We Are All Related: (Re)Storying With Augmented Reality to Build Indigenous-Settler Relations

by

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Abstract

Engaging settlers in inviting yet unsettling ways to understand settler colonialism and introduce Indigenous epistemologies may help build and sustain Indigenous-settler relationships. Augmented reality (AR) offers an opportunity to co-create and share Indigenous digital stories connected to territory to create sites of (re)storying that challenge colonial narratives that treaties involved land surrender. This thesis describes and reflects on my experiences participating in a series of projects involving Treaty 6 marker sculptures and digital media, including developing and prototyping learn-by-design resources for students and teachers to respectfully co-create AR stories with Indigenous Knowledge Keepers, Elders, and storytellers. Building on that work, I share my experience co-creating and sharing a trail of AR stories situated at Treaty 6 marker sculptures located in or near amiskwaciy-wâskahikan (also known as Edmonton, Alberta, Canada) through a community-based participatory research (CBPR) approach grounded in relationships and ongoing consent. Co-creating the story trail and selecting an AR storytelling platform was guided by the 4Rs of respect, relevance, reciprocity, and responsibility, OCAP®, data sovereignty, and a commitment to respect and adhere to Indigenous approaches to traditional cultural expression and protocol. Visitors to the Treaty 6 marker sculptures can experience AR stories from a respected Knowledge Keeper on what it means to be in relationship on Treaty 6 territory. Hearing these stories may prompt reflection on past, current, and future relationships and initiate further learning to build relationships and understanding.

Preface

This thesis is an original work by Amanda Almond. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name "(Re)storying with augmented reality to build Indigenous-settler relations", Pro00093408, November 18, 2019.

This thesis project is grounded in the *We Are All Related AR* project (Pro00083476) led by Dr. Rob McMahon (University of Alberta) and Dr. Diane Janes (Southern Alberta Institute of Technology) in collaboration with Dr. Diana Steinhauer (Yellowhead Tribal College, Saddle Lake Cree Nation) and Stewart Steinhauer (Saddle Lake Cree Nation). The *We Are All Related AR* project developed the foundation for this work, including governance, ceremonial, relational, ethical, copyright/intellectual property, research, and AR technical and design considerations. It also generated the AR story co-creation process which was then piloted in a graduate studies course and further developed and applied in this thesis (Pro00084226). I reflect on my involvement in these projects as a student and Graduate Research Assistant in chapter 3 and apply the AR story co-creation process to create an AR story trail as a new project specific to this thesis in chapters 4 and 5. The *We Are All Related AR* project team published an article on the initial project in 2019: McMahon, R., Almond, A., Whistance-Smith, G., Steinhauer, D., Steinhauer, S., & Janes, D.P.. (2019). Sweetgrass AR: Exploring augmented reality as a resource for Indigenous-settler relations in *International Journal of Communication, 13*, 4530–4552. We also published an article in 2018: Almond, A., McMahon, R., Janes, D.P., Whistance-Smith, G., Steinhauer, D., and Steinhauer, S. (2018). We are all related: Using augmented reality as a learning resource for Indigenous-settler relations in *Northern Public Affairs 6*(2). This thesis project is inspired by and aims to reflect the team-based and collaborative nature of both community-based participatory research (CBPR) and the relational accountability of Indigenous research methodologies. The *We Are All Related AR* project is documented at www.sweetgrassAR.ca

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Table of Contents

List of Tables

List of Figures

Chapter One: Introduction

Introduction

This thesis explores and reflects on my experiences of (re)storying through co-creating and sharing treaty stories in augmented reality (AR) with the goal of building Indigenous-settler relationships and understanding. Finding ways to engage settlers in inviting yet unsettling ways to understand settler colonialism and introduce Indigenous epistemologies may help build and sustain Indigenous-settler relationships. One approach is (re)storying or (re)telling—sharing stories which challenge dominant narratives (Regan, 2010; Dion, 2004). AR offers a digital platform to share Indigenous counter-narratives in an engaging format connected to territory and place.

My work in this thesis is guided by the question: "How can (re)storying through the co-creation and sharing of augmented reality stories support building Indigenous-settler relations?" To explore this question, I describe and reflect on my experiences participating in a series of projects involving Treaty 6 marker sculptures and digital media. Through these collaborations I developed a set of guidebooks that help students and teachers navigate through a process of respectfully co-creating AR stories with Indigenous Knowledge Keepers, Elders, and storytellers. Building on that work, I share my experience in applying that process in a new setting, drawing on digital content prepared in the aforementioned projects to co-create and share new AR stories and build a corresponding story trail of AR stories situated at Treaty 6 marker sculptures in amiskwaciy-wâskahikan (a place also known as Edmonton, Alberta, Canada). My thesis aims to document my work with Indigenous and non-Indigenous team members on these

projects, to explore a community-based participatory research (CBPR) approach to AR story co-creation.

Thesis Context

In 2015 the Truth and Reconciliation Commission of Canada (TRC) released their Final Report and 94 Calls to Action, the culmination of years of testimony, witnessing, and investigation on the impact of residential schools (Truth and Reconciliation Commission of Canada, 2015). In response to this work, many Canadian organizations, institutions, and governments developed community projects and strategic plans to respond to the Calls to Action and indicate their support for reconciliation (RISE, 2019; Government of Canada, 2015; CBC News, 2014; University of Alberta, 2016). However, despite these demonstrations of support for reconciliation, horrific and tragic news stories continued to emphasize ongoing systemic issues faced by Indigenous peoples, such as in the justice and child welfare systems (Hubbard, 2019; Macdonald, 2015). Polarized responses to these and other events reflected ongoing tensions between settlers and Indigenous peoples (Starblanket & Hunt, 2018; Hubbard, 2019; Macdonald, 2015). In early 2020, Wet'suwet'en land defenders and allies protested the development of the Coastal GasLink pipeline through Wet'suwet'en traditional territory. Solidarity protests were held across Canada, blocking roadways and railways at multiple sites (Ballingall, 2020). The conflict escalated to include the Royal Canadian Mounted Police arresting protestors, Prime Minister Justin Trudeau calling for the barricades to come down, and a backlash of overt racism against Indigenous peoples (Sterritt, 2020; Friesen, 2020).

Settler acts of reconciliation were critiqued as largely performative (Daigle, 2019) and uncommitted to changing the status quo (Hansen, 2016; Indigenous Students Council, 2018; Stirling, 2017; Asch et al., 2018). The hashtag #reconciliationisdead emerged on social media

and Anishinaabe author and journalist Tanya Talaga argued, “reconciliation never truly existed” (2020, n.p.). At the same time, during the COVID-19 pandemic crisis, Alberta’s Energy Minister commented on a podcast “Now is a great time to be building a pipeline because you can’t have protests of more than 15 people... people need jobs and those types of ideological protests that get in the way are not going to be tolerated by ordinary Canadians" (Bracken, 2020, para. 3 and 6). These tensions and conflicts, as well as many other examples, demonstrate more work needs to be done to build Indigenous-settler relations and understandings of Indigenous epistemologies, particularly in the contexts of Indigenous laws and territories. Building understanding and relationships may also be a starting place, for some, to further explore and support initiatives resisting settler colonialism and working towards indigenization (Gaudry & Lorenz, 2018), decolonization (Tuck & Yang, 2012), and Land Back (Longman et al., 2020).

One approach to building understanding and strengthening Indigenous-settler relationships is through the sharing of stories (Dion, 2004; Regan 2010). Sharing stories can help people understand the experiences of others and build relationships (Hildebrandt et al., 2016; Bissell & Korteweg, 2016; Castleden et al., 2013). Hearing suppressed and excluded stories can reveal truths that challenge dominant narratives, including how the land known as Canada was settled (Regan, 2010). There are many ways to share stories. One is augmented reality (AR), an emerging form of digital media that offers an engaging digital platform to share stories, inviting people to co-create and share stories from respected storytellers and perhaps be “unsettled”. However, at present little is known about sharing AR content co-created with Indigenous Knowledge Keepers to (re)story towards building relationships and understanding. Existing research in this area explores the potential of AR to share previously-suppressed Indigenous stories in a culturally relevant manner (Gaertner, 2016; Irving & Hoffman, 2014; Lacho, 2018).

In this context, this thesis discusses and expands on earlier work exploring the potential of co-creating and sharing AR stories, including the development of an AR story co-creation process. The AR story co-creation process is designed to navigate discussions of settler colonialism, cultural appropriation, knowledge sharing and project governance—prompting reflection upon past, current, and future relationships between Indigenous and non-Indigenous peoples. In this way, co-creating AR stories provides opportunities for learners throughout the co-creation process as well as in experiencing the AR stories (McMahon et al., 2019a; Almond et al., 2018).

Positioning

I position myself in this thesis to indicate the context of my involvement and motivations to do this research (Kovach, 2009). My professional background prior to entering the MA in Community Engagement (MACE) program at the University of Alberta included working with coalitions of service providers and social workers in the city of Edmonton, Alberta. My role involved coordinating projects exploring issues relevant to diverse communities including newcomers to Canada, LGBTQ2S+ youth, and youth experiencing homelessness. Working with marginalized urban populations, the over-representation of Indigenous peoples amongst communities such as youth experiencing homelessness is a readily observed and well-documented result of colonization, cultural genocide, racism, and intergenerational trauma (Kidd et al., 2018; Thistle, 2017). After starting the MACE program and learning about Indigenous research methodologies in my coursework, I recognized an opportunity to focus my learning on better meeting the needs of the people I was working with. When MACE 501 Principles and Practices of Community Engagement Instructor Dr. Rob McMahon offered an assignment option to create a digital story with Saddle Lake Cree Nation sculptor Stewart Steinhauer and Faculty of

Extension's Indigenous Programs leads Dr. Pat Makokis and Dr. Fay Fletcher, I quickly requested the topic and created the *Sweetgrass Bears* video with a classmate. The *Sweetgrass Bears* video explored the Treaty 6 marker sculptures, their inspiration, and the significance of having treaty markers on University of Alberta campuses. This video was my introduction to Dr. Diana Steinhauer and Stewart Steinhauer, and to the meaning of the Treaty 6 marker sculptures.

After the MACE 501 class, I worked with Dr. McMahon as a Graduate Research Assistant supporting youth from Piikani First Nation in Southern Alberta to learn digital literacy skills they then applied to create a video about their experiences at a cultural camp led by Elders. When Dr. McMahon described the proposal for *We Are All Related AR*, an Indigenous-settler relations project utilizing AR storytelling, I was highly interested and suggested I could support the project through the community-service learning component of my MACE program. Funded by the Teaching and Learning Enhancement Fund (TLEF) at the University of Alberta, the *We Are All Related AR* project (2017-2019) aimed to develop a 'proof of concept' set of educational resources that explored ways to integrate emerging digital technologies into courses. The project involved working with a team of university-based and Saddle Lake Cree Nation team members to co-create a governance framework that included both Saddle Lake Cree protocol and institutional agreements, technical considerations, and a digital media development process for co-creating AR stories with Indigenous Elders, Knowledge Keepers, and storytellers in a respectful and non-extractive way.

The *We Are All Related AR* project team included Dr. Rob McMahon (Co-PI), Associate Professor, Faculty of Arts; Dr. Diane Janes (Co-PI), Educational Developer, Southern Alberta Institute of Technology (SAIT); Dr. Diana Steinhauer, Saddle Lake Cree Nation Knowledge Keeper and President, Yellowhead Tribal College; Stewart Steinhauer, Saddle Lake Cree Nation

sculptor; and Greg Whistance-Smith, Research Assistant. Through my community-service learning and Graduate Research Assistant positions with this project, I worked with this team to draft Open Educational Resource (OER) guidebooks for the story co-creation process, helped test the process through field visits to Saddle Lake Cree Nation, and worked with other graduate students to support the design of a series of prototype AR stories.

The story co-creation process was then integrated in a graduate class offered by Dr. McMahon in the MA in Communications and Technology (MACT) program at the Faculty of Extension. I was involved in the field trips associated with the class, and while listening to Dr. Diana Steinhauer share the treaty story during a trip to Saddle Lake, I was struck by the richness of the treaty story and how it was a story I and many others are still unfamiliar with. Afterwards, I gave thought to how I might contribute to Dr. Steinhauer and Stewart Steinhauer's efforts to further share the treaty story.

During a subsequent project team meeting, I proposed to use AR to expand the treaty story held by Dr. Diana Steinhauer to additional Treaty 6 marker sculptures created by sculptor Stewart Steinhauer as part of my thesis. It was essential that this project was something Diana and Stewart also desired and felt would be worthwhile. Following the protocol established by the project team, I presented this request first verbally on January 11th, 2019, with protocol on January 21st, 2019, and in ceremony at Saddle Lake Cree Nation on May 03, 2019 to the two Knowledge Keepers. They accepted my request, agreeing to expand the stories and to guide me in this thesis project.

Being involved with the Treaty 6 marker sculpture projects also offered me a personal opportunity. My background includes Métis, Cree, English, and Scottish ancestry. Through my grandmother, I am from Métis and Cree families who have lived for generations in the Edmonton

area and I am a descendant of Chief Papaschase, who signed an adhesion to Treaty 6 in 1877 (Papaschase First Nation, 2020). My work and studies at UAlberta prompted me to begin learning more about my ancestry and identity, and working with Diana and Stewart provided an incredible opportunity to learn more about treaty and treaty relationships. I am in the process of reconnecting, which for me is a form of resistance against cultural suppression. In recognition of my disconnection, I position myself as an early learner and I am deeply grateful to those who graciously share their knowledge along the way, including Diana and Stewart.

Dr. Margaret Kovach (2015) prompts the following question for non-Indigenous researchers, which can also be applied here: "Am I creating space *or* taking space?" (p. 52, original emphasis). As a learner newly reconnecting, I hope this thesis project creates space to share Indigenous stories with others for whom these stories remain unheard in their lives using augmented reality as the vehicle for (re)telling these stories. This next section explains AR.

What is Augmented Reality?

Augmented reality (AR) is the overlay of digital information superimposed in real time on the "real-world" view framed by a device or computer (Azuma, 1997; Azuma et al., 2001). This term was created to differentiate AR from virtual reality, where the user is immersed in a digital environment created to simulate a physical environment (Alexander, 2017). Catching Pokémon by visiting a local park and viewing the characters through your phone is an example of AR (Fig. 1). Wearing goggles that simulate the experience of being on a roller coaster while standing in your living room is virtual reality (Fig. 2).

Figure 1

Pokémon Go Character Viewed Through a Mobile Phone

Figure 2

Person Wearing a VR Headset

Note. Photo by Hammer & Tusk on Unsplash.com.

AR "supplements reality, rather than completely replacing it" (Azuma, 1997, p. 356). This ability to augment reality with additional auditory and visual information creates an opportunity to share lesser-known narratives connected to present-day places and experiences (Engberg, 2017). This includes sharing Indigenous stories at specific locations (Gaertner, 2016). This capacity to connect suppressed narratives to territory and location is particularly significant for Indigenous storytelling, as place is deeply embedded within Indigenous epistemologies (Kovach, 2009). In this thesis, I focus on efforts to use AR to (re)story narratives suppressed by colonization, challenge dominant narratives, and build understanding.

A CBPR Approach to AR Story Co-Creation

This thesis reflects on and applies a community-based participatory research (CBPR) approach to AR story co-creation informed by Indigenous research methodologies (McMahon et al., 2019a; Kovach, 2009; Wilson, 2008). CBPR promotes the co-creation of knowledge through reciprocal, mutually beneficial, and relational research (Castleden et al., 2015). Collaboration to co-create knowledge and stories is particularly important, given a long history of researchers extracting cultural traditions and knowledge in ways that do not benefit, and even harm, Indigenous peoples and other individuals and groups positioned as 'subjects' of research (Schnarch, 2004; Smith, 2012). Anishinaabe scholar Deborah McGregor (2017) argues: "the dominant paradigm of [post-secondary institutions] *extracting* knowledge from Indigenous peoples, communities and organizations has to shift to one of *collaborating and partnering.* In this collaborative approach, knowledge remains within Indigenous communities, on their terms*"* (p. 17, original emphasis). A CBPR approach to AR story co-creation facilitates a collaborative process that shares decision-making power and ownership among all parties (Castleden et al., 2012). This collaborative approach can facilitate and sustain longer research relationships including through

iterative projects. The earlier Treaty 6 marker sculpture projects—the *Sweetgrass Bears* video, the *We Are All Related AR* project, and the graduate class—created relationships, frameworks, and processes foundational to this thesis project, reflecting iterations often observed in CBPR.

My approach is also informed by Indigenous research methodologies, including: the 4Rs of respect, relevance, reciprocity, and responsibility (Kirkness & Barnhardt, 1991), relational accountability (Wilson, 2008), and the OCAP®[1] principles (Schnarch, 2004). As Wilson (2008) explains, relational accountability means "the methodology needs to be based in a community context (be relational) and has to demonstrate respect, reciprocity and responsibility (be accountable as it is put into action)" (p. 99). This thesis is grounded in the relationships founded through my previous work creating the *Sweetgrass Bears* video in MACE 501 (2016), the *We Are All Related AR* guidebooks and prototype AR stories (2017-2019), and COMM 597 field trips (2018). Following Saddle Lake Cree protocol, the *We Are All Related AR* project began with a sweat lodge and closed with a pipe ceremony. I offered protocol to Dr. Steinhauer to help guide this thesis project and asked permission to further co-create and share AR stories about treaty so that more people may experience the stories. The AR story expansion was also supported by Stewart Steinhauer, sculptor of the Treaty 6 marker sculptures. In their acceptance of protocol and verbal agreement to work together to expand the AR stories, they indicated their consent and our accountability to one another throughout the process. McGregor (2017) identifies that Indigenous research "asks critical questions about knowledge production, generation, mobilization, and who really benefits from the research" (p.11). By working with Diana and Stewart to make key decisions regarding the AR story expansion, including approving

[1] OCAP® is a registered trademark of the First Nations Information Governance Centre (FNIGC). For more information, please see www.FNIGC.ca/OCAP

the AR story platform, stories and placement, the project is relevant and reciprocal to all involved.[2]

Hidalgo's concept of *augmented scholarship* is also relevant to this thesis (2015). Augmented scholarship is "a collaborative process between researchers and oppressed communities to produce alternative narratives and reveal erased histories using AR to inform, educate, raise public consciousness, elicit community action, and social change" (Hidalgo, 2015, p. 301). Applying a CBPR approach informed by Indigenous research methodologies to (re)story through the co-creation of AR stories to build Indigenous-settler relations aligns closely with the concept of augmented scholarship.

Terminology and Names

This thesis project stems from an earlier project formally titled *We Are All Related AR* (also called *SweetgrassAR* by some of the project team members). I have elected to use *We Are All Related AR* in this thesis to pay homage to the text on the Treaty 6 marker sculptures, my recollections of Stewart first explaining this statement to me, and the significance of its meaning. I occasionally refer to the Treaty 6 marker sculptures as "Sweetgrass Bear" when discussing a specific sculpture.

