird Strike - Reflect*, 2017).

Potential use in a workshop: The supplementary materials provided by *Thunderbird Strike's* website can lend the game the educational substance it needs to work in an educational workshop, covering a wide range of topics from the mythology of the Thunderbird to the risks posed by the Alberta Tar Sands. Additional links are also included for further research and learning. (*Thunderbird Strike - Reflect*, 2017) The use of the *Thunderbird Strike* game provides a level of active engagement and fun, which can serve as a supportive basis and context for the theoretical discussions posed by the Reflect page. Use of the two in tandem could serve a workshop focused on Indigenous culture and environmentalism well.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another,
- Understand how these differences can affect lifestyle, values, and identity,
- Interact with people from various cultural backgrounds with sensitivity.

Thunderbird Strike can help players to recognize differences between cultures, not lastly by framing the game in Indigenous mythology. Additionally, it encourages players to recognize modern-day problems facing Indigenous tribes, understand these tribes' values in relation to the problems, and encourages active participation in efforts to solve these problems alongside them. While this constitutes a different layer of "culture" than other entries – focusing less on history and mythology – it still is very much relevant in understanding Indigenous value systems in the modern day, which are also a part of culture.

Tipi Kaga from Carl Petersen

Platform: Desktop computers (Windows and MacOS)

Culture: Lakota – traditions



Figure 14: A screenshot from Tipi Kaga. The player builds a tipi with step-by-step instructions in the Lakota language. Self-made screenshot. Game source: Petersen, 2017)

Tipi Kaga (Tipi Builder) (Petersen, 2017) is a simple application designed to pass down Lakota knowledge and language. With the help of step-by-step instructions voiced by a fluent Lakota speaker, players can get a feel for the language while constructing a tipi from the ground up.

The game was created by Northern Plains Studio founder Carl Petersen as a project for a programming class at Dakota State University. It has received multiple accolades, most notably being an Official Selection at the ImagineNATIVE Film and Media Arts Festival 2019, and two youth grants (*Tipi Kaga (Builder)*, 2021).

Table 15: : An LM-GM Analysis of Tipi Kaga. Game source: (Petersen, 2017)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none">Tutorial	<ul style="list-style-type: none">Instructional	Written and voiced instruction	To guide player through the building process; to provide expose to Lakota language
	<ul style="list-style-type: none">Accountability	Step-by-step, translatable instructions	Players can determine pace and content of learning: move instructions ahead at their

			own pace and translate the lines to English as many times as needed. Potentially increases chances of knowledge retention.
<ul style="list-style-type: none"> • Simulation • Cascading Information 	<ul style="list-style-type: none"> • Action/Task 	Step-by-step building	Used to break the tipi-building process into increments. Help students to understand each step and the whole

Potential use in a workshop: While *Tipi Kaga* provides learners with the chance to interact with Lakota language and culture, its short playtime (about 2 minutes) and unadorned gameplay experience would indeed make it difficult to center a workshop around. However, in a fuller curriculum addressing the Lakota culture, this game could make a wonderful tool to support learning by getting players interacting with the culture and exposed to the language. Such a curriculum is not provided by the game or its publishers, as seen in other entries, and would require more effort from the side of a workshop planner.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another.

Tipi Kaga allows players to absorb knowledge and speech from another language, and the option to directly translate the instructions back and forth between Lakota and English facilitates observation and comparison. However, one would need more extensive materials to be able to relate these differences to Lakota senses of identity or be able to increase their sensitivity when interacting with members of the tribe.

When Rivers Were Trails from Elizabeth LaPensée and The Indian Land Tenure Foundation

Platform: Desktop computers (Windows and MacOS), Mobile devices (iOS and Android – tablets only)

Culture: Heavy focus on Anishinaabe, inclusion of many other North American Indigenous tribes – art, lifestyles, value systems, traditions, beliefs



Figure 15: A screenshot from *When Rivers Were Trails*. The player can prompt a hunting minigame, "as long as you stand with the resistance and honor traditional ways." Self-made screenshot. Game source: (LaPensée, 2019)

The final candidate for the FDGC catalogue is *When Rivers Were Trails* (LaPensée, 2019), another work under the creative direction of Elizabeth LaPensée in collaboration with over thirty Indigenous contributors, the Indian Land Tenure Foundation, Michigan State University's Games for Entertainment and Learning Lab, and with support from the San Manuel Band of Mission Indians (*When Rivers Were Trails*, n.d.) .

