BRINGING DINOSAURS INTO THE 2020S: CONSIDERING CURRENT VISITATION AND FUTURE VIRTUAL TOURISM POSSIBILITIES FOR THE TUMBLER RIDGE MUSEUM AND THE TUMBLER RIDGE UNESCO GLOBAL GEOPARK (BC)

by

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Abstract

Designed in collaboration with the Tumbler Ridge Museum and the UNESCO Tumbler Ridge Geopark, I adopted a mixed-methods approach in designing this project. My research examines potential virtual tourism inclusions for the Geopark and the Museum, and considers how these technologies can be used to enhance visitor experiences and accessibility. Core project components are a literature review of virtual tourism technologies and possibilities represented in the academic literature, and empirical data that I gathered via a visitor survey and on-site observations in Tumbler Ridge, British Columbia, Canada (summer 2022). My literature review found inconsistencies in virtual tourism terminology. As a result, I am proposing a new umbrella term, "virtual tourism experiences (VTEs)," to encourage clarity and ease of access to this topic. VTEs include technologies such as Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), 360° photo view, live streaming, and webcam-travel. All of these can be used to invite people to connect with remote places and/or on-site experiences. VTEs can be employed engage people during different stages of a user/visitor journey: pre-trip, during-trip, and post-trip. To clarify potential types and uses with respect to trip stages, I am also forwarding a modified conceptual model. It illustrates how various types of VTEs can be employed throughout the user/visitor journey. The Tumbler Ridge visitor survey data that I collected and analyzed generally fits with prior visitor data, but also provides new insights into stays and activities. It also raises some key concerns and contrasting opinions about VTEs—some participants perceived VTEs as potential helpful supplements to physical trips. Others raised concerns about VTEs as threats to nature-based authenticity. My thesis closes with resulting tailored VTE recommendations for the Tumbler Ridge Museum and Tumbler Ridge UNESCO Global Geopark.

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Glossary

360° photo view: a panoramic-view image format that users can rotate and navigate interactively using mouse or touchable screen.

AR: Augmented Reality, "the enhancement of a real-world environment using layers of computer-generated images through a device" (Guttentag, 2010 and Jung et al., 2015, as cited in Yung & Khoo-Lattimore, 2019, p. 3).

Live streaming: a real-time video and audio transmission over the internet that allows users to watch events or experiences remotely.

MR: Mixed Reality, an integration of VR and AR designed to combine reality and the virtual world.

VR: Virtual Reality, "the use of a computer-generated 3D environment that the user can navigate and interact with, resulting in real-time simulation of one or more of the user's five senses" (Yung & Khoo-Lattimore, 2017).

VTE: virtual tourism experiences, an umbrella term that I propose to represent all the various types of technology-based tourism activities that use multimedia elements to create or enhance interactive or immersive experiences for visitors that can be included.

Webcam-travel: the activity of observing places or destinations via a place-based webcam (Jarratt, 2021).

Acknowledgements

Chapter 1 Introduction

This study is an academic review of the literature on virtual tourism offerings, combined with a case study of visitation and visitor perspectives on potential virtual tourism inclusions in Tumbler Ridge, British Columbia (BC), Canada. The research partners for this project, Tumbler Ridge Museum Foundation and Tumbler Ridge UNESCO Global Geopark, are both considering future virtual inclusions. Both organizations are interested in keeping the destination current and dynamic, and neither has the time to investigate the related academic literature. As such, I designed this research to inform their future decision-making about potential inclusions. I investigated virtual tourism experiences (VTEs) by consulting the literature and integrating empirical data. I focused on travel motivations, expectations, experiences, and perceptions of virtual tourism experiences. This project also specifically emphasized VTEs used in nature-based destinations and museums given the local context and partner specializations. In Tumbler Ridge, I used a visitor survey and observation to think about potential virtual tourism integrations for the area. While I hope that academic audiences will enjoy any resulting manuscripts from this thesis, the main purpose of this project was to assist my partners in better understanding virtual tourism offerings and how they might fit with future visitation to Tumbler Ridge.

1.1 About Tumbler Ridge

Tumbler Ridge is a small town in northern BC, Canada. Established in the 1980s as the last "instant town" in BC, its roots are in coal mining—a history that continues to shape it (Halseth & Sullivan, 2002). The town's reliance on the coal industry has made it sensitive to shifts in global markets and regulatory changes. It should be noted that the Quintette Mine in Tumbler Ridge returned to operation in 2024 after it closed in 2000 due to a decline in coal

prices (Petersen, 2024). The highs and lows of economic cycles have pushed leaders in Tumbler Ridge to aim for greater economic diversification (Jackson & Illsley, 2006). As with many other small rural towns in BC, recreation and tourism are part of this diversification planning (Jackson & Illsley, 2006).