I use the term "co-creation" throughout this thesis to refer to the production of the digital AR stories. In using this term, I do <u>not</u> refer to the creation of the treaty stories that are held and shared by Knowledge Keeper Dr. Diana Steinhauer. These oral stories granted by ancestors to Diana are stewarded and protected for future generations (Steinhauer, 2018). For this reason, and to prevent extraction of cultural content, the *We Are All Related AR* project team determined that

[2] In this project, Dr. Diana Steinhauer and Stewart Steinhauer are representing themselves as individuals from Saddle Lake Cree Nation; they are not representing Saddle Lake Cree Nation.

the ownership and copyright of all digital raw video footage and recordings belong to Diana and Stewart, and to that end worked with the University of Alberta to transfer copyright to them. However, Diana and Stewart also gave permission for others, including students, to use the video footage and recordings to co-create AR stories. These permissions allowed for future collaborations, including this thesis project to co-create AR stories using short digital excerpts and combined clips of these existing video recordings to share through an AR platform. This approach follows recommendations by others working in this space. For example, in her book *A Digital Bundle* Dr. Jennifer Wemigwans refers to her role preparing Indigenous stories to be shared online as the content producer and further explains:

> "Knowledge production" here refers to the technical production, or really the reproduction, of *aspects of long-existing Indigenous Knowledge in new formats and in relation to new contexts*- in the sense of assembling, representing, and creatively configuring this pre-existing knowledge but certainly not creating it (2018, p. 3, original emphasis).

Likewise, I use the term "co-creation" or "co-creator" in reference to my role in the story co-creation process, where I assembled digital excerpts and clips from pre-recorded content and designed digital stories within an AR story platform.

In this thesis, I discuss many team members and colleagues who contributed to this project and the earlier Treaty 6 marker sculpture projects. I use their names, with permission, to recognize their contributions and the collaborative nature of this thesis.

Thesis Overview

Following this introduction chapter, Chapter Two explores the literature on Indigenous digital storytelling and Indigenous AR. In Chapter Three, I reflect on the process of drafting the *We Are*

All Related AR guidebooks and prototype AR stories. Chapter Four describes how I selected an AR platform to host new AR stories and Chapter Five describes how I created an AR story trail, co-creating and placing AR stories at Treaty 6 marker sculptures. Chapter Six discusses this thesis' contributions to the field and recommendations for future research.

Chapter Two: Indigenous Digital Storytelling with Augmented Reality

Literature Review

This review explores the literature related to the creation of Indigenous augmented reality (AR) content. As there is limited literature currently available on creating Indigenous AR content, Indigenous digital storytelling is examined as a comparable process and experience. Digital storytelling is the creation of a short personal narrative using digital media including audio and imagery (Hands on Media Education, 2020).

To explore the potential of Indigenous AR to counter current narratives and build relationships between Indigenous peoples and settlers, I start this review with literature on learning about settler colonialism through digital storytelling. The literature on Indigenous digital storytelling is reviewed next, to consider how it may inform Indigenous AR. Lastly, the limited literature available on AR to share Indigenous stories and other marginalized stories is discussed.

Literature Review Research Questions

1. How can the literature on learning about settler colonialism through digital storytelling inform the co-creation of Indigenous AR content with Indigenous and non-Indigenous co-creators?
2. How can the literature on the process of Indigenous digital storytelling inform the co-creation of Indigenous AR content?
3. How is AR currently being applied to Indigenous traditional cultural expression, or marginalized stories?

Methodology

Searching the literature began with a research plan created with Tanya Ball, a Métis librarian at the University of Alberta. Tanya assisted with identifying databases, subject headings and

keywords. Readings were selected through searching EBSCO Delivery Service at the University of Alberta Libraries, Google Scholar, and by reviewing citations and references from selected articles. The emerging nature of AR meant limited literature was available related to Indigenous AR content. Digital storytelling provided a rich substitute for comparison with an established body of literature. Indigenous digital storytelling is relevant to Indigenous AR storytelling since both centre Indigenous voices and knowledge, can share previously suppressed stories, and are suitable for oral storytelling traditions.

Search strings were entered into EBSCO Discovery Service which cross-searches the University of Alberta's NEOS catalogue as well as other electronic resources the library subscribes to (University of Alberta Libraries, 2018). Search strings included the following key words, all with filters set for peer-reviewed and English-language literature:

1. a) augmented reality OR mixed reality OR merged reality AND b) Indigenous or Native American OR Aboriginal OR Indians OR First Nations OR Inuit OR Métis
2. a) subject term digital storytelling AND b) Indigenous or Native American or Aboriginal or Indians or First Nations or Inuit or Métis
3. a) digital storytelling AND b) Indigenous or Native American or Aboriginal or Indians or First Nations or Inuit or Métis AND c) settler
4. a) digital storytelling AND b) Indigenous or Native American or Aboriginal or Indians or First Nations or Inuit or Métis AND c) reconciliation
5. a) augmented reality or mixed reality or merged reality AND b) intangible

In addition to the above EBSCO searches, I reviewed citations and references, and abstracts for relevant titles for potential inclusion. Authors who were repeatedly referenced, such as Dion (2004), were reviewed and included where relevant. A Google Scholar alert for

"'augmented reality' and Indigenous" identified new relevant papers such as Lacho's 2018 thesis on Indigenous AR for language revitalization and Marques et al.'s 2019 paper "Whispering Tales: Using Augmented Reality to Enhance Cultural Landscapes and Indigenous Values." One author was identified by Dr. Diana Steinhauer as a key scholar in the area of property rights for Indigenous peoples.

The results of the above searches did not reveal highly relevant papers such as Sieck & Zaman's article "Closing the Distance: Mixed and Augmented Reality, Tangibles and Indigenous Culture Preservation" (2017) or Irving & Hoffman's paper "Nyungar Place Stories Pilot: Using Augmented Reality for Indigenous Cultural Sustainability" (2014). To investigate this, I contacted a University of Alberta librarian, who indicated that the peer-review filter excluded the items, and that the filter relies on publisher metadata, which is often incorrect (personal communication, Feb. 2018). Running the above AR-related searches such as a) augmented reality or mixed reality or merged reality AND b) Indigenous or "Native American" or Aboriginal or Indians or First Nations or Inuit or Métis in Google Scholar and reviewing titles identified these additional highly relevant papers that were not included in the results from the EBSCO search.

Search results I excluded included: papers referencing the country of India, caught through the keyword search for Indian; papers who used the term "native" in reference to "digital native" or "native language" without reference to Indigenous topics; and papers focused on unrelated topics such as advertising, cybersecurity, or aeronautical maintenance. Searching the topic of AR in education was outside of the scope of this literature review, but a literature review of AR in education was included to note key systematic findings.

This literature review was initially conducted between January and April 2018, and updated in April 2020. To update this literature review, the search strings identified earlier were conducted for the years 2018 - 2020 in UAlberta's EBSCO Discovery Service. In addition, relevant papers identified through the ongoing Google Scholar alert for "'Indigenous' AND 'Augmented Reality'" were also included.

Storytelling and Indigenous Digital Storytelling

"The truth about stories is that's all we are."
Thomas King (2003, p. 2)

The stories we share influence how we understand our world. Stories can provide belonging, connection, entertainment, healing, learning, and purpose (Dion, 2004; Carlson et al., 2017; Hampton & DeMartini, 2017; Thomas, 2005; Iseke, 2013; Cunsolo Willox et al., 2013). Stories facilitate the sharing of knowledge for present and future generations, and storytelling can also be a way to resist colonization and suppression (Thomas, 2005; Corntassel et al., 2009).

But whose stories are told? As Carlson et al. argue "whose stories are told, at what point in time, and to which audiences are critical elements that shape individuals and societies" (2017, p. 24). A frequently-told story about what is now known as Canada is that Canada was settled by hardworking pioneers who settled on *terra nullius* or "nobody's land" (Vowel, 2016). Within these colonial narratives, Indigenous peoples are often either glossed over in this story, cast as victims of progress in need of saving, or assumed to be vanishing (Regan, 2010; Corntassel et al., 2009).

Settler colonialism is a form of colonialism "where colonisers 'come to stay' and to establish new political orders for themselves" (Veracini, 2013, p. 313). As Canada was settled and demand for immigration grew, Indigenous peoples began to be viewed as a "moral and

economic burden" (Regan, 2010, p. 87). In 1876 the federal *Indian Act* "determined who was an Indian and therefore a federal responsibility, entitled to treaty and other benefits, and also controlled every aspect of Indigenous peoples' lives, lands, and finances from the cradle to the grave" (Regan, 2010, p. 97). Residential schools were later enforced to continue the settler government's efforts to assimilate Indigenous peoples.

Until relatively recently, the stories of residential schools were not well-known to Canadians (Vowel, 2016). The Truth and Reconciliation Commission of Canada witnessed testimony from thousands of survivors and shared what they witnessed in community events, reports, and Calls to Action (Truth and Reconciliation Commission of Canada, 2015). The TRC investigation and reports increased awareness of Indigenous stories of residential school and the resulting ongoing intergenerational trauma (Vowel, 2016). Settler colonialism profoundly impacted, and continues to impact, these and other stories told in what is now known as Canada. In their article on storytelling and critical land literacy, Hampton & DeMartini (2017) describe how Western European stories were imposed as dominant narratives and stories from others were diminishingly referred to as superstition, folklore and legend (see also Hopkins, 2006).

(Re)storying creates and shares stories that challenge and counter these narratives. One way educators have approached teaching and learning about settler colonialism is through creating and sharing digital stories (Hampton & DeMartini, 2017; Hildebrandt et al., 2016). Generic forms of digital storytelling can take many forms—podcasts, video, music, blogs, twitter stories, and more. The term "digital storytelling" is also used to refer to a process of creating stories developed by StoryCenter in California (StoryCenter, 2018a). In the StoryCenter process, participants create short first-person video narratives of a story of importance to them though

workshops using video clips, photos, music, text, and voiceovers. This form of digital storytelling has been used to explore a wide array of topics, including health, social justice issues, relationships, and the environment (StoryCenter, 2018b).

Digital storytelling has been used with students of different ages and backgrounds to explore settler colonialism. For example, Hildebrandt et al. (2016) utilized digital storytelling to explore treaty education with mostly non-Indigenous elementary students. Treaty education can be an approach to learning the truth about how Canada was settled and continues to be colonial (Tupper, 2014). Claire, a classroom teacher involved in this project who positioned herself as a co-learner with her Grade 3 students, wrote "through a process of inquiry learning, the students in the class were frequently able to ask difficult, sometimes discomforting questions about the treaties, questions that might begin the process of disrupting dominant discourses of colonialism" (p. 24). In another example from Australia, elementary-aged Indigenous school children created digital stories on iPads with paintings and poems about first contact between Indigenous peoples and white colonists (Mills et al., 2016). Both projects included visits from Indigenous Elders.

Place is another lens used to explore settler colonialism through digital storytelling. Some educators have encouraged students to explore the significance of familiar places as part of learning about settler colonialism. Scully (2012) argues that having students investigate the Indigenous significance of sites they are familiar with through land-based learning provides a sense of agency in their unsettling process and that "exposing the ways that a different experience of a place and the signifiers that make meaning out of place can create rich dialogue and understanding across perspectives. A complex and rich understanding of place can change the view from where one is standing" (p. 152). For example, social work students from Australia who created digital stories reflecting upon the visibility and valuing of First Nations' peoples in

their local area, indicated that engaging in familiar places with this lens was transformative (Sunderland et al., 2020). Hampton & DeMartini (2017) analyzed digital stories created by students about their relationships to land, arguing "the only way to account for these colonial stories is to engage with them and directly confront the tensions, discomfort, and difficult truths they raise" (p. 263).

Digital storytelling has been one approach to exploring settler colonialism with both Indigenous and non-Indigenous students. Digital storytelling has also been used in research with diverse Indigenous peoples on a variety of topics, including climate change (Cunsolo Willox et al., 2013), residential schools (Oral History Centre, 2014), language revitalization (Whiskeyjack & Napier, 2020), HIV (Monchalin et al., 2016), diabetes awareness (Fletcher & Mullet, 2016), Indigenous-Black identity (Beals & Wilson, 2020), heart health (Fontaine et al., 2019), school perseverance (Garakani, 2014), suicide and substance abuse (Holliday et al., 2018), end-of-life care customs (Moeke-Maxwell et al., 2020), health policy (Redwood et al., 2019), animal management (Schurer et al., 2015), and youth visions for their community post-modern treaty (Sloan Morgan et al., 2014).

Compatible with oral storytelling traditions, digital storytelling is considered culturally relevant for diverse Indigenous peoples (Monchalin et al., 2016; Cueva, Kuhnley, Revels, et al., 2016; Rice et al., 2020). Both story creators (Cueva, Kuhnley, Lanier, et al., 2016) and viewers (Cueva, Kuhnley, Revels, et al., 2016) find the digital storytelling process and stories culturally relevant. For example, an Alaskan Native health professional who created a digital story about cancer explained:

> Culturally, story teaching has been our way of life. Digital stories allow us to share with more people about our way. A lot of natives have a better

> understanding of cancer from other natives and the wording is so much easier to understand than all the medical language that providers use. (Cueva, Kuhnley, Lanier, et al., 2016, p. 42)

While digital storytelling is considered culturally appropriate, adaptation of the process may be required; there is no "one size fits all" process that can be used by diverse Indigenous peoples. This diversity is reflected, for example, in protocol. Williams et al. (2017) embedded Kaupapa Māori research principles into their work examining digital storytelling on Māori palliative care, beginning with the pōwhiri process as a formal welcoming at the start of the research. Diversity of approach is also reflected in resources developed for Indigenous digital storytelling. For example, the Oral History Centre (2014) created a series of guidebooks for children of residential school survivors to create digital stories, incorporating cultural supports into their process and instructions. In an effort to ensure their processes were culturally appropriate, Rodil & Winschiers-Theophilus (2015), experienced in digitizing Indigenous knowledge with OvaHerero peoples in Namibia, began with an exploration of what storytelling means when starting new work digitizing storytelling with Khoisan schoolchildren in Namibia. The adaptability of digital storytelling for different Indigenous peoples is promising for creating AR content, suggesting the creation of AR stories can also be adapted to be culturally respectful for diverse Indigenous peoples.

For digital storytellers, the story creation process provides a way to "self-determine their own representation" (Bissell & Korteweg, 2016 p. 8; Cunsolo Willox et al., 2013). This is particularly significant when media representations of Indigenous peoples are often stereotypical and inaccurate (Iseke & Moore, 2011). Indigenous digital storytelling projects can be a way to resist and "re/turn the heteropatriarchal settler colonial gaze" (Rice et al., 2020). Beals & Wilson

(2020) explain “as Indigenous-Black people, we are telling our stories as we disrupt colonial narratives and centre ourselves outside the white-settler gaze” (p. 33). Eglinton et al. (2017) found that Alaskan youth often expressed their Inupiaq and gender identities in their digital stories and that “digital storytelling as arts-inspired inquiry pushes youth voice to the fore, helps us to reposition youth as active agents, supports reflecting with youth on the ways in which they construct and make their worlds, and empowers youth to be part of their changing worlds.” (p. 17).

Through self-representation and self-determination, Indigenous digital storytelling can support (re)storying, including to “disrupt narratives of Canadian history, recognize injustice, celebrate resistance, and influence social change for the betterment of Aboriginal peoples” (Oral History Centre, 2014, Guide 1 p.4). For example, Métis scholar Yvonne Poitras Pratt is creating curriculum content for Métis digital stories to increase awareness of Métis stories and perspectives (Poitras Pratt, 2020). She writes “these seldom-heard stories of Canada’s racist and colonial past have historically been overtaken by the master narratives, or mainstream myths, of peace, order, and good government, and have been well hidden behind our national desire to be regarded as a tolerant and multicultural nation” (2020, p. 25).

For people engaged in this process, creating digital stories can be transformative (Eglinton et al., 2017). Participants who created digital stories about cancer found the process emotionally healing, increased their comfort in talking about cancer, and increased their own healthy behaviours (Cueva, Kuhnley, Lanier, et al., 2016). Creating digital stories with community adults and Elders created new perspectives of their community and connections to cultural identity for Inpupiat youth (Weinronk et al., 2018). After creating or viewing Indigenous digital stories about cancer both storytellers and viewers were motivated to make changes

towards their own wellness (Cueva, Kuhnley, Revels, et al., 2016). Feedback from families, teachers, project stakeholders, and community members who viewed digital stories created by Australian Indigenous high school students indicated the audience, "found the event deeply meaningful, and an honest, authentic representation of Indigenous experiences" (Mackay, 2019, p.10).

With proper support, creating digital stories can be very age-inclusive, suitable for both children and Elders (Williams et al., 2017; Schurer et al., 2015). Digital storytelling can also support intergenerational knowledge exchange between youth and Elders (Poitras Pratt, 2020; Fletcher & Mullet, 2016; Davey & Goudie, 2009; Cunsolo Willox et al., 2013; Edmonds et al., 2016; Weinronk et al., 2018). Digital storytelling can engage youth to preserve knowledge for future generations (Fletcher & Mullet, 2016; Mills et al., 2016; Davey & Goudie, 2009). It facilitates self-representation, revitalization of cultural knowledge, and intergenerational engagement. For example, Davey & Goudie (2009) describe the sentiments of Elders regarding digital storytelling:

> Elders recognized the feeling of being trapped between two worlds and hoped that this new technology would not further remove their younger generations from traditional ways of being and doing but could become a way to re-engage the youth with the Elders and renew and revitalize traditional knowledge and culture and make it meaningful in the present (p. 37).

The uptake of digital storytelling in Indigenous communities is attributed not just to the modality of digital storytelling, but also to relationships, including between researchers, facilitators, and participating community members (Iseke & Moore, 2011; Loebach et al., 2019). Existing relationships were often vital to recruitment (Schurer et al., 2015). Word of mouth

recruitment through community relationships sometimes dramatically increased the number of participants (Eglinton et al., 2017) and extended the project out to other communities (Burgess & Klaebe, 2009; Ward & de Leeuw, 2018). The Oral History Centre (2014) deemed good relationships between project facilitators, participants, collaborating organizations, support technicians, and funders essential to creating digital stories with children of residential school survivors, "in order to develop a shared vision for the project and collaborate in a respectful, ethical and productive manner" (Guidebook 2, p. 7). Relationships built during the storytelling workshops—among participants; between facilitators and participants; and between Indigenous and non-Indigenous folks—were opportunities to connect authentically and meaningfully (Bissell & Korteweg, 2016; Castleden et al., 2013) and develop trust (Fontaine et al., 2019). This building of relationships through the co-creation of digital stories is highly significant in demonstrating the potential of a similar process of co-creating AR stories to facilitate relationships and understanding.