When Rivers Were Trails is a 2D point-and-click adventure which allows players to live the story of an Anishinaabe person who is forced from their land after it is sold to white settlers in the late nineteenth century. Players begin by choosing a clan – one of 4 of the 7 clans, or *dodem* of Anishinaabe tradition (Patricia D. McGuire, 2008) – and can navigate a map of North America area by area, turn by turn. Each turn presents the player with conversations with NPCs, historical facts, and/or opportunities to gather resources. Players must balance their food, medicine (also used as *asemaa* offerings, as was seen in *Growing Up Ojibwe*), and wellbeing (encompassing the concept of

mino-bimaadiziwin, also referred to in *Growing Up Ojibwe*). Running out of any of these can cause the player to die and rejoin their ancestors before finding a place to resettle – the ultimate goal.

The game addresses historical themes of suppression and injustice as well as cultural themes of reciprocity and community. It was the 2019 winner of the IndieCade Adaptation Award (*IndieCade Awards, 2019*) and is included in the Games for Change catalogue (*When Rivers Were Trails - Games for Change, n.d.*).

Table 16: An LM-GM Analysis of *When Rivers Were Trails*. Game source: (*LaPensée, 2019*)

Game Mechanics	Learning Mechanics	Implementation	Usage
<ul style="list-style-type: none"> Resource Management 	<ul style="list-style-type: none"> Plan 	Wellbeing, food, medicine	Enforces understanding of dire situation; encourages conscientiousness
<ul style="list-style-type: none"> Rewards Roleplaying 	<ul style="list-style-type: none"> Discover 	Random events, chances of gathering resources	Encourages use of previously learned knowledge to discover new ways of earning resources
	<ul style="list-style-type: none"> Simulation 	Reward/penalty based on dialogue choices	Encourages players behaving in line with values taught/encouraged by the game to gain resources
<ul style="list-style-type: none"> Story Information 	<ul style="list-style-type: none"> Identify 	1 st person experience of 2D world and narrative	Encourages immersion in learning material and development of empathy
	<ul style="list-style-type: none"> Feedback Reflect 	Direct response and evaluation of player's choices	Explains repercussions of actions, encourages thoughtful interaction with material
	<ul style="list-style-type: none"> Accountability Explore 	Free choice of direction in world map, choice between dialogue options, optional educational popups	Gives players autonomy, ability to choose what they want to see and learn
<ul style="list-style-type: none"> Tutorial 	<ul style="list-style-type: none"> Tutorial 	Pre-game tutorial, in-game mini game tutorials	Guide the player through gameplay mechanics, enable learning to take place
<ul style="list-style-type: none"> Levels 	<ul style="list-style-type: none"> Guidance 	Map sections (Levels) and introductory scenes to them	Show players what to expect in the upcoming areas, what themes and topics they will be confronted with
<ul style="list-style-type: none"> Behavioral Momentum Game turns 	<ul style="list-style-type: none"> Repetition 	Levels and individual moves	Cover a wide variety of themes with the same basic mechanics;

			over time, navigate gameplay and teachings better
<ul style="list-style-type: none"> Urgent Optimism 	<ul style="list-style-type: none"> Simulation 	Resistance-based events	In initial phases, builds hope for the player to be eroded with each further instance. Encourages empathy.

When Rivers Were Trails makes tremendous use of a relatively simple game system, using a 2D point-and-click environment, resource management, and random events to address a wide variety of topics in a way that can resonate with the player. While an attempt has been made in the LM-GM analysis to separate mechanics up clearly by their use, in reality, the mechanics play off of one another in a way that makes them difficult to strictly separate.