Attractions in the case study area for this project include the Tumbler Ridge UNESCO Global Geopark and natural attractions within it such as dinosaur footprint trails and waterfalls (Tumbler Ridge UNESCO Global Geopark, n.d.). Despite its natural beauty, the community faces logistical and accessibility-related challenges in drawing people to the area and in facilitating visits. It is located at a great distance from large urban areas and main highways. For example, it is approximately 4 hours from Prince George—the closest big city. It lacks connections to regular air travel, trains, and other public transportation services. Also, it currently offers limited accommodation and restaurant options. Accessibility challenges impact both visitors and local residents, particularly seniors, whose love of trails remains despite physical limitations. For these reasons, the Tumbler Ridge Museum and the Tumbler Ridge UNESCO Global Geopark are looking into VTEs as part of a possible suite of future innovations. The goal is to connect/re-connect visitors and local users with their favourite outdoor settings, while adding ways for prospective visitors (including return visitors) to experience its beauty from a distance.

1.2 About Virtual Tourism Experiences

To date, there appears to be no widely accepted definition or classification of virtual tourism inclusions. I am proposing the umbrella term virtual tourism experiences or VTEs to include all the various types of interactions and formats in virtual sightseeing. I am doing this to address inconsistent terminology use in the literature as it can create barriers to

understanding VTEs and their applications (see further discussion in Chapter 2). VTEs include a host of different technological options that can be included as features associated with an existing site or attraction, such as the 360-degree view tour provided by the *Louvre Museum* (Louvre Museum, n.d.). Alternatively, a VTE can be an independent offering, acting as a form of virtual travel (off-site). For instance, during COVID-19, both Airbnb (https://www. airbnb.com) and Amazon Explore (https://www. amazon.com) developed innovative online products that enable users to book live, interactive, virtual experiences led by local experts/hosts around the world, and these can be experienced by people who will never be on site.

In terms of actual trips that will take place, VTEs can be used at various stages. During the pre-trip stage, VTEs can provide information for potential visitors and impact their decision-making process (Beck et al., 2019; Lin et al., 2022; Yung & Khoo-Lattimore, 2017). For example, someone might first take an online tour and then decide to follow up with an in-person visit. In the during-trip stage, visitors can experience VTE options such as Virtual Reality (VR). This can be complemented with on-site offerings that can make the trips more fascinating or informative (Carrozzino & Bergamasco, 2010; Lee et al., 2020). VTEs can also serve as additional offerings during other parts of travel. Post-trip, they can be used to relive favourite sites and experiences, and/or to add experiences not had in person (Jarratt, 2021; Resta et al., 2021).

1.3 Research Questions

This project included a dual focus on the distinct aspects of tourism to Tumbler Ridge and the concept of virtual experiences in tourism. I aimed to investigate how technological

resources can improve accessibility and visitor experiences in remote, nature-based destinations like Tumbler Ridge. My study asked three questions:

1) What are virtual tourism experiences (VTEs), and what are common contemporary types of virtual tourism experiences during the user journey (pre-, during-, and post-trip)?

2) What are Tumbler Ridge visitors' experiences, and what are their perceptions of potential VTE use in Tumbler Ridge?

3) What types of virtual tourism experiences are appropriate for the Tumbler Ridge Museum, the Tumbler Ridge UNESCO Global Geopark, and other destinations like these?

1.4 Methodology And Methods

I adopted a case study methodology to explore visitor perceptions of VTEs. In tourism research, case studies are most often used with respect to tourism development, tourism planning, and community perceptions of the impacts of tourism (Xiao & Smith, 2006). Case studies are also employed to investigate tourist experiences, destination marketing and images, the segmentation of tourist markets, management issues (Xiao & Smith, 2006), and tourism industry operations. I aimed to explore potential VTE adoption associated with the Tumbler Ridge UNESCO Global Geopark and the Tumbler Ridge Museum, drawing upon a visitor survey on-site and literature review. A case study made sense because I was seeking to explore the topic of VTEs as it applies to a particular place, and grounded in data about larger phenomena (tourism; VTEs) playing out a particular context.