Co-creating stories requires care and diligence with particular attention to the extent of facilitator influence on the participants' stories (Hill, 2018; Edmonds et al., 2016; Mackay, 2019). In cases where researchers created stories on behalf of others, involved researchers sought extensive input, feedback and approval of the stories from participants (Schurer et al., 2015). In their discussion on decolonizing collaborative filmmaking, Carlson et al. (2017) emphasize the importance of reflexivity, ongoing collaboration between team members, and continuous consent from participants. Consent and approval can extend not just to approval of the final story but also with whom the story is shared (Cueva, Kuhnley, Lanier, et al., 2016; Oral History Centre, 2014; Leobach, Tilleczek, Chaisson & Sharp, 2019). Researchers sought approval by both participants and an Elders advisory group to add commentary after stories about Māori palliative care created

for health professionals (Williams et al., 2017). Technicians or research team members may also assist in editing, taking direction from the storytellers (Fontaine et al., 2019). Iseke and Moore (2011) write in-depth accounts about the responsibility of editing stories with community members:

> Those with a relationship to the Elders and the community and those who are aware of the political, historical, social, and economic implications of the stories are in a better position to make decisions about what to include and exclude… it is important to maintain the integrity of the story and to consider the needs of the community during the editing process (p. 26-27).

Collaborative storytelling can build and strengthen relationships, including Indigenous-settler relationships (Bissell & Korteweg, 2016; Stanton et al., 2016). Protocol plays an important role in "bicultural" production of digital Indigenous materials (Brown, 2006). For example, Williams et al. (2017) embedded the Māori pōwhiri process of formal welcoming and relationship building, which "exchanged a hierarchical positioning of people for a collaborative one" (p. 7). Similarly, Hildebrandt et al. (2016) found that classroom visits by Cree Knowledge Keeper Joseph Naytowhow facilitated student learning on treaties through Naytowhow's teachings, stories and songs, and enriched the stories the students created about treaties. In these and other cases, relationships fostered through digital storytelling included both groups of participants independently creating digital stories, and people collaborating to co-create digital stories.

In summary, the significance of digital storytelling in Indigenous contexts strongly lies in compatibility with oral storytelling traditions, the self-determination and self-representation of the storyteller telling the story in the way they feel is best, and the revitalization and sharing of

cultural information. Digital storytelling was found to be so meaningful in Nunatsiavut, Labrador that the Rigolet Inuit Community Government established the 'My Word': Storytelling and Digital Media Lab "for digital media and community-engaged research and capacity development—Inuit research and facilitation by and for Inuit" (Cunsolo Willox et al., 2013, p. 133). In writing about decolonizing media for Indigenous educators, Poitras Pratt and Lalonde (2016) observe that "innovative use of technology can enable Indigenous and non-Indigenous people to creatively imagine and demonstrate their vision of what reconciliation and decolonization can look like in a relational and ethical space" (p. 117). Building on these findings, this thesis explores how the affordances of AR offer a digital platform compatible with oral storytelling traditions that can share unfamiliar stories about familiar places, and reveal meaning beyond what is first observed.

(Re)Storying: Telling Unseen Stories through Augmented Reality

As discussed in the introduction, AR overlays digital information over your real-world view in real time (Azuma, 1997; Azuma et al., 2001). Scanning a book with a mobile device to see a 3D illustration over your view of the page is an example of AR (Lacho, 2018). Your view and experience of the real-life world is not replaced or substituted, as is the case in virtual reality (VR). Instead, AR supplements your real-life experience with additional digital information. Connecting real-world experience with supplemental auditory or visual information in real-time creates opportunities to share lesser-known narratives connected to present-day places and experiences (Engberg, 2017).

AR offers a new digital space for what is sometimes referred to as (re)telling (Dion, 2004) or (re)storying (Regan, 2010). Corntassel et al. (2009) argue for restorying on a community level to counter colonial narratives, decolonize spaces, and as "a first step toward

remembering and revitalizing our collective and individual consciousness" (p. 155). AR has been used to share lesser-known stories of marginalized peoples, including Latina/o communities (Hidalgo, 2015), children stolen from colonies for exhibits (Engberg, 2017), immigrant garment workers (Gottlieb, 2017), and stories of former slaves (Amakawa & Westin, 2018). Hidalgo (2015) argues "Augmented Fotonovelas allows for the re-augmenting of history, where sharing the historical legacy of racism by reclaiming and retelling stories that have been lost helps raise public consciousness about current economic domination" (p. 311). Amakawa & Westin (2018) also argue AR offers an opportunity to share disenfranchised history. In their paper about a project to re-create a town founded by a former slave, they note there are fewer standing structures in the town to recognize the history because of disenfranchisement. Visitors to the former townsite, now a field, have their visits enhanced with AR to see where buildings used to exist, and witness recreations of intangible heritage including stories and songs.

Augmented Reality in Indigenous Contexts

Indigenous peoples have consistently created and adapted media technologies in culturally appropriate ways (Winter, 2018; Brown, 2006). Iseke (2013) explains:

> Indigenous stories and the knowledge systems they reflect are continually supporting communities and individuals in meeting the challenges of life. They are dynamic and evolving to meet the needs of modern life. In fact, media forms such as the Internet, YouTube, and Facebook encourage Indigenous storytellers and storytelling to find relevance and meaningfulness to a younger generation. These modern media forms encourage connections and creation of new stories to meet the needs of current and future generations as part of the process of Indigenous storytelling. (p. 573)

Indigenous storytellers and creators have developed AR Indigenous storytelling in a variety of settings and ways. For example, *Wikiup*, a custom app for creating Indigenous AR content, was created to share Indigenous culture and foster reconciliation through storytelling (Devlin, 2017). The *Indigital Storytelling* app out of Australia shares AR stories connected to rock carvings created with Senior Traditional Owners (Indigital, 2017). Various museums and artists are also using AR to share Indigenous stories (Berger, 2018; Urban Shaman Contemporary Aboriginal Art, 2017; Wallworth, 2020; Green, 2018; Lodge, 2018). The Indigenous Matriarchs 4 (IM4) lab at Emily Carr University of Art and Design offers VR, AR and 360-degree video workshops for Indigenous creators (IM4 Media Lab, 2020). Mount Royal University created the app *DeciphAR* in partnership with Red Crow Community College to share Blackfoot library signage and "encourage the active use of Blackfoot in library spaces" (Loyer & Nuhn, 2020, n.p.).

Researchers are similarly exploring and creating AR in Indigenous contexts. Coulson et al. (2019) incorporated Māori language, protocol, and concepts of interconnectedness to engage young students in participatory learning about air quality through art, music, and AR, combining "Mixed Reality (MR) with a participatory method: blending a western scientific mode of knowing with holistic, indigenous conceptions of the world around us" (p.5). Taia et al. (2019) integrated traditional Māori cultural ways of knowing and remembering into a prototype AR app *Maumahara Papahou* which activated a digital papahou (treasure box) as a memory aid for persons with traumatic brain injuries. Young students reported enjoying *Nomads*, a collaborative and culturally relevant AR math board game (Yu & Denham, 2019). Vigil-Hayes et al. (2019) are developing a learning game with Navajo Nation that incorporates geosocial gaming, AR, and cultural content to promote social and emotional resiliency. AR has been created to revitalize

culture where cultural transmission from Elders to youth has been interrupted (Sieck & Zaman, 2017) and to promote language revitalization (Lacho, 2018; Cassels & Farr, 2019; MacCallum, 2019; Kelly, 2020). Additionally, designing AR experiences can be an engaging and motivating experience for Indigenous youth (Kauhondamwa et al., 2018; Searle et al., 2018). For example, Sieck & Zaman (2017) found that motivators for using Indigenous AR content "include the enjoyment of sociability, knowledge sharing, recognition, status and sense of community identity" (p. 4).

What is especially intriguing for AR in Indigenous contexts is the ability to connect a story to a specific place. Place is significant for many Indigenous peoples (as seen in the digital stories created by schoolchildren in Mills et al., 2016). Sharing stories at a specific place can share the meaning of the place, and localized stories can demonstrate the diversity of many different Indigenous peoples and cultures. AR can also create a sense of place/time by layering stories onto current reality (Engberg, 2017), activating hidden histories (Myburgh, 2018). Gaertner (2016) argues that AR can link students to the land and Indigenous epistemology. He describes the audio digital theatre podplay, *Ashes in the Water,* which layers Coast Salish history onto a beach as "(re)interjecting" Indigenous stories and "projecting Indigenous presence onto deeply colonized spaces" (p. 497). Marques et al. (2019) argue, "[AR] technology permits the user to remain grounded in the context of a specific site, while engaging in a direct relationship with the cultural values of that landscape" (p. 196). Health professional students exploring Indigenous stories through an AR app were surprised to hear the stories connected to familiar places in their city of Perth, Australia and found using the app meaningful (Irving & Hoffman, 2014). McKemmish et al. describe working with Indigenous Australians to create 3D animated narratives for language revitalization which may later be connected via VR or AR to "...

significant places, repatriated to their place of origin, brought home to Country, and reconnected with records already embedded there" (2019, p. 283). This ability to share Indigenous digital stories tethered to place and "reconnect Indigenous place names, language and culture to the land" (Kelly, 2020, p. 419) is a distinction of AR in Indigenous contexts.

AR also offers an opportunity to connect tangible and intangible cultural information. For example, Sieck & Zaman (2017) integrated culturally relevant tangibles including beaded bracelets with AR to share cultural knowledge, and the ability to touch the artifacts connected to the AR content was appreciated by users. This application is encouraging for the AR stories connected to this thesis and literature review, since the Treaty 6 marker sculptures are designed as tangible representations of Cree knowledge and treaty relationships.

How Can (Re)storying Through the Co-creation and Sharing of AR Stories Support Building Indigenous-Settler Relations?

Research indicates that both creating and viewing AR content engages people in learning. AR in education facilitates collaboration and enhances learning, motivation, engagement and the "visualization of invisible concepts" (Akçayır & Akçayır, 2017, p. 6). Creating AR content can bring new meaning to familiar locations, and engage students in community issues (Klopfer & Sheldon, 2010). AR is an effective method of engaging communities in participatory research to share untold stories (Hidalgo, 2015). Irving & Hoffman (2014) added Indigenous AR stories to health professional curriculum to learn about the impact of colonization for Aboriginal people, arguing "this capacity to layer the physical world with cultural artefacts that augment rather than replace was critical to the pedagogical approach because it reflects the coexistent nature of cultures and the layered meaning of places" (p. 369). Creating AR stories has also been used as a pedagogical approach with pre-service student teachers preparing to teach for reconciliation

(Aitken & Radford, 2018). Writing about the experiences of pre-service student teachers and Indigenous students creating digital stories after a unit on the land, Bissell & Korteweg (2016) observe:

> The process of coming-to-know the stories of Indigenous peoples prompted settler-teacher candidates to shift horizons in a way that simultaneously decolonized their perceptions and allowed them to believe that better relationality between Indigenous and non-Indigenous Canadians is possible and achievable in their own classrooms (p. 5).

Creating and sharing stories can challenge what we think we know about Canada, its history, and relationships between Indigenous and settler peoples. In the next chapter, I discuss how the *We Are All Related AR* project explored the potential of co-creating AR stories to build relationships and understanding.

Chapter Three: The *We Are All Related AR* Guidebooks & Prototype AR Stories

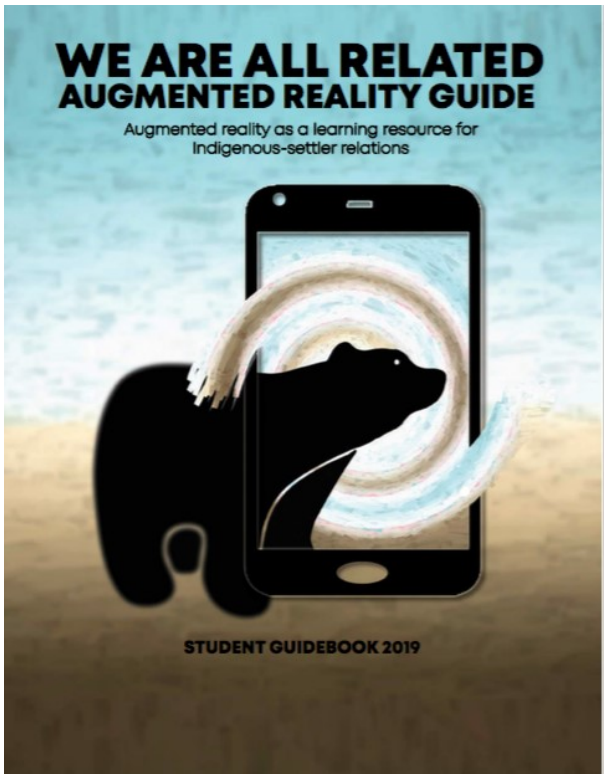
The *We Are All Related AR* project at the University of Alberta developed a reflective learn-by-design process for students to co-create augmented reality (AR) stories with Knowledge Keepers, Elders and storytellers, with the aim of exploring Indigenous-settler relations and understanding (McMahon et al., 2019a). In this chapter, I describe and reflect upon my work on this project. I discuss how I worked with the team to draft Open Educational Resource (OER) guidebooks to navigate students through the story co-creation process (McMahon et al., 2019b; McMahon et al., 2019c) and then test the process by designing prototype AR stories. I also briefly describe how the story co-creation process was integrated into a graduate course offered through the MA in Communications and Technology (MACT) program at the Faculty of Extension in fall 2018.

I joined the *We Are All Related AR* project through the community-service learning component of my MACE program and later as a Graduate Research Assistant, supported by funding from the Teaching and Learning Enhancement Fund and the Graduate Student Internship Program. My first trip to Saddle Lake Cree Nation was for a sweat lodge ceremony in September 2017. That fall I joined the *We Are All Related AR* team for regular project planning meetings. I began drafting the guidebooks in early 2018 and worked with other graduate students to design the prototype AR stories in the summer and fall of 2018. Drafting the guidebooks while developing the story co-creation process and designing prototype AR stories helped define and articulate the story co-creation process. The *We Are All Related AR* project produced two OER documents: the Student Guidebook 2019 & the Teacher Handbook 2019, referred to together as the "guidebooks" (Fig. 3). The guidebooks are available for download at the project website

(http://sweetgrassAR.ca/) and through the Education & Research Archive (ERA) at the University of Alberta.

Figure 3

Cover of the We Are All Related AR *Student Guidebook.* Cover design by Hanne Pearce.



The Student Guidebook navigates students through an AR story co-creation process grounded in respectful and reciprocal relationships in order to explore Indigenous-settler relations and understanding. Story co-creation topics are accompanied by discussion questions, reflection prompts, activities, resources, and the *We Are All Related AR* process as an example. The Teacher's Handbook includes short introductions to the different topics in the student guidebook, learning outcomes for each section, and resources for educators. While the OER guidebooks were developed for educators and students, the *We Are All Related AR* team wanted to develop a process that could be used by anyone interested in co-creating an AR story with Indigenous storytellers. The guidebooks consist of four main sections: Exploring AR for

Learning and Relationship-Building, Laying the Groundwork for Co-Creating AR Stories, Creating the Story Together, and Sharing and Stewarding the AR Story.

Exploring AR for Learning and Relationship Building

This first section aims to introduce readers to the topic and answer questions such as "What is augmented reality?" and "Why use AR to learn and build relationships?" These basic essential questions are immediately addressed. The reader is introduced to AR and how co-creating and sharing AR stories can generate opportunities for learning and relationship building. AR's suitability for sharing intangible cultural knowledge and place-based stories is also discussed.

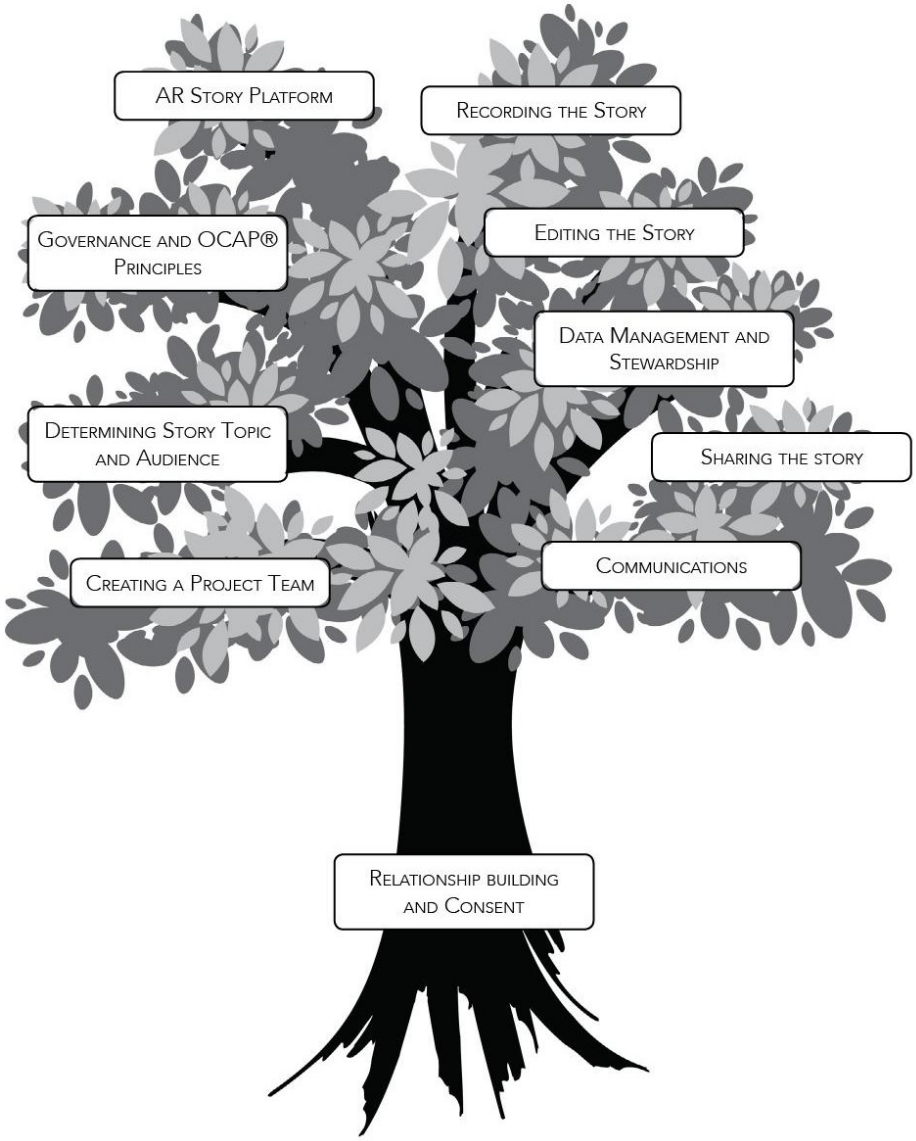
Importantly, this section explains that the AR story co-creation process requires adaptation to co-create stories with different Nations and peoples. The guidebooks offer a framework of important decisions to be made collaboratively to co-create AR stories; they do not offer specific instructions, since to do so is impossible and threatens a Pan-Indigenous approach. Each story, storyteller, Nation, or community will create their AR stories in different ways for different purposes and interests. As the Student Guidebook describes, decisions should emerge from discussions grounded in the relationships the teams form over time.