For example, the overall behavioral momentum (or encouragement to get in a “flow”) is most heavily influenced by the repetitive nature of game turns. However, mini-games are periodically built in to provide a quick change of pace and lighten the atmosphere. These usually serve to gather resources, thus relating the behavioral momentum to the “planning” learning mechanic and “resource management” game mechanic.

The most notable instance of the mechanics’ ability to influence one another comes in the form of the “urgent optimism” game mechanic. “Urgent Optimism” presents itself by being triggered in the player early on through opportunities to show resistance, either by joining Indigenous men and women organizing resistance movements or by standing up to Indian Agents, aggressive settlers, etc. Given the positive experiences one has likely experienced with random events thus far and the will to get out of a dire situation, one can easily feel optimistic about resisting along with a pressing need to do so. This is combined with the cause and effect “simulation” learning mechanic quite cleverly; resistance almost always fails and taxes players’ wellbeing, teaching players in an impactfully disheartening way that resistance historically proved futile. Through this method, the optimism initially experienced is taken advantage of and quickly turned into discouragement. The “resource management” mechanic further deteriorates the player’s hope and ability to resist over time by forcing a need to conserve wellbeing via difficulty balancing, bringing in the “planning” mechanic. These mechanics all work together to build a player’s journey from optimism to discouragement to eventual hopelessness – reinforcing empathy for the main character of the story by making his experience tangible to players via gameplay.

Perhaps in part due to the wide variety of contributors to the project, *When Rivers Were Trails* is able to teach about culture and historical events of many tribes and peoples. One learns basic phrases in many Indigenous languages via their interactions with NPCs, as well as stories of their people, their journeys, and their beliefs. Through random events, one can also gain insight into multiple historical viewpoints both for and against the actions of the United States Government – from both Americans and Indigenous people – to encourage further reflection from the player. The inclusion of other minority groups, such as Chinese immigrants or the children of Black slaves, are short, but provide a fuller picture of life in the United States at the time, encouraging players' immersion in the story and providing them further context with which to form an opinion. Additionally, *When Rivers Were Trails* addresses topics with which the player may already be familiar – such as that of residential schools, which generated much public outrage in 2021 (Al Jazeera, 2021) – utilizing the immersive nature of the game to promote new empathy and understanding.

Potential use in a workshop: With roughly 2 hours of playtime for one path and all the above mechanics taken into consideration, *When Rivers Were Trails* provides an exemplary basis for use in an educational workshop environment. The gameplay provides an easy-to-understand basis for teaching about a wide variety of cultures and their backgrounds. The individual nature of each player's journey – from random events to player choices and clans – provides a basis for discussion and reflection, whereas the historical nature of the story can be a starting point for further teaching about Indigenous history, racism, and minority oppression.

Impact on cultural awareness: Through gameplay and with reflection on the gameplay experience, players' cultural awareness can be impacted in the following areas:

- Recognize differences between one's own culture and another,
- Understand how these differences can affect lifestyle, values, and identity,
- Interact with people from various cultural backgrounds with sensitivity.

When Rivers Were Trails has an informational intention that provides players with knowledge about Anishinaabe culture and many others. The way these cultural aspects affect identity and lifestyle is made clear, and even directly presented to players in the form of the wellbeing mechanic. Most notably, the game goes beyond simply providing the words for players to verbally interact with Indigenous culture. By providing players with an understanding of the struggles and injustices that led to Indigenous oppression in the United States and Canada, *When Rivers Were Trails* allows

players to be more readily able to interact with Indigenous peoples with a consciousness of their backgrounds and sensitivity toward the difficulties that persist for them even in the present day.

5 Results

As a result of the key research objective – identifying which games currently able to teach cultural awareness are the best-suited for the FDGC Catalogue of Games with Pedagogic Potential – the following conclusion was reached:

From the 13 games analyzed in depth, this study aimed to identify those which could best impact cultural awareness and simultaneously be of potential use in FDGC/MBB workshops.