The strengths of case study methodology include its ability to provide a holistic understanding of the subject matter. It allows for exploring "why" or "how" research questions rather than "how many" or "how often" questions and may contribute to research topics with little or limited empirical evidence (Yin, 2014, as cited in Çakar & Aykol, 2021). Building this case study was challenging as there is limited academic research and practical information on tourism in Tumbler Ridge (exceptions include Halseth & Sullivan, 2002; Hardy, 2023). Visitation data exists from annual surveys carried out by the Tumbler Ridge UNESCO Global Geopark and the Tumbler Ridge Museum. However, most of the data collected until now is quantitative and limited in scope. There is no detailed information on tourist motivations, experiences, and preferences. I sought to collect data on such aspects to inform recommendations about potential future VTEs for the area.

This project is meant to inform Tumbler Ridge Museum and Geopark planning and marketing decisions about VTEs, over the next few years. I used mix-methods to collect data in Tumbler Ridge, including a literature review on VTEs to answer my first research question (Chapter 2) and a visitor survey to answer my second research question (Chapter 3). The combination of qualitative and quantitative data collected offers a more comprehensive understanding of my topic (Creswell and Creswell, 2023; Truong et al., 2020). It also offers useful information for planning by destination decision makers (Hewlett & Brown, 2018). The thesis closes with Chapter 4 which integrates findings and analyses from Chapters 2 and 3, and answers my third research question. Details on project methodology and methods can be found in the two main chapters of this thesis but I offer some in the sections that follow.

1.4.1 A Literature Review

To answer my first research question, I conducted a literature review to gather existing knowledge on VTEs, their types, applications, and impacts across different tourism settings. This included a special focus on nature-based tourism destinations and museums, and in the end-- an emphasis on review papers that surveyed across the literature, simplifying trends and patterns. A literature review is a fundamental research method used to summarise and integrate findings from previous studies to find trending topics, gaps, and developments related to an area of study (Creswell and Creswell, 2023; Snyder, 2019). In tourism research, literature reviews can be useful when investigating new topics such as VTEs, as prior research is often spread across multiple disciplines such as technology, economy, psychology, geography, marketing and management (Pahlevan-Sharif et al., 2019; Snyder, 2019). I expected existing literature, especially review papers, to help me find clear definitions of VTEs and to reveal common types of VTEs used in tourism (Snyder, 2019). Within the review, I also paid attention to current VTEs in nature-based destinations and museums.

The strength of a literature review is its capacity to combine various sources of information and provide a comprehensive examination of the topic at hand (Paulus et al., 2014). Literature reviews can identify gaps where data is missing, leading researchers to areas in need of further research (Creswell and Creswell, 2023). However, the shortcoming of my review is that it is possible I missed some relevant papers. This could have been exacerbated by the variety of terms and labels used (see details of search terms in Chapter 2). For example, some research might have been missed due to the lack of consistent terminology, such as those that use alternative phrases such as "smart tourism," "digital tour," or "e-tourism". This challenge is heightened by the fact that VTEs are an interdisciplinary

topic explored in various ways. This means, for example, that some essential research might be in publications outside of the typical tourism journals that I was encountering. My focus on review papers rather than on all possible papers on VTEs also limited the scope of my review. Further, I only used the Web of Science academic database, potentially leaving out research indexed in other academic databases (Pahlevan-Sharif et al., 2019). Constant technological innovation also implies that the VTE environment is always changing. This means that the latest VTE developments are not included in my literature review, as much of it was done in 2022.

1.4.2 A Visitor Survey

I used a visitor survey to collect primary data from visitors, as existing and potential VTEs users. Questionnaire-based surveys are increasingly used in tourism research to collect data (McGuirk & O'Neill, 2021). I chose surveys as they are a valuable tool for investigating people's behaviours, experiences, social interactions, attitudes, perspectives, and comprehension of events (McGuirk & O'Neill, 2021). Surveys are useful because they can reach a large number of people and provide valuable data on individual and group perspectives (McGuirk & O'Neill, 2021). This is particularly crucial in tourism research, where considering visitor attributes, patterns, and preferences can help determine destination management strategies and marketing approaches (Veal, 2006). Closed questions in surveys are typically used to collect data about attributes (such as demographic information) and behaviours (visiting habits, activity preferences, etc.) (Sarankatos, 2013), and results from these tend to be aggregated into percentages or other representative numbers. Open-ended questions allow participants to share details about their experiences and perceptions, as well as explain their perspectives in their own words (McGuirk & O'Neill, 2021; Sarankatos,

2013). The use of both closed and open-ended questions enables a more complete examination, combining quantitative data such as counts of answers like "yes" or "no" with the depth of qualitative insights provided in answers to questions addressing "why" or "why not" type inquiries.