Providing guidance and direction without offering specific instructions required some creativity in writing the guidebooks. For example, we wanted to advise students they may need to offer protocol, but the guidebooks would not be able to advise on protocol requirements due to variation among diverse Indigenous Nations and peoples. In the end, this flexible approach was used throughout the guidebook—we presented a framework that participants could use to identify key considerations for story co-creation teams to consider throughout the process. We created a table of Key Considerations with corresponding check-ins to emphasize the integral decision-making junctions in the story co-creation process. I was asked by the *We Are All*

Related AR team to create a graphic illustrating how the key considerations are grounded in principles of relationship-building and consent. After I drafted some (terrible) tree maps, we requested a design from fellow graduate student and graphic designer Hanne Pearce. She thoughtfully placed the key considerations onto an image of an actual tree, improving the concept greatly (Fig. 4). The Key Considerations table and illustration are included in the first section of the Student Guidebook to underscore their importance.

Figure 4

Key Considerations for the Story Co-Creation Process



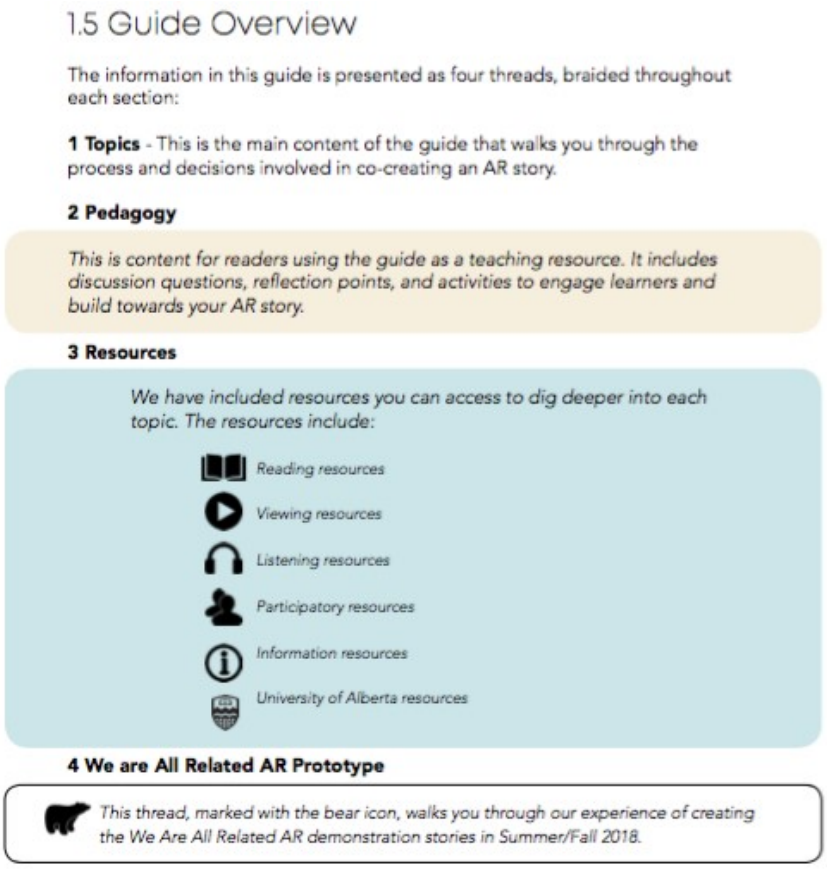
The Story Making Process

As I developed the first draft, I often thought of my approach as weaving or braiding different threads throughout the guidebooks—the topics discussed, pedagogy prompts, external resources, and how we created the prototype AR stories. The team supported this concept of braided threads and we demarcated the different guidebook threads through graphic design elements provided by Hanne Pearce (Fig. 5). We also explain in the guidebook there is no set schedule for the story co-creation process, as it is grounded in relationships and requires patience

and flexibility. The "Exploring AR for Learning and Relationship Building" section closes with a quick introduction to the four guidebook sections, and an invitation to tell us a story.

Figure 5

Student Guidebook Excerpt Describing the Threads Braided Throughout



Laying the Groundwork for Co-Creation AR Stories

The "Laying the Groundwork for Co-Creation AR Stories" section is designed to prepare students to respectfully engage with Indigenous Elders, Knowledge Keepers and storytellers to co-create AR stories. In drafting this section, I was guided by the perspectives of Indigenous writers and scholars. After attending a discussion with Gregory Younging during the Congress of the Humanities and Social Sciences conference in May 2019, I purchased *Elements of Indigenous Style: A Guide for Writing By and About Indigenous Peoples*. I read the slim book in

one sitting, inspired by the clear and instructive guidance. Chelsea Vowel's *Indigenous Writes: A Guide to First Nations, Métis, and Inuit Issues in Canada* was also a valuable reference. Both books are included in the guidebooks as resources. Foundational literature by Paulette Regan (2010) helped guide the section on settler colonialism. I was completing an independent study literature review on Indigenous digital storytelling and Indigenous AR as part of my MACE program while writing this section of the guidebooks, and these two projects informed one another and formed the basis for Chapter Two of this thesis.

As the entire story co-creation process is grounded in respectful relationships, time is spent in this section discussing relationship building and relational accountability (Wilson, 2008). Students are reminded to be trustworthy, patient, flexible and reflexive. It was important to prepare students for the responsibility of co-creating stories, to be accountable team members, and to recognize and address issues of representation and appropriation. With a painful history of unethical and marginalizing research conducted on Indigenous peoples (Schnarch, 2004), accurate and self-determined representation was vital to the AR story co-creation process. The guidebooks share this Dion (2004) quote:

> "[I]t is important to (re)member that Aboriginal people have always been involved with cultural production, representing ourselves and our world views in various texts including stories, art, and ceremony. It was and continues to be the violence of colonization that created conditions wherein Aboriginal people lost the power to control the ways in which dominant society constructs and interprets images of Aboriginal people" (p. 65).

The risk of appropriation is also a serious concern for collaborative projects and Indigenous knowledge shared online (Belarde-Lewis, 2011). A brief definition and discussion of

cultural appropriation was included, with resources from CBC's Unreserved (2016) and the guide *Think Before You Appropriate* (2016) from the Intellectual Property Issues in Cultural Heritage (IPInCH) project at Simon Fraser University. As with the discussion on representation, students were reminded that co-creating stories on a foundation of relationships and consent would help ensure the AR stories supported self-representation and avoided appropriation.

Writing about complicated topics such as cultural appropriation and settler colonialism was a challenge, but essential to prepare students for respectful and ethical story co-creation. I am grateful to the many advocates, authors, and scholars addressing these topics so that myself and others can learn from them. The "Laying the Groundwork for Co-Creating AR Stories" section closes after introducing project governance and the OCAP® principles (Schnarch, 2004), both of which are applied to decision-making in the story co-creation process and discussed more in-depth in the following sections.

Creating the Story Together

The "Creating the Story Together" section focuses on creating AR stories through respectful collaboration and media production. Students are reminded of the significance of representation and collaboration with an impactful quote from Younging (2018):

> The key to working in a culturally appropriate way is to collaborate with Indigenous Peoples at the center of the work. Collaboration ensures that works do not speak for Indigenous Peoples. It ensures that works are Indigenous Peoples speaking. Only Indigenous Peoples speak with the authority of who they are, connected to Traditional Knowledge, their Oral Traditions, their cultural Protocols, and their contemporary identity. Collaboration is crucial in achieving authentic content, and in

> demonstrating respect for the complexity and individual nature of Indigenous Peoples. (p. 31)

This section discusses the importance of ongoing consent from participants at the multiple decision-making junctions in the AR story co-creation process, and from elected leadership where appropriate. These discussions of communication, collaboration, and consent inform project governance. Students are encouraged to consider both the governance requirements of their educational institution (e.g. informed consent for a research ethics board) and the governance requirements of the Nation or community they are working with (e.g. protocol, ethics policies and permissions).

Governance was a vital component of the *We Are All Related AR* project. Importantly, the project sought to include governance practices drawn from both institutional (e.g. university) and Indigenous (e.g. Cree protocol and laws) contexts. We began the project with a sweat lodge, a ceremony described by Diana as acknowledging the place of spirit in our lives, the ancestral lineage where Indigenous Knowledge is passed forward from, and a way to invite the project into the process for future generations (Steinhauer, 2017). Our team spent nearly a year developing governance principles regarding ownership, process, access, roles, sustainability, revenue, and communications. Dr. McMahon met with the Alberta First Nations Information Governance Centre to request their governance advice and feedback. A letter was also sent to the Saddle Lake Cree Nation Chief and Council to explain the project, funders, team members and ethics approval. The many items included in *We Are All Related AR* project governance are discussed in the guidebook. Communication is excerpted below:

> **Communication** - We used in-person and telephone meetings. Meetings were held onsite at the University of Alberta and in Saddle Lake at regular

> intervals. Teleconference meetings substituted when weather or scheduling conflicts prohibited planned site visits. For University of Alberta researchers, a shared drive in Google Apps was used to store and collaborate on materials such as documents, presentations, and drafts of this guide. Drafts of materials for public audiences (e.g. these guidebooks, presentations, articles) were distributed by email, reviewed and approved by all team members. (McMahon et al., 2019b, p. 44)

As I will discuss in the following chapters, these governance principles also guided my work in expanding the AR stories for this thesis.

After establishing the groundwork of relationships, consent, and respectful collaboration, the guidebooks address co-creating AR digital stories. This guidebook topic was drafted by Research Assistant Greg Whistance-Smith, a graduate student in University of Alberta's Digital Humanities program. Greg describes AR basics, AR platforms and types of AR content, to which we added examples of AR counter-storytelling as applied demonstrations. In addition to technical information about AR, students are provided with tips for recording audiovisual digital content. These tips were drafted based on content developed by *We Are All Related AR* videographer Billy Smale and *Gwich'in Tribal Council Digital Literacy Project* Research Assistant Hanne Pearce. Tips for recording video, audio, b-roll, photography and editing are included, along with resources for each. Lastly, I created a step-by-step tutorial for creating AR content for the app *HP Reveal*. *HP Reveal* is now obsolete due to the discontinuation of the app, a risk of using third-party software applications.

Sharing & Stewarding the Story

This section of the guidebooks discusses how to best share and steward the co-created AR stories and corresponding raw digital data such as images, audio and/or video. We explain that stewardship pertains to the maintenance, care and protection of the digital materials. AR story co-creation teams are prompted to consider whom the story is created for— for example, will it be shared publicly or restricted to certain audiences? AR stories can be designed for wide public use or for a specific community, in which case they may be created to purposefully restrict external influence (Sieck & Zaman, 2017).

This section briefly discusses Western and Indigenous approaches to ownership and access, introducing several highly important concepts including the OCAP® principles, data sovereignty, intellectual property, and copyright. The legal implications for these concepts are complex and an in-depth exploration is beyond the scope of the guidebooks and this thesis (see Younging, 2018; Anderson, 2015; and Harry, 2011 for further discussion). However, these concepts all have significant implications for the AR story co-creation process and so a basic understanding is strongly encouraged.

OCAP® Principles

The OCAP® principles regard the ownership, control, access and possession of First Nations data (FNIGC, 2016) and can be applicable in some contexts for Inuit, Métis, and other Indigenous Peoples (Schnarch, 2004). The principles were developed in response to a difficult and painful history of colonial research conducted on First Nations and Indigenous peoples. Schnarch (2004) explicitly applies the principles to the *relationship* between First Nations and their data, and states “In trying to put the principles into action, it is important to recall that at the heart of OCAP® is self-determination, including recognition of First Nations jurisdiction over

research in their communities" (Schnarch, 2004, p. 89). These principles are relevant to the AR stories co-created for the *We Are All Related AR* project and this thesis, particularly the digital audiovisual recordings as they contain Indigenous knowledge, and the guidebooks prompt story co-creators to integrate the OCAP® principles into their project agreements.

Data Sovereignty

Data sovereignty is "the right of a nation to govern the collection, ownership, and application of its own data" (US Indigenous Data Sovereignty Network, 2018, para. 2). Indigenous peoples have always collected and shared data, information, and knowledge about themselves through many methods, including oral storytelling, totem poles, and Niitsitapi winter counts (Rodriguez-Lonebear, 2016) with corresponding rights and responsibilities (Kukutai & Taylor, 2016). Data sovereignty is relevant to creating Indigenous AR content (Vigil-Hayes et al., 2019). In the story co-creation process, the carefully-negotiated project agreement guides decision-making, roles, and responsibilities regarding the data generated and stewarded throughout the project.

Intellectual Property & Copyright

Intellectual property and copyright are limited as these Canadian-based precepts do not meet the requirements of the need to protect traditional cultural expression from extraction, fragmentation, and commodification (Harry, 2011; Smith, 2012). Intellectual property mainly refers to "creations of the mind" and is protected in Canada by laws regarding copyright, patents, trademarks and more (Government of Canada, 2019, para. 3). Copyright pertains to the rights an author has regarding their creation. Anderson (2015) writes, "the key relationship that functions at the core of copyright is that the author is the originator and owner of the work, and as the owner, the author has a range of rights that can be asserted over the work; including distribution,

copying, licensing and publishing" (p. 773). However, it is important to emphasize that European concepts of intellectual property and copyright were designed for individual creators and are ill-suited for knowledge held through collective ownership and stewardship (Harry, 2011; Anderson, 2015; Udy, 2015). One of the limitations of copyright and Intellectual Property laws are that they have end dates. Cultural knowledge may also have certain conditions for sharing and using, including restrictions, permissions, or protocol (Wilson, 2008; Udy, 2015).

Despite challenges regarding compatibility among these approaches, AR story co-creators may need to utilize Western ownership and access mechanisms in order to protect AR story cultural content. In creating Māori AR stories, Marques et al. (2019) describe "all narratives provided remained the property of the iwi [tribe]" with Māori consent to share illustrations in academic publications and conference presentations (p. 196). It is one of the limitations of this research and a recommendation from Dr. Diana Steinhauer to develop processes that privilege First Nations laws of transfer. This was the reason for the creation of OCAP principles.

For the *We Are All Related AR* project, Dr. McMahon developed a copyright transfer method based on advice from Dr. Catherine Bell (UAlberta), Dr. Jane Anderson (New York University), the Alberta First Nations Information Governance Centre, and work by Dr. Jennifer Wegmigwans (University of Toronto), the Mukurtu CMS development group (Warumungu community members, Kim Christen and Craig Dietrich), and others. This project approach ensured ownership of the cultural content remained with Dr. Diana Steinhauer and Stewart Steinhauer, with limited access permissions granted through Creative Commons copyright (McMahon et al., 2019). Project funder Teaching and Learning Enhancement Fund (TLEF) approved the transfer of ownership, and our research ethics board consent forms were adapted to

ensure ownership remained with Diana and Stewart. *We Are All Related AR*'s approach to ownership and access to cultural materials is documented in our Team Agreement. I also took these considerations into this thesis work; how could I ensure that copyright for the new AR stories I was creating would remain with Stewart and Diana, particularly when a thesis requires a sole author? I discuss how I addressed these needs in Chapter Five.

In the guidebooks, story co-creators were prompted to address these considerations of OCAP®, data sovereignty, intellectual property, and copyright in their own project governance documents. The guidebooks recommend creating a Memorandum of Agreement (MOA) with a framework developed by the Intellectual Property Issues in Cultural Heritage (IPinCH) project shared as an appendix (IPinCH, 2015). The "Sharing & Stewarding the Story" section then discusses digital stewardship, the care and protection of digital materials. This section was informed by content developed for the *Piikani Digital Literacy and Cultural Camp* and the *Exploring Digital Literacy in Gwich'in Contexts* project. Students are prompted to consider where the team will store project data and how they will keep it secure. Lastly, the story co-creation teams are asked to discuss and consider how to address any potential revenue that might be generated by creating a custom app for the AR stories, or by hosting digital content on a third-party platform such as YouTube where it could potentially generate ad revenue. The guidebooks end with appendices: the sample memorandum of agreement framework for project governance, an AR glossary, images which activated AR stories in *HP Reveal*, script and storyboard templates, a list of ideas for creating b-roll, and the *HP Reveal* tutorial.

Finalizing the Guidebooks

Drafting the guidebooks was a challenging task. Again, I am grateful to the many scholars who shared their knowledge for me to learn from, and for the team's guidance. When a draft of the

Student Guidebook was complete, we requested peer review by three educators: Jennifer Ward, Dr. Lana Whiskeyjack, and Dr. Fay Fletcher. Jennifer Ward (Umpqua and Algonquin descent) is an adult education and curriculum development specialist, working on her PhD in Indigenization and decolonization of the academy and post-secondary education. I attended two of her Centre for Teaching and Learning workshops while drafting the guidebooks and found her to be a gifted facilitator on the topic of Indigenous-settler relations. Dr. Lana Whiskeyjack (Saddle Lake Cree Nation) is a faculty member in the Faculty of Arts and one of my thesis committee members. Her research incorporates Indigenous arts-based methodologies and digital storytelling. Dr. Fay Fletcher is a settler scholar in the School of Public Health with extensive experience in community-based research with First Nations and Métis Settlements. They all graciously agreed to review the guidebooks and offered valuable feedback. Dr. McMahon added a series of activities throughout the Student Guidebook to apply the story-telling process, and prepared the accompanying Teacher Handbook. The process of drafting the guidebooks took over a year, and during this time the team also created prototype AR stories and piloted the story co-creation process through a graduate course offered at the Faculty of Extension.