The final recommendations are the games which can help players reach the most goals of cultural awareness. After analyzing each game's ability to do so with the help of an LM-GM analysis, these are the final recommendations to the FDGC:

- *Growing Up Ojibwe*
- *Mu Luodda*
- *On the Path of the Elders*
- *Rievssat*
- *Thunderbird Strike*
- *When Rivers Were Trails*

The above six titles were found to be games with pedagogic potential. Most importantly, they provide an opportunity for players to improve in all three identified areas of cultural awareness.

There is reasonable evidence to believe that use of any of these six games in a workshop environment can increase the cultural awareness of the players involved.

Mu Luodda and *Rievssat* can, especially when combined, form the basis for an educational workshop on understanding modern-day Sami – the challenges they have faced and continue to face today.

Growing Up Ojibwe, *On the Path of the Elders* and *When Rivers Were Trails* provide extensive learning opportunities with the support of (comparatively) longer playtimes and a wide breadth of topics addressed. *On the Path of the Elders* notably also provides additional teaching materials to support meaningful use of the game. Similarly, *Thunderbird Strike* also provides a pool of additional information to draw from to expand players' learning in a pedagogical environment.

6 Discussion

6.1 Summary

In an attempt to identify the most suitable games for the Foundation of Digital Games Culture to use in their workshops (and thus include in their Catalogue of Games with Pedagogic Potential), an analysis was conducted on the Indigenous Game Developers database of Indigenous-made Game Works.

From $n = 91$ media works total, the analysis suggests that six games – *Growing Up Ojibwe*, *Mu Luodda*, *Rievssat*, *On the Path of the Elders*, *Thunderbird Strike* and *When Rivers were Trails* – are the best games that teach culture to recommend to the FDGC. Their accessible nature and ability to engage and increase multiple facets of a player's cultural awareness make them more suitable than others, which were either inaccessible or not teaching cultural awareness to as high a degree.

6.2 Interpretations

Hypothesis H1: The more learning mechanics and game mechanics used, the more cultural awareness goals will be fulfilled.

The results of this study contradict the hypothesis H1 that more game and learning mechanics combined would lead to a more culturally educational experience. While some games, such as *When Rivers were Trails* and *On the Path of the Elders*, did have significantly more mechanics than others, this could likely be attributed to the length and breadth of their gameplay. *Mu Luodda*, *Rievssat*, and *Thunderbird Strike* all have a shorter playtime and a comparative lack of mechanics; however, they still manage to address all three key points of cultural awareness.

Hypothesis H2: The games that best teach cultural awareness will include the “explore” and/or “identify” learning mechanics.

Hypothesis H2 was confirmed, as all six games made use of the “identify” learning mechanic, going back to the research of Anderton & King. While five out of the six games use the “story” game mechanic in tandem with identification, *Rievssat* provides the sole exception. Here, identification is generated through movement and collection mechanics, putting the player in the place of the riekko struggling to find food. However, even in this scenario it should be noted that the riekko may be interpreted as a metaphorical stand-in for the Sami people, whose struggles are told in the game's narrations. In this way, even *Rievssat* may be said to use story to generate identification; however,

this effect is subject to a player's ability to understand symbolism, whereas the other games make the connection more directly apparent.

However, not all of the six games identified make use of the "explore" mechanic to generate a learning effect. A notable example here is *Thunderbird Strike*. Movement was linear in a side-scrolling format, and exploration was not present in the gameplay. Further research to define what exactly constitutes or encourages player immersion as defined by Crow and Mortara et al. could lead to effective mechanics being easier to hypothesize accurately. Observing this study, story and identification as game mechanics seem to be signs of immersion which form a basis for cultural learning, though they may not be strictly prerequisite.

Interpretation of mechanics

While their quantity did not prove to be relevant, each of the six games did all have two game mechanics in common: Information and Story.

These were not the only games which utilized these mechanics. However, this could suggest that the presence of these mechanics is necessary for increasing cultural awareness at all. Concrete proof of this theory would require further research, in which case this study could provide a basis for examination.