We Are All Related AR Prototype Stories

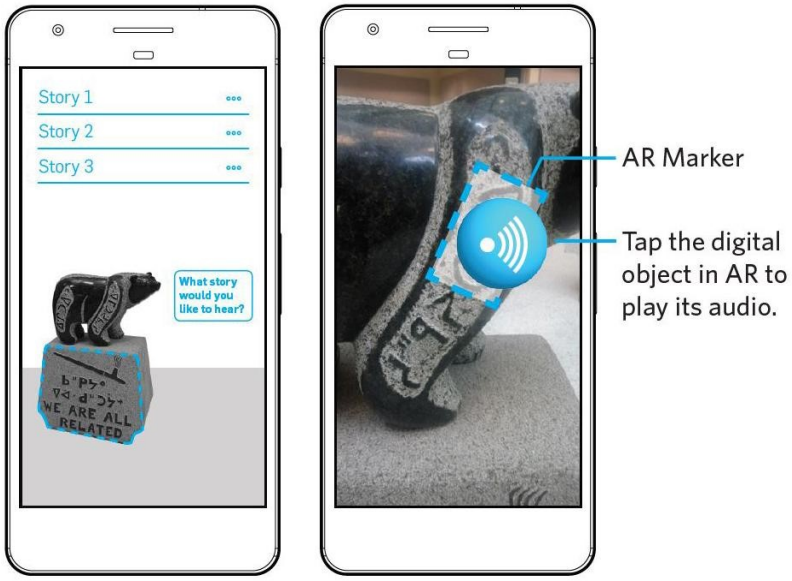
As we were developing the guidebooks, the *We Are All Related AR* team also created a set of AR stories to test and prototype the AR co-creation process in summer and fall 2018. In July, myself, Dr. McMahon, and videographer Billy Smale traveled to Saddle Lake Cree Nation to meet with Diana and Stewart and record audiovisual content for the AR stories. It was a sunny but very windy day, which led to technical challenges as the wind overwhelmed the sound of Diana's voice on the outdoor audio recordings. By luck, I had recently purchased a small lavalier microphone and had brought it along on the trip. Using this microphone and moving into a tipi to

record allowed us to capture footage of Diana sharing the treaty story. Billy also interviewed Stewart in his workshop and recorded a demonstration of granite carving. This raw footage was then edited into four short (1 - 2 minute) videos with feedback from Stewart, Diana, and Dr. McMahon.

We then designed AR versions of these videos. Our vision for the prototype AR stories was to invite people to engage with the Sweetgrass Bear Treaty 6 marker sculpture in Enterprise Square, exploring and scanning the sculpture with their smartphone to activate AR stories (Fig. 6) (Whistance-Smith, 2018). The AR stories would then be displayed overlaid on the person's real-world view of Sweetgrass Bear, linking the place and territory with the AR treaty story.

Figure 6

Concept Diagram for Custom App Design (Whistance-Smith, 2018, p. 8).



The *We Are All Related AR* project team explored a number of AR platforms to host the stories, including *Wikiup*, an Indigenous-owned geolocative AR app platform based out of

Vancouver. Research Assistant Greg Whistance-Smith and I spent time exploring and testing this platform, but the app ultimately did not fit our project needs, including the need for image-based scanning so users could scan the Treaty 6 marker sculpture (McMahon et al., 2019a). The AR app *Aurasma* was regularly identified in the literature for its use in educational contexts, and so this app was selected for the prototype AR stories (Herpich, Guarese & Tarouco, 2017; Walker et al., 2017; Aitken & Radford, 2018; Laine, 2018; Hidalgo, 2015; Aoyama & Hoyee, 2017).

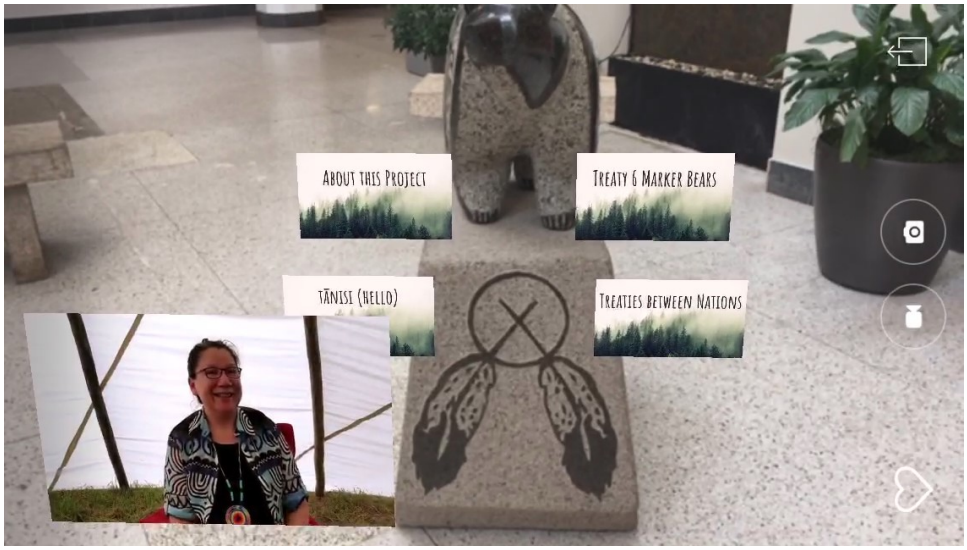
In 2017, *Aurasma* was rebranded as *HP Reveal,* and its corresponding website for creating AR content was renamed *HP Reveal Studio*. In *HP Reveal Studio* I used a photo of the "crossed feathers" design on the front of the sculpture to create a marker image that the *HP Reveal* app would recognize to activate AR content. I designed the AR content in *HP Reveal Studio* so that scanning the crossed feathers activated 4 title images overlaid on the user's real-world view of the sculpture (Fig. 7). I arranged the images so they surrounded but did not obstruct the user's view of Sweetgrass Bear. I designed the AR content so each of these four images would activate a video story (Fig. 8), and tapping on the playing video would make the video full-screen. Designing this series of commands required some trial and error. One early attempt at designing the AR content without the title images activated all the videos once, audio from four videos flooding my headphones. I thereafter designed the title images design to prevent this from happening. The title images also allowed users to self-select which video they wanted to play. Screenshots of the AR design were shared with Diana and Stewart for their feedback, and this design became the prototype *We Are All Related AR* stories.

Figure 7

Screenshot of Title Images after Scanning the Crossed Feathers Design in HP Reveal

Figure 8

Screenshot of the tānisi (hello) Video Beginning to Play in HP Reveal



We Are All Related AR Graduate Course

In fall 2018, Dr. McMahon taught a graduate course in the MA in Communications and Technology program at the Faculty of Extension that integrated the *We Are All Related AR* story co-creation process as a series of course assignments. This course was a blended format of online learning and two field trips. Online modules informed by the drafted guidebook content were

designed for the course, guiding students through the story co-creation process as well as relevant literature. I joined the graduate class for the two field trips, a sweat lodge south of Enoch Cree Nation in September and recording video footage for the AR stories at Saddle Lake Cree Nation in October. The graduate students each asked Diana and Stewart a question and created short videos on topics related to the treaty story and these interviews, with consultation and approval from Diana and Stewart. These videos were then shared with me for placement within the *HP Reveal* platform. I uploaded the videos and linked them to designated markers, using sections of the Sweetgrass Bear carvings assigned to each story by the AR story co-creation teams. As a frequent visitor to Enterprise Square, the site of the Sweetgrass Bear sculpture, I was able to test the AR stories regularly.

During the October visit to Saddle Lake, as I listened to Diana sharing the treaty story I reflected on how little I knew and understood about the role of treaty and implications for Indigenous-settler relationships, especially as a descendent of a Treaty 6 signee—ancestry I was not aware of until adulthood. I wondered how we could share the treaty story with even more people, prompting me to propose co-creating more AR treaty stories for my thesis project. During the October visit, Diana and Stewart emphasized the importance of relationship building, and how the relationships built through the *We Are All Related AR* project facilitated the subsequent class projects and storytelling. It was essential that Diana and Stewart be interested in expanding the stories to additional treaty sculptures and support this as my thesis project. I made this request to expand the AR stories first verbally and then with protocol, and they agreed to guide and support the project.

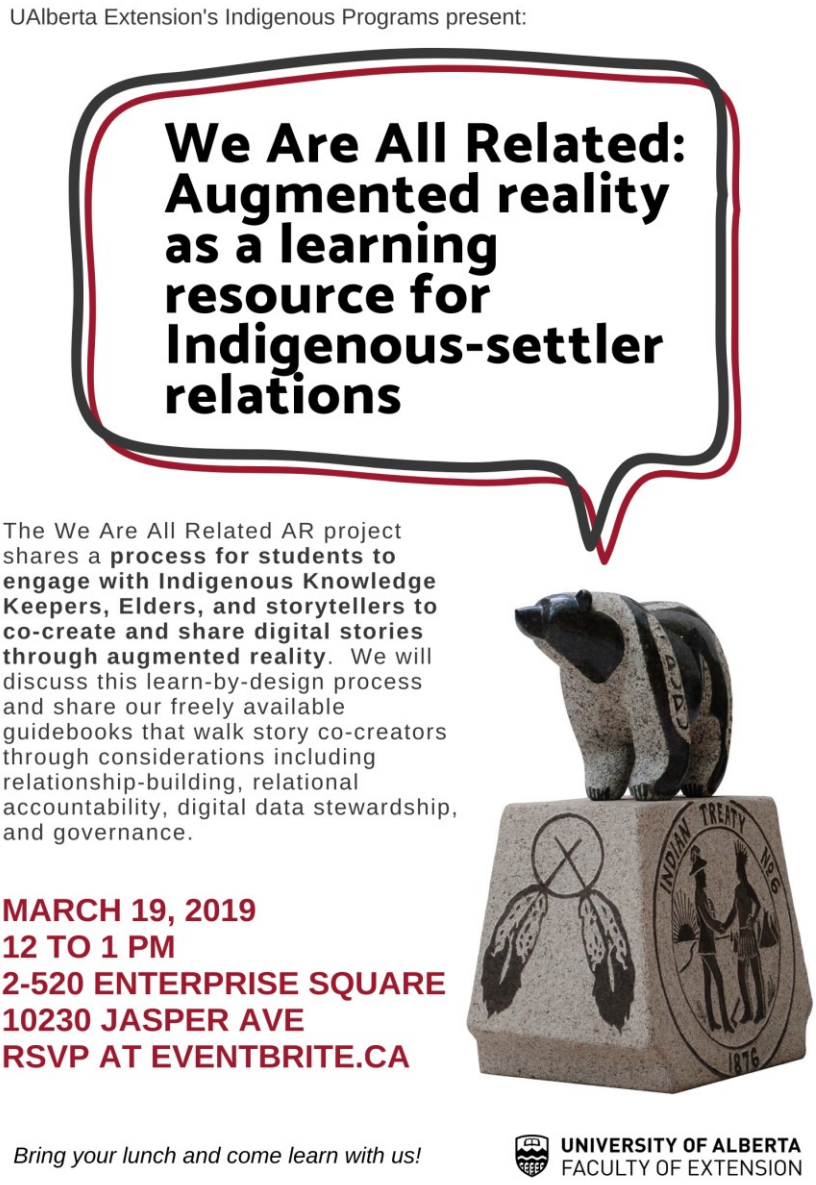
Sharing the Guidebooks

To formally launch the guidebooks, we held a public presentation at the Faculty of Extension on March 19, 2019 (Fig. 9). Dr. McMahon, Diana, Stewart and I presented on the project, its history, AR, and treaty. We displayed printed copies of the guidebook and shared where they were available online. After the session, I demonstrated the AR stories to interested attendees at the Sweetgrass Bear sculpture in the Enterprise Square foyer.

One of the joys of working on this project is the audience response elicited by presentations. Each presentation for this project has been followed by attentive questions and conversation, including discussion of how the AR process could potentially be applied to other contexts. This response indicates AR for Indigenous storytelling is an engaging topic for attendees.

Figure 9

Poster for a We Are All Related AR *Public Presentation*



Conclusion

This chapter described and reflected upon my experiences with the *We Are All Related AR* project team to develop an AR story co-creation process and guidebook resources, design prototype AR stories, and support a graduate course piloting the story co-creation process. These projects and the *Sweetgrass Bears* video described in the previous chapter were foundational to this thesis project, a community-based participatory research (CBPR) approach to AR story co-

creation. Each project built and sustained relationships, and further developed Treaty 6 marker sculpture storytelling. In the next chapter, I describe how I selected a storytelling platform for AR story co-creation for (re)storying at the sites of Treaty 6 marker sculptures.

Chapter Four: Selecting an AR Platform for Indigenous (Re)Storying

Augmented reality (AR) offers a way to layer digital media over your real-world experience, in real-time (Azuma, 1997; Azuma et al., 2001), creating opportunities to share Indigenous stories tethered to place and territory (Kelly, 2020). The last chapter described my learning process through the *We Are All Related AR* project. I reflected on the development of an AR story co-creation process, guidebook resources, and prototype AR stories. Here, I continue my engagement with Knowledge Keeper Dr. Diana Steinhauer and sculptor Stewart Steinhauer and expand on the *We Are All Related AR* work by co-creating additional AR stories shared at the sites of four Treaty 6 marker sculptures. My focus here is on demonstrating how (re)storying—sharing stories excluded from current colonial narratives—through augmented reality (AR) can connect Indigenous stories to territory and place. Given the challenges with *HP Reveal*, the AR app used for the *We Are All Related AR* project, this work began by selecting a replacement AR platform. As discussed in this chapter, my selection was guided by the 4Rs of respect, relevance, reciprocity, and responsibility (Kirkness & Barnhardt, 1991), OCAP® (Schnarch, 2004), and data sovereignty. I was also guided by the *We Are All Related AR* Project Team Agreement. This governance document describes the *We Are All Related AR* principles of project ownership, digital story ownership and access, and our shared commitment to respect and adhere to Indigenous approaches to ownership of traditional cultural expression and protocol.

The *HP Reveal* app used to create the prototype *We Are All Related AR* stories became obsolete in 2019, necessitating the search for a replacement AR platform. I use the term "AR platform" to refer to AR software applications ("apps") and/or websites where users create, share, and/or view AR content. I occasionally use the term "AR storytelling platform" as a reminder of my intention to select an appropriate AR platform for sharing co-created stories. In

this chapter, I explain how I identified AR platforms to review, describe my selection criteria, discuss platform features and characteristics, and explore how they relate to AR storytelling in Indigenous contexts.

This platform review and selection is not a technical analysis or evaluation. I am not a programmer or software developer; a thorough technical evaluation of the AR platforms reviewed is outside of the scope of my knowledge and this thesis. Instead, I focused on AR apps and corresponding software for content creators with little to no computer coding skills. An in-depth technical evaluation of AR platforms for Indigenous storytelling is recommended for future research, particularly to further explore technical considerations of data ownership, access, and sovereignty.

The AR platforms were reviewed and tested on a variety of devices, including a Microsoft Surface laptop, a MacBook Pro laptop, and an older-model iPhone SE 2016. Testing AR platforms on an older iPhone meant a couple of apps were not available as they were only supported by newer mobile devices. However, I considered this an asset for my search, as I did not want to select a platform only available on new devices, but rather a platform that would be possible to use on a range of devices, including older ones.

Searching for AR Platforms to Review

There is currently no widely familiar or household-name platform for AR content creators; the AR equivalent(s) of YouTube for video or SoundCloud for audio is yet to be determined. Azuma (2015) explains this situation with reference to the evolving nature of AR and the creation of customized systems tailored to specific requirements. He further notes the "lack of standard platforms increases the challenge of telling stories with AR and MR[3] technologies, requiring

[3] MR refers to mixed reality, where users can interact with virtual items in the real-world (Maas & Hughes, 2020)

storytellers to also become familiar with the capabilities and limitations of underlying technologies" (2015, p. 260); this reflection is exemplified in my review of AR platforms. To locate AR platforms to review I searched online for terms including "AR creation", "AR story creation", "AR for content creators", "AR content creation", and "AR storytelling". I conducted this search primarily through Google, as searching in the Apple app store largely identified AR games or apps where you place AR items such as dinosaurs or furniture in your immediate surroundings. I recorded each platform name and website in a spreadsheet for later review. As I was specifically searching for AR storytelling platforms that did not require coding expertise, I did not include AR software developer kits (SDKs) such as Vuforia, ARkit, or ARCore. However, several of the AR platforms reviewed (e.g. Onirix, Wikitude) offered drag-and-drop AR creation options as well as SDKs. I also excluded platforms designed for people to create their own AR apps, virtual reality (VR) platforms, platforms designed to create industrial applications, and platforms that required coding. My exclusion criteria is summarized in Table 1.

Table 1

Exclusion Criteria for AR Platforms

Exclusion Criteria
Software developer kits (SDKs)
Platforms which require coding skills or knowledge
AR games
Platforms for people to create their own AR apps
Virtual reality platforms
Platforms for creating industrial AR applications

Originally, I intended to exclude web-based AR platforms. Web-based AR means that a URL activates the AR content, the content is viewed within a web-browser, and users do not need to download an AR app. Web-based AR is currently emerging and many of the platforms require software development skills. However, during my search I found a few web-based AR platforms which did not require coding and I included these in my review. Once I had completed my search for potential platforms to review and populated my spreadsheet, I did a quick check of each to remove any platforms that fell under my exclusion criteria. I then had a list of 26 platforms to review in detail. My next step was to review platform features and characteristics and outline my selection criteria.

Platform Characteristics & Features

There were several characteristics and features I considered in selecting an AR storytelling platform. Some features were relevant to how the AR platform functioned: How was content activated? Could the AR content be tethered to a specific location? Features such as these were relevant to my project's focus on honouring respect, relevance, reciprocity, and responsibility in sharing the stories, as the intention was to share stories about treaty at Treaty 6 marker locations. Other features were relevant to Indigenous digital storytelling and data sovereignty—particularly platform policies regarding user content data ownership, storage, and access. I added each characteristic as a separate column in my review spreadsheet of AR storytelling platforms.

Below I will explain each characteristic I reviewed, why I chose to review it, what the implications were for Indigenous AR storytelling, what I found in my search, and how this influenced my decision-making in selecting an AR storytelling platform for treaty stories. An overview of the AR platform characteristics I reviewed is summarized in Table 2.

Table 2

Overview of AR Platform Characteristics Reviewed

Characteristic	Importance	Rationale
AR content trigger	Required	The AR trigger should tether the story to a specific location.
Types of AR content supported	Required	The platform must support video content. Audio and image support preferred. 3D model support not required.
OCAP® principle alignment	Required	Users must retain ownership of their content.
Interactive AR capability	Beneficial	Greater interactivity promotes viewer engagement.
Cost	Required	The platform could not be unaffordable for AR story creation & hosting, and needed to be free for users to hear the stories.
Analytics	Beneficial	Analytics were useful but not essential.
Offline access	Beneficial	Not required due to the Treaty 6 marker sculpture locations.
Android & iOS	Required	The platform must be available on both Android & iOS devices to increase accessibility.

AR Content Trigger

My review of AR platform characteristics began with identifying how each platform triggered or activated AR content. All AR platforms require an item that the software recognizes as the cue to activate the AR content. This item may be a GPS location, a surface for Simultaneous Localization and Mapping (SLAM) application[4], or an image which the software recognizes when scanned. Some AR platforms generate a customized specific image similar to a QR code to

[4] This type of AR scans a room and identifies the floor and other objects and applies AR content. My son and I once played with an app that scanned the floor and placed a 3D baby dragon in our living room. For a more in-depth discussion of types of AR, please see the *We Are All Related AR* Student Guidebook.

activate the AR content. Image recognition in AR differs from a QR code in that the AR content, once activated, is layered over the user's real-time real-world view or experience. In contrast, a QR code activates content which is viewed on your device without the real-world view.