Movement also appeared in four out of the six games. This indicates that, while movement used to facilitate education may be helpful, it need not be necessary. Neither *Thunderbird Strike* nor *When Rivers Were Trails* used movement in a way which correlated to any particular learning mechanic or pedagogic effect; however, the mechanic's frequency (and frequent use as a potential method for increasing player engagement) is noteworthy, nonetheless.

As far as learning mechanics are concerned, "action/tasks" appeared the most often (five out of six games), which could indicate that the use of concrete objectives and action points may encourage cultural learning. Four games also made use of the "reflection" mechanic. This could once again point to Anderton & King's findings on player's self-reflection as a result of identifying with in-game events. While identification stands at the start of the learning process, reflection encouraged by the game may provide the space needed to help the process along.

Further research into mechanical effectiveness could lead the way to the development of a cultural teaching guideline. The mechanics above indicate particular tendencies towards common – and

potentially effective – practices, but confirmation through test persons and case studies could provide important insights.

Interpretation of intentions

Further insight can be gained by comparing and contrasting two specific groups of works from the IGD database, namely those produced during the Sami Game Jam and the SKINS workshops. Both of these were developed under similar game jam conditions. However, the SKINS workshops placed more focus on teaching game development skills to Indigenous youth, as was the case with *He Ao Hou (Past Future Forward, n.d.)*. Youths involved could brainstorm a theme and story for their game together. The Sami Game Jam, on the other hand, provided concrete themes to each jam group, and its experienced participants were focusing more on exploring culture than on gaining skills (*Saami Game Jam, n.d.*). While the focus on learning vs. producing focus is certainly not negligible, it is also worth considering that the Sami Game Jam’s centered focus on meaningful themes generated more educational results.

Similarly, it is worth considering that a number of the above games may have been intended for passing down knowledge within an Indigenous community. Games such as *Tipi Kaga* cite their wish to pass down Indigenous knowledge (*Tipi Kaga (Builder), 2021*), which could easily refer to a desire for intracultural, as opposed to strictly intercultural, dialogue. In other words, if these games’ goal is to pass down knowledge within a community as it threatens to get lost, they are likely not designed with foreigners in mind. These games may not fulfil the goals of encouraging cultural awareness as defined in this study, because the term’s definition inherently implies that one party is foreign to another. One can still do their part by trying to learn from such games’ teachings and appreciate their worth and cultural value, but it must be considered that the teaching methods used may not be designed explicitly to benefit this purpose.

6.3 Implications

The results of this study build on existing evidence of games being effective tools for learning. Each of the four above games provides theoretical information (see game mechanic: “Goods/Information”) for players to process in addition to using mechanics that engage players’ emotional intelligence and sensitivity (see “Identify”). Further testing into what constitutes immersion, as noted by Crow and Mortara et al. could be of benefit. In addition, each of these games

utilizes the medium provided by video games to pass on information about a culture to the player, likening Williams' description of *Never Alone*.

This study provides an insight into cultural teachability in games by analyzing their mechanical content and putting it in relation to the noteworthy aspects of cultural awareness. While no definitive framework for this exists, an LM-GM-oriented approach can help immensely in shining light on a game's capacity for cultural teachability. Additionally, using the three points of cultural awareness identified in this study, a more goal-oriented approach can be taken to planning culturally educational game workshops and even developing culturally educational games.

6.4 Limitations

Limited contact with FDGC: As the media pedagogue and workshop planner from the FDGC was unavailable for consultation, the definition of pedagogic potential needed to be defined independently within the realms of the study. A more tailored approach would've been possible with input from the FDGC on the matter, but the approach taken is valid, nonetheless. A general aptitude for pedagogy in each game has been proven through the identification of their learning mechanics and further described through an LM-GM analysis.

Limited databases and resources: Research was limited to a small pool due to a lack of resources for finding games that teach culture. As mentioned, resources such as Games for Change and Peace Games provide a start, and imagineNATIVE, though only dealing with a few video games, provides more. However, the lack of dedicated databases for culturally educational games left few options for creating a pool of analysis.