Image recognition was used by the Rupertsland Institute for their *Rupertsland AR* app (https://www.rupertsland.org/). Scanning the app's Métis motif design activates AR imagery on topics such as Métis culture and language, and a link to the organization's website. Creatively, the Institute also shared cabochons[5] with the image for users to make their own jewelry, which could then also activate the AR content (Fig. 10). Image recognition was also used by Marques et al. (2019) to re-connect Māori storytelling and landscape.

Figure 10

Earrings with Cabochons That Activate Métis AR Content

[5] A cabochon is a gemstone shaped to be rounded on one side and flat on the other. This term also refers to jewelry-making items in this style made from resin or other materials, as seen in Fig. 10.

Note. Beadwork by Métis beader Krista Leddy. Photo courtesy of Krista Leddy.

As discussed earlier, the *We Are All Related AR* team used the image-recognition app *HP Reveal* for the AR story prototyping and initial stories created by graduate students (McMahon et al., 2019a; Almond et al. 2018). Scanning the sculpture itself to activate AR content encouraged users to explore the knowledge embedded in the sculpture, and the granite carvings provided high-contrast imagery for image recognition. As the *HP Reveal* app became obsolete in 2019, I needed to select a new platform to expand the AR stories and create a story trail as part of this thesis. I initially continued to prioritize image-recognition capabilities in my search for a replacement AR storytelling platform. As my review progressed into winter, however, sunset occurred earlier each day[6] and it became apparent that image-recognition of the sculptures would be far less accommodating in outdoor settings with variable lighting, much less in the dark. To honour the commitment to share treaty stories at the Treaty 6 marker sculpture locations, an alternate way of tethering AR content to place was required. Given the need to accommodate variable lighting conditions and with the sculptures being located at least 1 kilometer from one another[7], I began to instead search for a platform that would use GPS location to activate AR content. Having already recorded whether geolocation was available for each platform in my review process, I was able to readily switch to prioritizing geolocative capability over image-recognition. Geolocative AR then became a key criterion for selecting an AR platform so users could experience AR content at outdoor locations on Treaty 6 territory.

[6] Sunset on January 05, 2020 (the time of writing) was at 4:30 pm MST.
[7] A map is available in Appendix B.

Types of AR Content Supported

AR content can include digital images, text, audio, video, 3D modelling, and/or animation. For the Treaty 6 marker stories I was interested in platforms that could support audio, image, and video AR content. I was creating new AR stories using previously recorded video footage and so a platform that supported video formats was required. I also wanted the option to include images in the AR content and audio-only content. Audio digital stories are compatible with oral storytelling traditions (Cueva, Kuhnley, Revels, et al., 2016) and with audio-only content users could visually engage with the sculptures and the territory while listening to the treaty stories. Animated content was previously discussed during the *We Are All Related AR* project but determined to be unsuitable at the time due to requiring certain permissions to link that particular story with digital graphic representations (McMahon et al., 2019b). During my search, I found that some AR platforms limited the AR content to a predetermined menu of 3D models or animated characters and I excluded these platforms from further review.

Ownership, Control, Access, and Possession

As discussed in the previous chapter, data sovereignty and the OCAP® principles are important considerations for Indigenous knowledge and data. Data sovereignty is the right of a nation to govern its own data (US Indigenous Data Sovereignty Network, 2018). The OCAP® principles of ownership, control, access, and possession were originally developed for self-determination in research (Schnarch, 2004) and have since been applied to additional contexts. These principles can also be applied to creating and sharing AR stories for self-determination in protecting the knowledge and data generated, recorded, and shared through both the storymaking process and

the finished AR stories (McMahon et al., 2019a; McMahon et al., 2019b; Vigil-Hayes et al., 2019).

Here my selection criteria contained an inherent contradiction: a search restricted to platforms which did not require software development skills meant being limited to platforms which required users to upload their content, compromising control, access, and possession of the data. AR SDKs are more customizable and more likely to facilitate hosting content outside of the platform. Hosting AR content on your own server allows content creators more control of their data, but this is not available on drag-and-drop AR platforms, which are designed to be accessible and easy to use. A lack of control of the content once uploaded was a compromise for the project in return for a user-friendly AR platform which did not require coding skills. Given that ownership, control, access, and possession are critical considerations for Indigenous data including stories, a gap is identified in the need for AR platforms which are easy to use but where users have greater control over where the content is stored and how it is accessed.

A crucial component of my search for an AR platform was whether users retained ownership of their content once the content was shared with the AR platform. This is vital to projects working with content based on Indigenous knowledge to protect knowledge held collectively, mitigate risks of cultural appropriation, and prevent knowledge from being shared out of context (McMahon et al., 2019a; see also Vigil-Hayes et al., 2019). Part of selecting an AR platform included carefully reviewing the Terms & Conditions of promising AR platforms with attention to conditions for data ownership, storage, and access. Users retained ownership of their content in all of the Terms & Conditions I reviewed, while platform access to the data varied. Some form of content access and use by the platform is necessary in order for the platform to share the content in the form of an AR story. Users grant AR platforms a license to

access and display story content by using the platform and agreeing to the Terms & Conditions. For example, below is an excerpt of the Terms & Conditions for the AR creation platform ZapWorks:

> So that we can provide you with the Services and distribute your User Content through your chosen publication channels (e.g. WebAR, custom app solution, Zappar mobile application) you grant Zappar and its group companies an irrevocable, worldwide, royalty-free and non-exclusive licence to store, reproduce, adapt and modify (e.g. for technical reasons to enable the content to work on our platform), translate, publish, display, perform, transmit, distribute and otherwise use your User Content and Content Triggers on or through the Services, solely for the purposes of enabling Zappar and its group companies to operate, maintain, make available and distribute the Services in accordance with the User Agreement, including (as applicable) enabling our content delivery platform to (a) put together the final published version of your User Content and (b) provide individuals who activate your Content Triggers with access to your User Content. Your licence includes a right for Zappar or its group companies to make your User Content available and sub-licence its use to our service providers used in connection with the Services (e.g. Amazon Web Services) to the extent necessary to provide you with the Services. The licence granted to Zappar will continue throughout your use of the Services and until an item of User Content has been removed from our systems. **This is a licence only – your ownership of your User Content is not affected.** You represent and warrant to Zappar that you have (and will continue to have during your use of the Services) all necessary rights, permissions, power and authority to grant the licences contained in this paragraph. (ZapWorks Terms of Use, 2019, original emphasis)

The license granted is mainly to share AR content with other users through the platform, but may also include other purposes such as promotion. This can be a concern for Indigenous peoples as AR content is placed at risk of appropriation and/or being used out of context. The Terms & Conditions of the app izi.Travel includes license to "use (parts of) your Content, your name, brand and/or logo and the relationship between us for promotional and marketing purposes, for instance by presenting your Content as an example to other potential Content Providers and End Users, unless you do not approve such use in which case you should contact us" (izi.Travel, 2020, Article 7). I wanted to select an AR platform where data access was limited to what was required to share the AR content within the platform, and if possible, avoid granting

access to the data for other purposes in order to align with the principles of OCAP® and data sovereignty.

Interactive AR Capability

Some AR platforms work in a relatively straightforward manner: scanning an image or opening the app at a GPS-based location activates one specific item of content. For example, scanning an image to trigger a video or photo. Other platforms allow users to interact more with the content—allowing users to select what content they want to use, tap buttons to open a webpage, or toss a poké ball to collect Pokémon. This kind of interactivity can encourage engagement with the AR content (Scholz & Smith, 2016), providing users more agency in what content they would like to experience, and allowing more content to be shared. Therefore, interactivity was a desirable asset.

Cost

For content creators, there are two primary costs typically associated with using an AR platform: costs to create AR content and costs to share AR content. Many of the AR platforms reviewed offer tiered subscription-based services where extra features, more user engagement, customization, and greater product support were associated with higher costs. This project required a platform with the ability to create AR stories at four different sites at relatively low cost. Costs to create AR content ranged from free platforms with limited features (and likely, ads) to thousands of dollars a month for custom image-recognition. While most platforms were explicit about their costs, this information was difficult to find for a small number of platforms or I would be prompted to contact the platform's sales team for more information. Some platforms offered reduced costs for education, but these were mainly targeted towards K-12 classroom

settings where a primary educator account was affiliated with several student accounts. Many of the platforms I reviewed offered basic plans in the price range of $50-$65 CAD/month with options to purchase upgrades, and this cost was reduced if an annual subscription was purchased. One promising platform was excluded from further consideration once I discovered the cost for 5 AR experiences would be $499 USD ($650 CAD) per month.

There can be costs to users for game-based AR platforms such as *Pokémon Go* or *Zombies, Run* but the AR content creation platforms I reviewed were largely targeted towards marketing or educational purposes, and these contexts generally do not require user payment. A platform free of cost to users was a project requirement as the Treaty 6 marker sculpture AR stories share Cree cultural knowledge held for future generations that is not to be shared for profit. Additionally, the project's purpose was to increase understanding and build Indigenous-settler relations, and the project team determined that any financial cost to users would be a barrier to uptake.

Analytics

Some AR platforms offered analytics for content creators, such as how many times the AR content was viewed. For some platforms, analytics were not included with free accounts but were available with paid subscriptions. Analytics included number of views, length of time the content was viewed, how users interacted with the content, type of user device (iOS or Android), and user geographic region. Some platforms, such as *Wikitude*, incorporated Google Analytics. Analytics were considered a useful but non-essential feature for the Treaty 6 marker bear stories. While it would be helpful to know the uptake of the AR treaty stories by viewing analytics that reflected the number of users, other essential requirements such as cost and ownership were prioritized, and lack of analytics did not exclude otherwise promising AR platforms.

Offline Access

I documented whether or not the AR platform was available offline during my search. When a platform offers AR content offline, the content is downloaded within the app itself or is downloaded separately for later use in offline settings. For the AR app *Actionbound*, users download the *Actionbound* app and then separately download specific games (or "bounds") to play later without internet access. The AR content for the *Rupertsland AR* app is downloaded within the initial app download and available offline thereafter. This feature is especially critical for locations where there is no cellular service or Wi-Fi, a pertinent concern for many Indigenous Nations and communities with lower connectivity (Vigil-Hayes et al., 2019; McMahon, 2014). However, this was not considered an essential feature for the AR stories located at the Treaty 6 marker sculptures as the sculptures are located on post-secondary campuses and generally guest Wi-Fi access is available. Additionally, having offline access as a requirement significantly restricted the number of potential platforms.

Android & iOS

For each AR platform tested, I confirmed whether the app was available both in the Apple App store and in the Google Play store. Two AR platforms were only available for Apple iOS and were thereafter excluded from further review, because I wanted to ensure that the AR platform chosen would be available for use on a broader amount of devices to fulfill our team goal of sharing AR stories about treaty to help build Indigenous-settler relations.

Platform Testing

While reviewing AR platforms against the criteria described above, I also tested promising platforms. Testing the platforms allowed me to explore how user-friendly the platforms were for

content creators, and I added a column to my spreadsheet to record my impressions of each platform while testing. Initial platform testing was completed using publicly-available content, including photos of the sculptures, free photos from the website Unsplash.com, linking to the Sweetgrass AR website, or using the Sweetgrass Bears YouTube video as AR content. Treaty story videos were not used for testing to mitigate the risk of appropriation when uploading content to test different platforms. Prior to switching selection criteria from image-recognition to GPS location, I tested two different image-recognition AR platforms at two student research poster events. I used the AR platform *Roar* at the Faculty of Extension Research Showcase in May 2019. Users viewing my research poster in the *Roar* app could activate AR content for each poster image: a screenshot of the *Sweetgrass Bears* YouTube video activated the video in *Roar*, a screenshot of the Google map of Treaty 6 marker bear locations loaded the Google map, and other poster images activated photos of the Treaty 6 marker sculptures and a demo video of the AR content at the Enterprise Square Treaty 6 marker. A 3D yellow bird was visible in the branches of a tree image, albeit somewhat reluctantly as this model was slow to load. *Roar* worked successfully to allow attendees to view AR content at the poster event, but at a cost of over $60 CAD/month the subscription was canceled after the event and the AR content was no longer available to poster viewers. For the September 2019 event Show & Tell: A Student Research Celebration, I used the AR app *Zappar* to overlay AR content on my research poster. *Zappar* uses Zapcodes, similar to QR codes, to activate content. With a zapcode affixed to the corner of my poster, I was able to have all the poster images activate different content, as described above. Whereas with *Roar* users had to scan each image individually to activate the AR content, with *Zappar* the entire poster was immediately overlaid with AR content once the zapcode was recognized, creating a quick and engaging AR demonstration. Another advantage to

Zappar was that the zapcode was available free of cost with a personal account, and thus the AR content remained active after the event at no cost when the poster was displayed at the Faculty of Extension. This poster's AR content can be viewed by downloading the app *Zappar* and scanning Appendix A.

Platform Selection

As described earlier, I initially intended to use image recognition to activate AR content at the Treaty 6 marker sculpture sites, as was used with the prototype *We Are All Related AR* stories. However, I later decided to prioritize geolocated content to compensate for variable outdoor lighting. My requirements shifted to a platform which offered the following characteristics:

- geolocative AR content;
- the ability to create audio, image, and video AR content;
- acceptable terms and conditions;
- available for iOS and Android devices; and
- relatively low cost.

Largely through a process of exclusion as I explored and tested AR platforms against this criteria, I selected the AR platform *awe*. awe.org Pty Ltd is an Australian company offering web-based mixed reality (AR & VR) platforms. The *awe* web-based AR platform offered geolocative content, interactive AR capability, AR content in the form of images, videos, 3D models, and audio, for $38 USD/month. As I will discuss in the next chapter, I confirmed *awe* was acceptable to the *We Are All Related AR* team members supporting my thesis work before creating new AR content. This confirmation with teammates was an important part of the community-based participatory research (CBPR) approach applied in this thesis, where key decision-making was shared among team members.

Given the limitations of available drag & drop AR platforms regarding data access and control, it was determined by the *We Are All Related AR* team that the platform selected for this thesis would be considered a temporary measure in hopes of developing a more suitable platform for Indigenous AR storytelling in the future. Developing an AR platform for Indigenous storytelling could address issues related to data sovereignty and the OCAP® principles, support collaborative AR storytelling, and help protect cultural knowledge being held for future generations.

In this chapter I have described my search for a suitable platform to share Indigenous digital stories through AR, mindful of the principles of respect, relevance, reciprocity, and responsibility (Kirkness & Barnhardt, 1991), OCAP® (Schnarch, 2004), data sovereignty, and guided by the *We Are All Related AR* Project Team Agreement. I have described my criteria, features examined, and how I selected a platform for sharing AR stories at Treaty 6 marker sculptures. In the next chapter I describe how I applied the story co-creation process, established in relationships, ongoing consent and collaborative decision making, to create new AR stories and build a story trail.

Chapter Five: Co-Creating a Treaty 6 Marker AR Story Trail

In this thesis I have argued that (re)storying Treaty 6 territory with augmented reality (AR) stories that challenge settler narratives of land surrender may help build Indigenous-settler relationships and understanding. Sharing stories through AR tethers them to Treaty 6 territory, connecting suppressed narratives to present-day places and experiences. In this chapter, I reflect on my process and experience of AR (re)storying and the co-creation of AR stories at Treaty 6 marker sculptures to create a story trail on Treaty 6 territory in Alberta, Canada.

In situating myself at the start of this thesis and reflecting on my various experiences of co-creating AR stories, I am practicing the community-based participatory research (CBPR) principle of reflexivity. Reflexivity in CBPR is attentive to the role of the researcher and power relations between researchers and stakeholders and/or participants (Darroch & Giles, 2014); roles I have approached through a framework of the 4Rs (Kirkness & Barnhardt, 1991) and relational accountability (Wilson, 2008). Additionally, Probst (2015) found that for qualitative social work researchers, the benefits of reflexivity included transparency and "accountability, trustworthiness, richness, clarity, ethics, support, and personal growth" (p.42). These benefits may apply here as well. In reflecting on my experiences and the story co-creation process, I hope to provide a demonstration of story co-creation that others may learn from and perhaps engage with in their own AR (re)storying projects.

(Re)storying Through the Co-creation and Sharing of AR Stories to Support Building Indigenous-Settler Relations

The trail of AR stories at Treaty 6 marker sculptures was co-created to (re)story Treaty 6 territory—to challenge colonial narratives that privilege settler perspectives, educate the public

that Treaties were about sharing of lands, and prompt reflection on past, present and future relationships. Treaty 6 marker sculptures are located on four University of Alberta campuses (a map is available in Appendix B). Three of the campuses are located in amiskwaciy-wâskahikan (Beaver Hills House, also known as Edmonton) in what is currently known as Alberta, Canada. Between two of the campuses flows kisiskâciwani-sîpiy (swift-flowing river, also called the North Saskatchewan River) with a riverbank site used as an Indigenous gathering place for thousands of years (Goyette & Roemmich, 2004). If you were to visit the Sweetgrass Bear Treaty 6 marker sculpture at the Enterprise Square campus in downtown Edmonton, you could then head south, passing through the gathering space and perhaps stopping at the Rossdale Memorial site, a traditional burial area and location of the old Fort Edmonton cemetery. Just across the river is the Δᓂ° (ÎNÎW) River Lot 11∞ Indigenous Art Park. From the art park, you could head west to visit Sweetgrass Bear on UAlberta's North Campus, or east along the river valley and through Mill Creek Ravine to visit Sweetgrass Bear at Campus Saint-Jean. To visit Sweetgrass Bear at the Augustana campus, you will need a vehicle or to significantly extend your walking itinerary as it is located nearly 100 km further southeast in the city of Camrose, Alberta.

Sharing treaty stories through AR at the sites of Treaty 6 marker sculptures tethers these stories to Treaty 6 territory. Writing about storytelling, Smith (2012) describes "the story and the storyteller both serve to connect the past with the future, one generation with the other, the land with the people and the people with the story" (p. 146). Sharing the treaty story on Treaty 6 territory through AR may initiate this connection as well, linking storyteller, story, and location. Experiencing what is perhaps an unfamiliar story in a familiar environment can facilitate new perspectives (Scully, 2012; Hidalgo, 2015; Irving & Hoffman, 2014; Sunderland et al., 2020),

unsettle (Regan, 2010), and build relationships and understanding. Wemigwans (2018) explains the significance of representing treaty knowledge online:

> Representation of Indigenous history and treaties on the Internet, especially if leveraged into public educational systems, could help to end hostile relations between Indigenous Peoples and Canadian settler society—or at least provide a reference point for dialogue and hopefully intelligent engagement that would go beyond the tiresome reproach that Indigenous Peoples "get everything for nothing." Such online work would challenge these racist statements and engage in the project of decolonization, which would ultimately contribute to Indigenous resurgence. This type of work would present a much-needed corrective history from an Indigenous worldview (p. 122).

There is also potential for creating new understanding of relationships through the layering of treaty stories over territory through AR. Papaschase Cree descendent Dwayne Donald (2012) explains that layering memories and experiences can create new understandings of relationships. Donald further describes ethical relationality as "an ecological understanding of human relationality that does not deny difference, but rather seeks to understand more deeply how our different histories and experiences position us in relation to each other" (p. 535). The AR stories are shared in the hopes that listeners may likewise reflect on the stories and give consideration to the significance of being on Treaty 6 territory and the responsibilities that may entail.

It is important to note that while learning about treaty relationships through AR can be an introduction to the oral understandings of treaty, the stories told through AR do not replace the relationships and learning that happens between people when stories are shared in person. As

Wemigans (2018) writes, "*no mere tool, no matter how well designed or used, can ever replace—or even come close to—oral, person-to-person transmission of traditional cultural knowledge*" (p. 28, original emphasis). The Treaty 6 marker sculpture AR stories may function as a starting point to learning about what it means to be on Treaty 6 territory, particularly for people curious about the sculptures and the knowledge they share. As Dr. Diana Steinhauer explains in one of the AR stories, the project is "for people to be naturally curious to want to learn more, and we invite you to learn more" (Steinhauer, 2020). Diana then describes the protocol of tobacco, guiding the listener on how to engage Elders and Knowledge Keepers in-person.

The AR stories were co-created and shared during a time of renewed interest in (re)storying and counter-storytelling. Land acknowledgements recognizing treaty territory and Indigenous peoples are shared at the start of meetings and gatherings and in email signatures. Indigenous Canada, the University of Alberta's massive online open course (MOOC), saw a surge in enrolment in 2020, attributed to an interest in wanting to learn more about systemic racism and oppression (Cook, 2020) although there has been some critique that the course continues the colonial narrative of Treaties as land surrenders (Steinhauer, 2021). Canadian actor Dan Levy joined the course and invited others to participate, prompting thousands more to enrol (Porter, 2020). In an Instagram post with over a million views, Levy commented that "if 2020 has taught us anything, it's that we need to actively relearn history, history that wasn't taught to us in school, to better understand and contextualize our lives and how we can better support and be of service to each other" (Levy, 2020). Temporary plaques recognizing history excluded from colonial narratives were installed in Toronto as a form of counter-storytelling; one plaque

identified that streets in the area were named after an individual who enslaved Black and Indigenous peoples (Bessonov, 2020).

AR similarly offers opportunities for (re)storying and counter-storytelling connected to place. However, one significant challenge affiliated with AR storytelling is the threat of technological obsolescence. The *We Are All Related AR* project selected the app *Aurasma* to host the AR stories and developed guidebook content and an online tutorial based on the app (McMahon et al, 2019b). *Aurasma* was later purchased by Hewlett-Packard and rebranded as *HP Reveal*. *HP Reveal* was then discontinued in 2020. The *We Are All Related AR* project took into consideration the potential discontinuation of any selected AR platform, and designed the AR story co-creation process as one that could be applied across platforms. In conducting my literature review, I noted a number of projects whose AR content would no longer be available at the time of reading, having used now-obsolete apps including *Aurasma* or *Layar*. Cassels & Farr (2019) reviewed mobile apps for Indigenous language learning, and identified the need for ongoing updates as particularly unfeasible for apps funded by grants or similar short-term funding. Without updates, the apps—and potentially the content they house—eventually become unavailable to users.

Roth & Fisher (2019) identified both technological and user-based challenges in their exploration of AR for sharing stories about the underground railroad: “our experience shows that AR currently presents several challenges to storytelling in this transitional moment, as both literacies and hardware and software change: existing “AR literacy” and understanding, users’ physical comfort while using devices, user attention span, and user expectations for AR experiences" (p. 151). The expectations of AR users was demonstrated during the *We Are All Related AR* project when I asked two coworkers to test *HP Reveal* AR stories I had placed at the

Sweetgrass Bear sculpture in Enterprise Square. When the AR videos began to play both coworkers immediately went to tap the video to pause playback and provide feedback. At the time, I hadn't designed the AR content to pause when tapped, and the videos continued to play. I later added the function for the videos to pause when tapped after observing this response and expectation. Platforms for laypersons to create AR content will likely adapt to meet common user expectations, as have platforms for drag-and-drop website design or video editing.

Despite these challenges, I argue that AR holds strong potential for (re)storying, particularly in the co-creation of AR stories and in sharing stories linked to territory. AR stories can be respectfully co-created through a process grounded in relationships and consent and attentive to details related to data sovereignty. Through AR (re)storying, visitors to the Treaty 6 marker sculptures can experience stories from a respected Knowledge Keeper on what it means to be in relationship on Treaty 6 territory. Hearing these stories may prompt reflection on past, current, and future relationships and initiate further learning to build relationships and understanding. It wasn't until I began to hear these stories that I recognized their absence, and I hope to offer the same opportunity to others.

The Co-creation Process

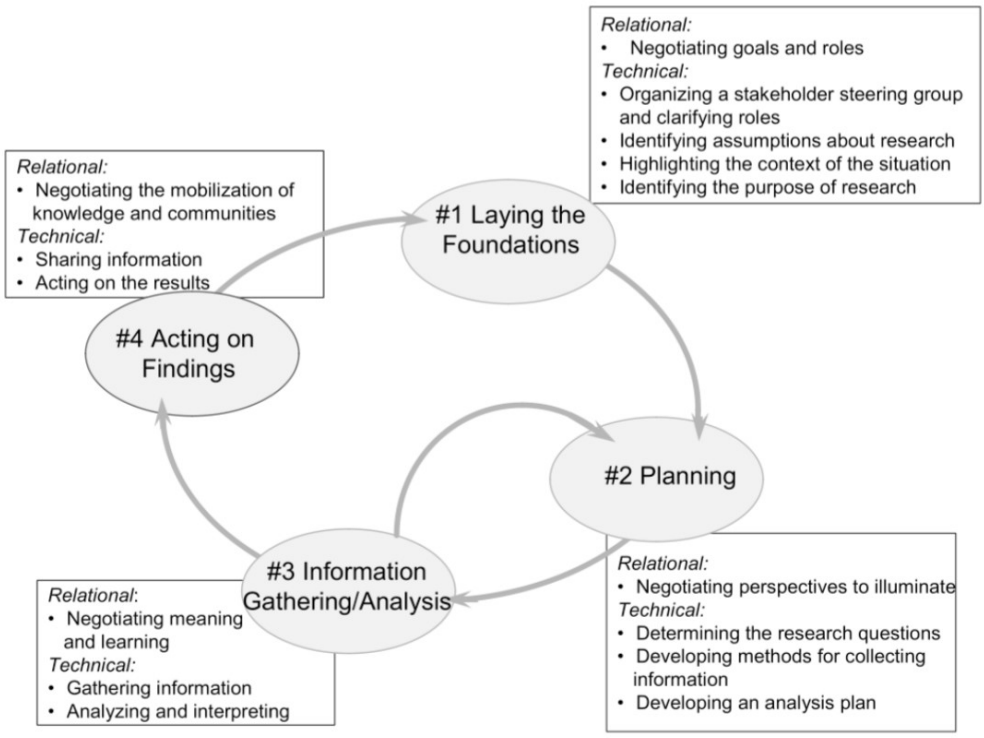
The AR stories and AR story trail described in this chapter were co-created with Knowledge Keeper Dr. Diana Steinhauer and Treaty 6 marker sculptor Stewart Steinhauer, following the process described in Chapter Three. As discussed in previous chapters, prior to this thesis project I collaborated with Diana and Stewart on other projects related to the Treaty 6 marker sculptures. We created the *Sweetgrass Bears* video, developed a governance framework and AR story co-creation process in the *We Are All Related AR* project, and I joined field trips for ceremony and treaty story recording with other graduate students (McMahon et al., 2019a). The work done

through my thesis to co-create an AR story trail was grounded in the relationships built through these earlier projects, which reflect iterations often observed in community-based participatory (CBPR) research.

In the CBPR process, relationship building precedes or begins to be established through the development of a shared purpose (Castleden et al., 2012; Ochocka & Janzen, 2014; LaVeaux & Christopher, 2009). Collaborative planning is followed by action or implementation towards that purpose. Afterwards, the team reviews and reflects upon the efforts, and may begin planning a new project or iteration. The projects leading to this thesis can be viewed in a similar way. A shared vision was developed for each project, with the 4Rs (Kirkness & Barnhardt, 1991) and relational accountability (Wilson, 2008) guiding ongoing planning and implementation. Regular team planning and communication facilitated reflective and consensus-based practice. Figure 11 from Ochocka & Janzen (2014) helps illustrate this process—in each phase attention is paid to both the relational aspects of the work together as well as to the technical, emphasizing the meaningful and ongoing roles of collaboration and relationships throughout the project.

Figure 11

The Four Phases of Community Based Research (Ochocka & Janzen, 2014, p 21)



Co-creating AR stories related to a graduate thesis required navigating collective knowledge and copyright. As discussed in Chapter Three, European concepts of intellectual property and copyright were developed for individual creators and are ill-suited for collective knowledge (Harry, 2011; Anderson, 2015; Udy, 2015). I was required to be the sole author of this thesis as per requirements for my M.A. program, but I wanted to ensure that I was not the sole copyright owner of the newly-designed AR stories. Cree stories are Indigenous knowledge and responsibilities collectively stewarded for future generations (Steinhauer, 2018). Research on digital storytelling has described the potential for digital content created as part of a research project to be automatically considered the intellectual property of an individual researcher or the post-secondary institution that individual works for, unless exceptions are made (Loebach et al., 2019; Poitras Pratt, 2019). In one cautionary example of intellectual property risks to collectively-held Indigenous knowledge, Bell & Shier (2011) describe a researcher who held

information gathered from Kwak'wala language speakers declining to share the information with U'mista Cultural Society and 'Namgis First Nation, who considered the data vital to language revitalization (see also Bear Nicholas, 2017).

As described in Chapter Two, the *We Are All Related AR* project team developed a copyright limited transfer method with advice from several colleagues to ensure copyright of cultural content remained with Diana and Stewart (McMahon et al., 2019a). For this thesis, I contacted UAlberta's Copyright Office to also ensure any copyright for the newly-co-created AR stories was also transferred. I met with office staff for a preliminary discussion in June 2019, and a staff member adapted the project's information letter and media consent form in July 2020 to confirm copyright of the AR stories would remain with Diana and Stewart.

The OCAP® principles and concepts of data sovereignty are particularly important when it comes to stewarding and sharing Indigenous knowledge that is shared in digital and/or online ways. Sharing Indigenous knowledge online can facilitate self-determined representation and promote counter-storytelling—as Wemigans (2018) argues, "Indigenous Knowledge online speaks back to dominant colonial systems of knowledge in Canada by representing an active presence rooted in the local soils of diverse Elders and Knowledge Keepers" (p. 2). By sharing Indigenous knowledge online, (re)storying projects can reach a wide audience, increasing accessibility and opportunities for challenging inaccurate representations and colonial narratives. However, online and AR for an Indigenous knowledge context also risks appropriation and information being shared out of context (Wemigwans, 2018; Vigil-Hayes et al., 2019).

Zuni/Tlingit scholar Belarde-Lewis (2011) details risk mitigation approaches to protect cultural knowledge during an intertribal canoe journey: rules were shared by Makah tribal masters of ceremony, photography and video recording limits were enforced, and documentary

footage was edited to restrict song exposure and prevent appropriation. Mediation between sharing and mitigating risk is required to share Indigenous knowledge while stewarding and protecting the knowledge. The need for navigation between sharing and stewarding demonstrates the vital role of ongoing relationships, collaboration, and consent in sharing stories online through AR in the story co-creation process.

As discussed earlier, ongoing consent was essential to co-creating the AR stories and story trail. As Smith (2012) describes "consent indicates trust and the assumption that the trust will not only be reciprocated but constantly negotiated-*a dynamic relationship rather than a static decision*" (p. 137, emphasis added). This was the approach to consent taken for the AR stories—ongoing and dynamic, rather than a one-time up-front permission. I had originally planned to travel to Saddle Lake throughout the project to offer protocol and request continued guidance in co-creating AR stories. However, the COVID-19 pandemic declared in March 2020 changed those plans (World Health Organization, 2020). At the University of Alberta, rural travel and in-person gatherings were no longer advisable for non-essential research (UAlberta, 2020). I missed visiting with Diana and Stewart around a kitchen table, but was very thankful for the time we did get to spend together prior to needing to connect remotely and that we were able to remain connected during the pandemic with virtual and teleconference meetings. Their consent and guidance was crucial to the project, and I enjoyed visiting with them.

Co-Creating and Designing the AR stories

For this thesis project I worked with Diana and Stewart to co-create the AR stories using recordings from previous Treaty 6 marker sculpture projects, including video footage recorded during field trips to Saddle Lake and telephone interview audio for the *Sweetgrass Bears* video. As described earlier, copyright for the raw video footage from the field trips was held by Diana

and Stewart, who granted me permission to use this footage and the audio recording to create new AR stories. The video footage consisted of Diana sharing the treaty story, interviews with Diana and Stewart, and a small amount of b-roll footage. Prior to meeting with Diana and Stewart I reviewed this footage and noted what was shared, the imagery, and audio quality. Using these notes, I developed ideas for AR story concepts. The AR story concepts included topics, corresponding quotes from the recordings, and some thoughts on placement at Treaty 6 marker sculptures to discuss with Diana and Stewart.

With multiple sites for the Treaty 6 marker sculptures, I took into consideration that some viewers may visit just one sculpture while other viewers may visit multiple sites. Requiring viewers to begin listening to the stories at one sculpture and end at another would not only limit accessibility but also suggest a non-existing linear storytelling style. An approach that would accommodate both visitors to one sculpture and visitors to multiple sculptures was needed. I designed an approach where each marker would host an introduction story and an AR story on the oral understanding of treaty. In addition, each sculpture would host two stories unique to that site. By including an introduction and key messaging about the oral understanding of treaty at each site, every visitor would receive these vital messages. With unique stories at each site, visitors who visited more than one sculpture would also be able to hear new stories at each sculpture, creating a story trail. Before beginning to design AR stories based on these ideas, I sought consent and feedback from Diana and Stewart.

Prior to meeting, I offered protocol to Diana and Stewart with a request for guidance and feedback. With their acceptance, I shared updates in a teleconference and they provided guidance and feedback. I explained my AR platform review and the *awe* platform, discussing the features and characteristics I had reviewed, and describing the license to access user content in detail. I

also explained how I had met with the UAlberta Copyright Office to ensure copyright of the AR stories would remain with them in this thesis project. Diana and Stewart approved the *awe* platform, the story concepts and design, and placement (Table 3). I offered honoraria for their guidance, with support from a University of Alberta Killam Accelerator Award.

Table 3

The AR Story Trail: Treaty 6 Marker Sculptures and AR Story Placement

Treaty 6 Marker Sculpture	**AR Stories**
Main Campus	● tānisi ● Oral Understanding of Treaty ● As Long as the Sun Shines ● tawâw
Enterprise Square	● tānisi ● Oral Understanding of Treaty ● Treaty Medal ● Granite
Campus Saint-Jean	● tānisi ● Oral Understanding of Treaty ● Sweetgrass Trail ● Role of Knowledge Keepers
Augustana	● tānisi ● Oral Understanding of Treaty ● Early Treaties ● Nation to Nation

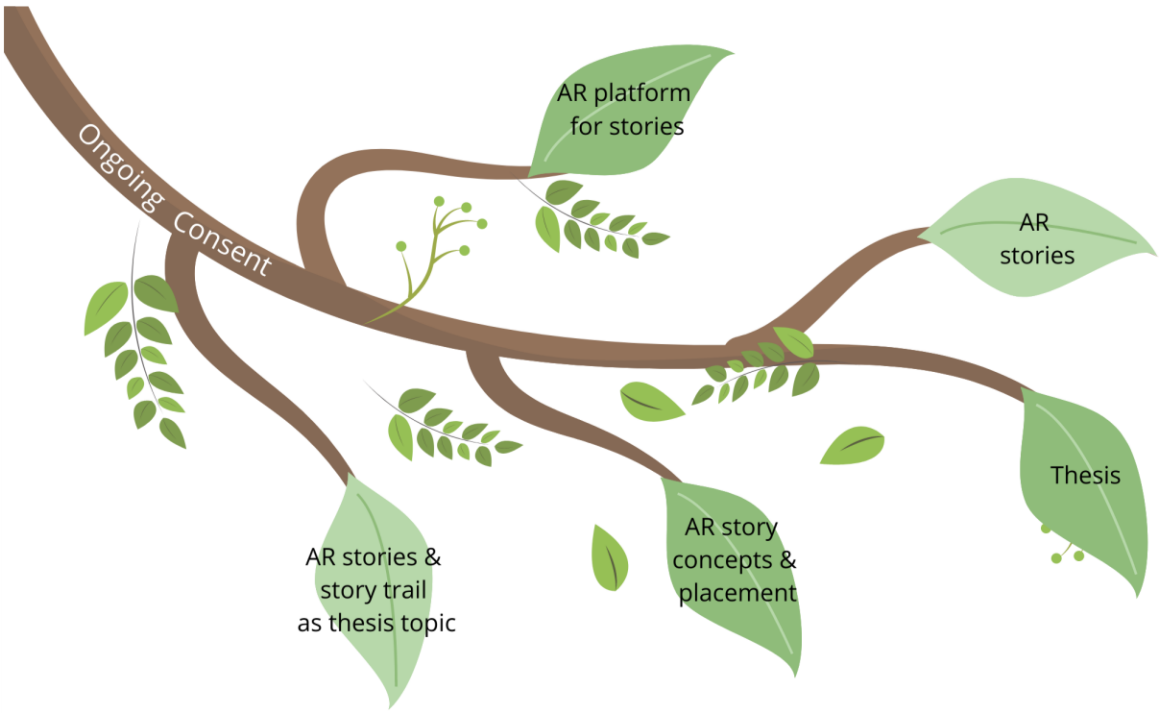
With this approval, the AR stories were designed next. The AR stories were designed to be short. In creating AR stories about the underground railroad, Roth & Fisher (2019) found "laborious video editing to craft a story was lost in the AR user, who, fatigued or simply curious and eager to move on, would tire of holding still for the duration for a several-minute-long video" (p.140). With this in mind, the AR stories were designed to be 1 - 5 minutes in length. Some of the AR videos were excerpts of the pre-recorded video footage with minimal editing

and other videos assembled clips from pre-recorded videos and added photos to an audio track, which required more editing. The videos were created with iMovie video editing software and sound editing software Audacity.

Drafts of the AR videos were shared with Diana and Stewart for feedback, and final approval of the AR stories was with Diana and Stewart (Fig 12). Requesting final approval from Diana and Stewart as stewards of the treaty story and marker sculptures was important for relational accountability and for self-determination and self-representation in the AR stories. As Smith (2012) describes, "representation of indigenous peoples by indigenous people is about countering the dominant society's image of indigenous peoples, their lifestyles and belief systems" (p. 152). In co-creating AR stories as a form of (re)storying and counter-storytelling, it is crucial that Indigenous peoples are sharing their own stories and are represented how they chose to be.