In this same vein, concrete use cases were difficult to identify. Where able to be found, this study has recorded use cases and accolades of the games analyzed. However, lack of media coverage and lack of central databases and news sources limited the number of use cases able to be found to a rather small number.

Many games that could've been wonderful recommendations for the FDGC were left out due to not meeting any scientific criteria that could be used for gathering data. The IGD database is non-exhaustive and focuses only on Indigenous peoples around the world, so entries such as *Ukraine – Not a Game* (It's Ukraine Not A Game, 2023) and *Skábmá – Snowfall* (Red Stage Entertainment, 2023) were not able to be included in the analysis. Though they fit the topic in their themes and intentions, these games could only be found during random searches, not when searching by scientific criteria.

It is the intention of this study to poise the FDGC as one such resource for finding culturally educational games. Though their inclusion of games into their catalogue is predicated upon their usage in MBB workshops, an expansion of their catalogue could provide gamers and educators with a source for finding games which is sorely lacking.

Lack of research to quantify cultural teachability: As stated above, many games teach culture by way of normalizing it (e.g. *Hill Agency: PURITYdecay* (Achimostawinan Games, 2022)), by way of symbolic representation (e.g. *Wanisinawin | Lost* (Meagan Byrne, 2015)), or by way of using it as a backdrop for other pedagogic topics (e.g. *Coyote Quest* (Silverstring Media, 2017)). These methods certainly have their place in teaching culture. As LaPensée describes it:

“Media studies would more genuinely benefit from a complete engagement with Indigenous ways of knowing by seeing Indigenous cultures as **living** acts of survivance” (LaPensée, 2018b).

Seeing cultures as they have endured into the modern day, or learning from them in whatever format they choose to represent themselves, allows players to abandon the idea of them as distanced “relic[s] of the past” (LaPensée, 2018b). The sensitizing effects of such an approach are easily imaginable.

However, such an effect remains to be made concretely measurable. In turn, the teachable effects of these methods are difficult to objectively quantify or identify. Their teachability is highly subjective to player interpretation, as opposed to games which utilize concrete teaching mechanics to deliver a single clear message to players.

Though they may still prove effective (in a different research environment), their effectiveness would require further research to define. Perhaps a mixed-methods analysis of test persons and their reactions to such games could provide a solid basis for quantifying these effects. Such knowledge would provide a basis for the present study to be conducted once more, with a more extensive theoretical basis. As it stands, the games analyzed in the course of this study have made use of the theoretical knowledge available at present.

7 Conclusion and Recommendations

Further research is needed to establish a concrete framework for development and analysis of culturally educational games. Though a worldwide consensus may never be reached, a simple

identification of which mechanics and designs are most effective when teaching certain parts of a culture could be of benefit. Not only would this make development of such games easier, more accessible, and more effective, but it would also provide the same benefits to the conducting of studies such as this one. The games listed above, among other successful works such as *Never Alone*, can provide a wonderful basis for such a study.

Additionally, the games' eventual presence in the Catalogue of Games with Pedagogic Potential could be a starting measure for solving the issue of limited resources for finding culturally teachable games. With a wider audience, more people can learn and the knowledge within these games can be more easily preserved and taught again.

The most tangible benefit of the games being taken up by the FDGC and MBB, however, would be in their potential for enacting change on a local scale. Going forward, the usage of these games in a practical workshop led by the FDGC and the MBB could lead to a rise in cultural awareness of the participants, and bring our generation a step closer to the harmony and cultural longevity which UNESCO is striving to bring about. Especially in younger age groups, the obtaining of cultural sensibility can instill sensitivity and understanding in players as they grow and raise a generation of their own.

In all, the Foundation of Digital Games Culture has the opportunity to further solidify their place among other socially-oriented games catalogues such as Games for Change, providing resources to fuel the minds of those looking to learn. Of course, they possess the unique strength of being able to implement these games in workshops provided by Medienboard Berlin-Brandenburg, providing guided learning for gamers of all ages. With these boons at their disposal, their platform presents a prime opportunity to enact change; it is the hope of this study's author that the games suggested above can help facilitate one small step further in this direction.

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