Figure 12

Ongoing Consent and Approvals throughout the Thesis Project



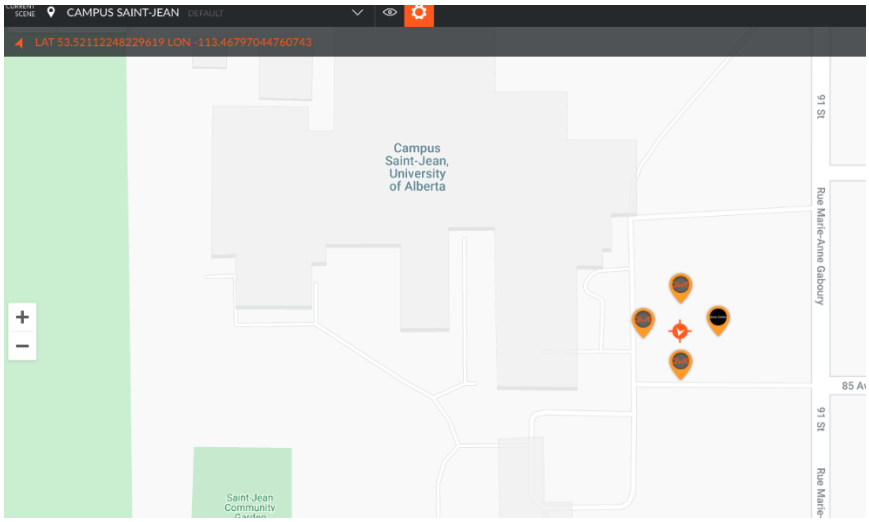
With approval of the AR stories in video format, the videos were uploaded into the *awe* AR platform website. On the *awe* website, I uploaded the treaty story videos to be shared with visitors to the Treaty 6 marker sculptures. With web-based AR, users visit a website in their mobile device browser to view the AR content, as opposed to downloading an AR app. The website prompts the user to permit camera access and location access. These permissions granted, the website opens the mobile device camera and if the viewer is at the correct location, loads AR content to be viewed over the real-world view in real-time.

Designing the AR content to be viewed relative to location required positioning the content within a 3D coordinate frame along x, y, and z axes. In an early test, I had trouble locating the video content placed near a Sweetgrass Bear marker sculpture only to realize it was placed far above me, appearing as a tiny image in the sky. The videos had to be arranged so they did not overlap one another or start to play simultaneously, as in earlier tests. To help prevent overlap, I placed the stories north, south, east and west of the marker sculptures (Fig. 13).

Content was also designed so it would always be facing the user, lest a visitor approach the "back" of an AR video positioned by the Treaty 6 marker, as they might approach a 3D model.

Figure 13

Map of AR Stories at the Treaty 6 Marker Sculpture at Campus Saint-Jean as Viewed in awe



The stories were tested on an iPhone and on a Samsung Android phone. I had planned to request testing by additional users (e.g. coworkers or friends working on different UAlberta campuses) but was unable to complete this request as campus access was restricted during the COVID-19 pandemic. After I tested the AR stories, I recorded my screen viewing the AR content and shared this recording with Diana and Stewart.

Sharing the Stories

Sharing the AR stories was essential for the purpose of building Indigenous-settler relationships and understanding. The stories were shared for viewers to experience, learn from, and reflect upon. Additionally, sharing the AR stories created for this thesis publicly contributed towards responsibilities to share Indigenous research with communities in accessible formats (Schnarch, 2004; Smith, 2012; Gaudry, 2015).

Links to the AR stories and a Google Map of the Treaty 6 marker sculpture locations were added to the *We Are All Related AR* project website sweetgrassAR.ca. To raise awareness of the AR stories on UAlberta campuses, a description of the AR story trail was shared with UAlberta's Situated Knowledges: Indigenous Peoples and Place (SKIPP) initiative team and a request was made to add a link to the AR content to the Sweetgrass Bear section of the pîtos-mâmitoneyihtamowin (reimagine) UAlberta website (https://sites.google.com/ualberta.ca/reimagine-ualberta). The Reimagine UAlberta website identifies Indigenous places and artwork on UAlberta North Campus that are often "hidden in plain sight" (Reimagine UAlberta, n.d., para 3). Spreading the word about the availability of the AR stories will be an ongoing process of seeking and responding to opportunities to share about the availability of the AR stories

Though the AR stories were created to build Indigenous-settler relationships and understanding, I was reminded by an Indigenous young woman that the AR stories also provide opportunities for Indigenous listeners, particularly those who may not have many opportunities to leave the urban environment and would be interested in local stories (personal communication, 2018).

Chapter Six: Conclusion

Augmented reality (AR) is becoming increasingly commonplace. *Pokémon Go*, a game where users collect and battle animated creatures, was wildly popular upon its release in 2016 (Hollister, 2017) and a number of other popular franchises have since developed AR games (Webster, 2018; Needleman, 2019). AR is being employed in numerous contexts, including manufacturing (Bottani & Vignali, 2019), navigation (Statt, 2020), tourism (Yung & Khoo-Lattimore, 2019), journalism (TIME staff, 2019), entertainment (Holt, 2019), retail (Pardes, 2017), education (Akçayır & Akçayır, 2017), and children's play (Edmonton Public Library, n.d.). A Google search for "sea turtle" or "chauvet cave" on your phone may prompt you to place an AR 3D model of the item near you. Newer phones and tablets are being released with greater AR capabilities (Apple, 2020). As AR becomes increasingly available in a wide variety of contexts, AR may become a part of daily life for many people.

Creating user-generated AR content is not as common yet as creating videos or podcasts, but many people are already customizing their own AR experiences through social media, particularly through filters for selfies. Platforms such as Instagram allow users to create video stories with image-altering filters, an experience particularly popular during the COVID-19 pandemic (Tiffany, 2020). AR content creation will likely become more mainstream as AR content creation platforms become more accessible.

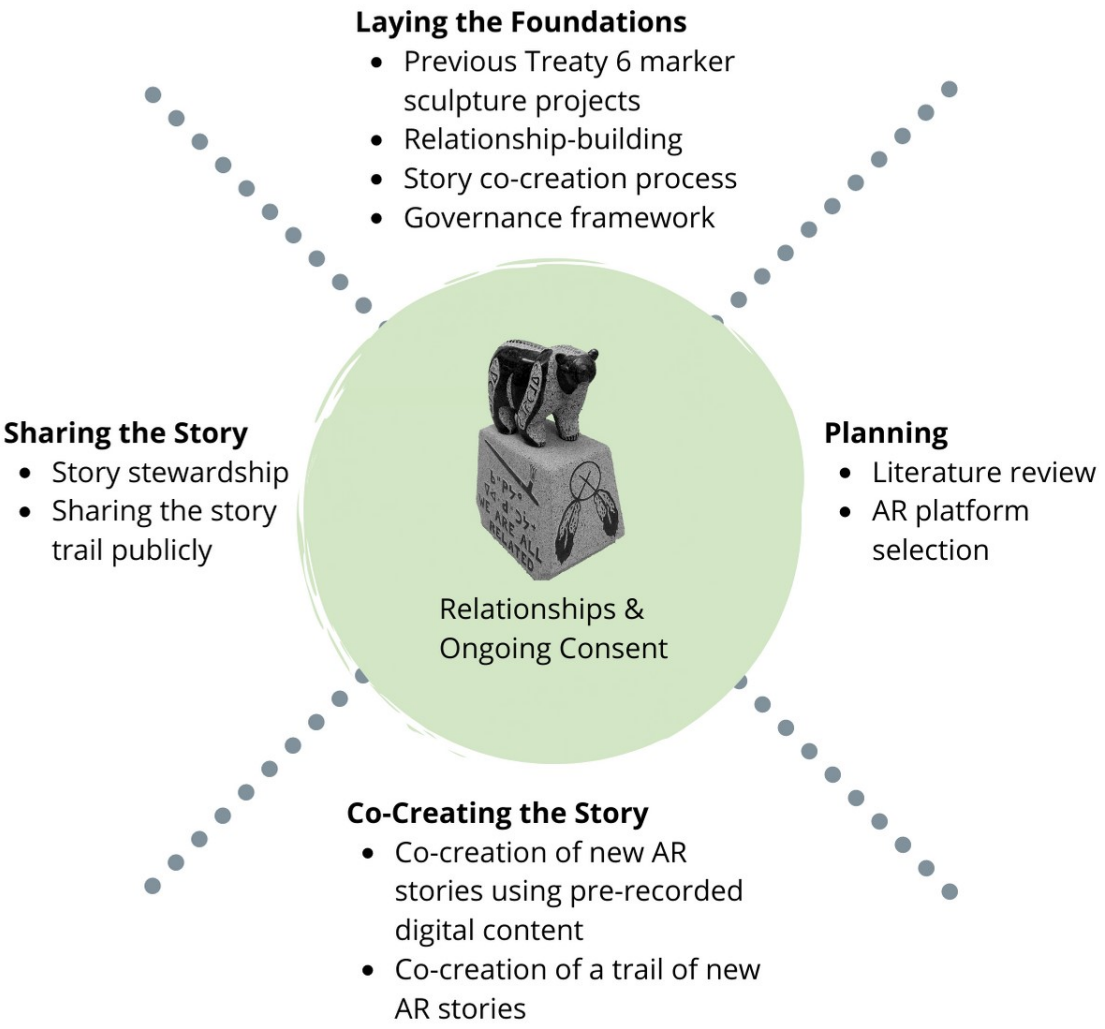
As AR uptake grows, so do the opportunities for AR (re)storying to share stories that counter colonial narratives. This thesis explored how (re)storying through AR could help build Indigenous-settler relations and understanding by sharing treaty stories at the sites of Treaty 6 marker sculptures. I applied and reflected upon a community-based participatory research (CBPR) approach to AR story co-creation informed by Indigenous research methodologies of the

4Rs of respect, relevance, reciprocity and responsibility (Kirkness & Barnhardt, 1991), relational accountability (Wilson, 2008), and the OCAP® principles (Schnarch, 2004). This project stemmed from earlier Treaty 6 marker sculpture projects: the *Sweetgrass Bears* video, the *We Are All Related AR* project, and a graduate course offered at the Faculty of Extension at the University of Alberta. Importantly, the relationships built throughout the earlier projects supported and guided this project that placed AR stories at four Treaty 6 marker sculptures to create a story trail.

CBPR supports the co-creation of knowledge through reciprocal, mutually beneficial and relational research (Castleden et al., 2015), sharing decision-making and ownership among all parties (Castleden et al., 2012). Figure 14 adapts Ochocka & Janzen's model of the four phases of community based research to illustrate the CBPR approach applied to this thesis project. In this adaptation, I have replaced Ochocka & Jannzen's Phase 3 "Information Gathering/Analysis" with "Story Co-Creation" and Phase 4 "Acting on the Findings" with "Sharing the Stories" to reflect the story co-creation process. In this model, the previous Treaty 6 marker sculpture projects lay the foundation for this thesis project, including developing relationships, the story co-creation process, and governance frameworks. The planning stage of this thesis included a literature review exploring Indigenous digital storytelling and Indigenous AR, and the selection of a platform to host the AR stories. In the story co-creation phase, new AR stories were co-created using existing digital content and the AR content was designed. The stories were then shared publicly as the final phase.

Figure 14

The CBPR Process Applied to this Thesis Project



Note. Adapted from Ochocka & Janzen, 2014.

The AR stories were co-created with Cree Knowledge Keeper Dr. Diana Steinhauer and Treaty 6 marker sculptor Stewart Steinhauer. The co-creation process, developed in the *We Are All Related AR* project and applied in this project, is grounded in relationships and ongoing consent. Through geolocative AR, the co-created stories and story trail are tethered to Treaty 6 territory at sites of Treaty 6 marker sculptures. Kelly (2020) argues:

> "Indigenous animacy of place, ontology and language can be reborn, renewed and revitalized by re-anchoring Indigenous people to their lands via augmented and virtual reality applications. The foundational assumption that the lands currently occupied by descendants of Western colonial settlers are and were a *terra nullius* to be freely taken, occupied, and used must be challenged in order to begin to heal centuries of colonization and oppression of the Indigenous peoples of the world" (p. 418).

These stories are likewise shared to challenge settlers to learn the true narratives, and to prompt reflection on past, current, and future relationships on Treaty 6 territory.

Contributions to the Field

This thesis project further tested the AR story co-creation process developed in the *We Are All Related AR* project (Almond et al., 2018; McMahon et al., 2019a) and piloted the use of geolocative AR within the co-creation process. Azuma (2015) notes, "AR storytelling is still in an early, exploratory phase" (p. 272), and this project placed AR stories at multiple Treaty 6 marker sculpture sites to create a publicly-available story trail where visitors can experience unique treaty stories at each site. With a focus on (re)storying that seeks to reveal new narratives based on the truths of these lands, this thesis project contributes to the literature on AR counter-storytelling as well as the emerging literature on Indigenous AR. As a project applying a CBPR approach to (re)story treaty stories, this thesis project also contributes to Hidalgo's (2015) concept of *augmented scholarship* "a collaborative process between researchers and oppressed communities to produce alternative narratives and reveal erased histories using AR to inform, educate, raise public consciousness, elicit community action, and social change" (p. 301). Hidalgo's work focused on the creation of AR fotonovelas to share stories of Latina/o

communities, and this project contributes an example of augmented scholarship in an Indigenous context.

Recommendations for Future Research

Recommendations for research stemming from this thesis project include further explorations of AR technology and the experiences of the AR story viewers. An in-depth technical review of AR platforms for Indigenous storytelling is recommended. As described earlier, the AR platform selection for this thesis project was limited to reviewing platforms which did not require coding or software development skills. A more in-depth technical review of AR for Indigenous storytelling could explore issues related to data storage, access, and data sovereignty.

Another recommendation is to explore the perspectives of the AR (re)story viewers—their motivations for seeking out and experiencing the AR content, reactions to the content, and their recommendations for further AR (re)storying. Do the AR (re)stories prompt unsettling, reflection on relationships, and serve as an entry point to further engagement, as hoped? AR viewer feedback could also evaluate the AR stories from a user experience perspective as to how well the AR stories functioned and recommendations for improvement.

A recommendation specifically for future iterations of the Treaty 6 marker sculpture AR stories would be to explore best practices on AR accessibility for story viewers and listeners who may have motor, visual, or hearing disabilities, including closed captioning and audio descriptions (Bureau of Internet Accessibility, 2020).

Conclusion

Dion (2004) writes “Canadians have told and retold themselves a particular story; hearing our stories disrupts their understanding of themselves and as such requires a process of «learning

from»" (p. 59). The AR stories in this thesis project were co-created for a similar purpose—to educate the general public about the truth of these shared lands and (re)story Treaty 6 territory in the hopes of building Indigenous-settler relationships and understanding. The AR stories were shared to engage interest and curiosity; they offer an invitation to learn more about where you are and the relationships that exist there. It took me a long time to hear these stories and recognize their absence. I hoped to share this same opportunity with others.

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Appendices

A. Thesis Proposal Poster

B. Map of Treaty 6 Marker Sculpture Locations

Appendix A: Thesis Proposal Poster

Poster created for the September 2019 event *Show & Tell: A Student Research Celebration*.

Scanning this poster with the app *Zappar* activates AR content for each image.

Appendix B: Map of Treaty 6 Marker Sculpture Locations

Figure 15 is a screenshot of a Google Map identifying the sites of the four Treaty 6 marker sculptures hosting AR stories and Saddle Lake Cree Nation. Selecting a bear icon loads a photo of the sculpture and a link to the AR content. A second layer to the map can be added that identifies additional sites of interest, including the Rossdale burial site, Ȧȡ° (ÎNÎW) River Lot 11∞ Indigenous Art Park, and other sculptures by Stewart Steinhauer. Figure 16 is a zoomed-in screenshot of the map focused on central amiskwacîwâskahikan (Edmonton, Alberta, Canada).

Figure 15

Google Map Screenshot of Four Treaty 6 Marker Sculpture Locations and Saddle Lake Cree Nation

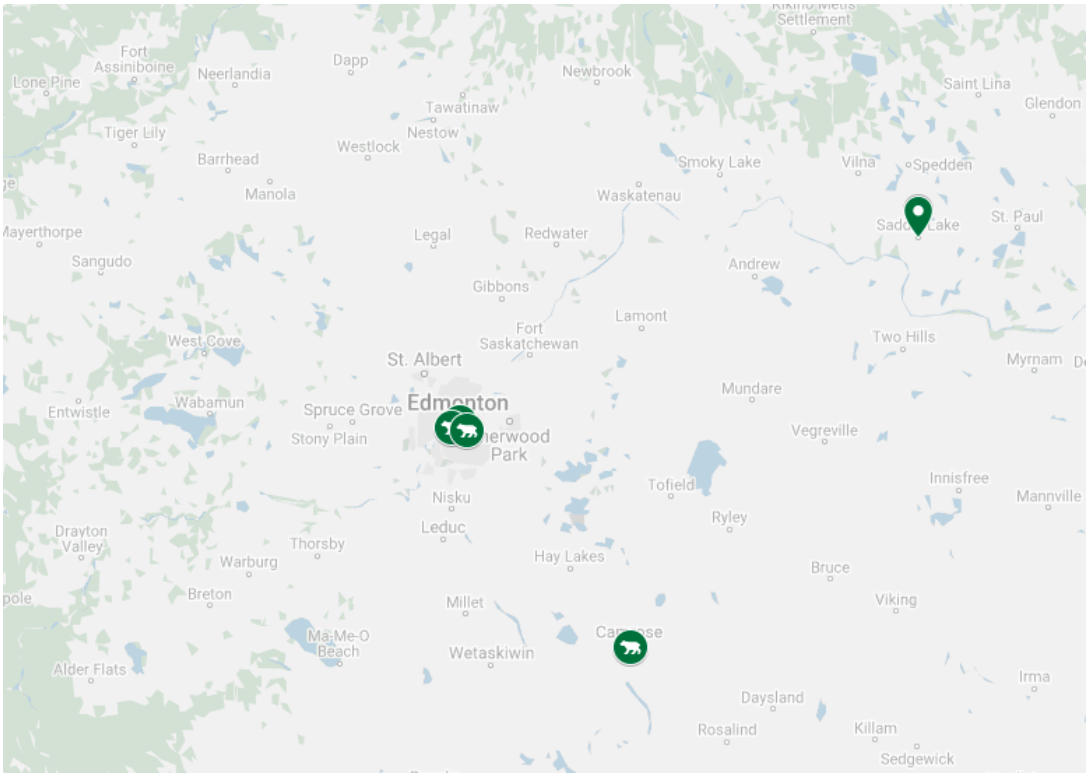

Figure 16

Google Map Screenshot of Three Treaty 6 Marker Sculpture Locations in Central amiskwaciy-wâskahikan (Edmonton, Alberta, Canada)