My survey design was informed by discussions with project partners, data from prior related surveys, and Tumbler Ridge tourism marketing materials. Survey questions explored tourism experiences, tourism motivations, visitor perceptions of Tumbler Ridge, tourist satisfaction, tourism offerings and related challenges and possibilities, as well as visitor demographic information. I chose a face-to-face survey method instead of an online survey as face-to-face surveys tend to have higher participation rates (Babbie, 2016). I used purposive sampling, a sampling strategy often used in qualitative studies (Guest et al., 2013; Sarankatos, 2013). Purposive sampling helps when the objective is to collect insights from a selected group people who can provide relevant information about a certain topic (Sarankatos, 2013). This can ensure data collected is more targeted and more relevant. My sampling goal was to focus on visitors to Tumbler Ridge since they will be the main users of VTEs. I also purposively sampled them at a few different known tourism sites in the area, to include some diversity. My questionnaires included closed questions and open-ended questions, and I was able to collect both quantitative and qualitative data. The responses to closed questions resulted in basic statistics drawn from the answers, such as percentages or frequency distributions, showing general trends of visits or visitors. Including open-ended questions allowed me to invite more in-depth responses about perceptions, preferences, and attitudes (e.g. regarding the quality of visitation experiences, and about visitor willingness to use virtual tourism experiences, etc.).

Surveys also have drawbacks, such as the possibility of response bias affecting answers and the limitations of self-reported data, which may not always accurately reflect real behaviours or beliefs (Grigsby, R., 2001; Hoggart et al., 2002, as cited in McGuirk & O'Neill, 2021). For example, participants may change their replies to make themselves sound more socially acceptable or provide what they assume to be the "right" or "needed" answer rather than their real opinion (Grigsby, R., 2001). Also, while purposive sampling allowed me to focus on the visitor group and to ensure data collection at different sites, using a non-random sample means that my data is not generalizable to larger populations like simple random sampling would be (McLafferty, 2016). This means that the findings from my purposive sample should not be assumed to constitute representative data on visitation for Tumbler Ridge.

1.4.3 On-Site Observation

During my 55-day stay in Tumbler Ridge in the summer of 2022, I also carried out on-site observation that provided further qualitative insights into the local tourism environment. My supervisor Dr. Zoe Meletis joined me for two weeks. On-site observation is a useful method in qualitative research since it allows researchers to directly interact with the place in person (Bailey, 2018; Creswell and Creswell, 2023; Sarankatos, 2013). This method allowed me to participate in the daily life in Tumbler Ridge, to observe the local social environment, to make connections with the local community, and to record my own experiences (Watson, 2021). The power of observation is being able to record behaviours and reactions in the moment, offering valuable details about the local community (Creswell and Creswell, 2023; Watson, 2021). For example, walking the trails, seeking out signs, and attempting to access services gave me greater insights into what visitors were writing and

telling me. On-site observation allowed me to observe local tourism infrastructure, services, and accessibility concerns firsthand, which added valuable qualitative information into the larger picture of tourism in Tumbler Ridge. It also allowed me to have informal discussions with business owners, decision-makers, and residents, which helped me understand the community's perspectives on tourism. Conducting the face-to-face survey also provided an excellent opportunity to observe participant behaviours and reactions beyond survey answers (May & Perry, 2022). The face-to-face approaches allowed me to invite comments during the exact moments when people were noticing and thinking about aspects of their visits, which extended greater discussion of emergent results. I also found that using and collecting paper surveys allowed participants to add additional comments to the pages as well as to share them orally. For instance, several participants annotated the edges of their surveys, and others commented when returning the surveys, which would not have happened if the survey had been conducted on-line.

On-site observation also has limitations. Observations can be subjective since they are interpreted through the researcher's view and may be impacted by personal biases or stereotypes (Grigsby, R., 2001; Iacono et al. 2009; Sarankatos, 2013). Also, given that my fieldwork occurred within one summer during the COVID-19 period, my observations and findings may not entirely reflect situations during other seasons or years (Sarankatos, 2013).

Chapter 2 Virtual Tourism Experiences And Their Use In Museums

And Nature-Based Destinations

2.1 Introduction

This chapter provides a review of VTEs in parks and museums— contexts most relevant to the Tumbler Ridge UNESCO Global Geopark and the Tumbler Ridge Museum. It is meant to serve both academic and applied audiences. The main audiences include my research partners and academics who are looking for a comprehensive review of VTE types, uses, and related research. It is also meant to inform future planning in Tumbler Ridge in terms of potential VTE integration. I combined an academic literature review with an online review or environmental scan of VTE offerings at relevant park sites, museum sites, and geological tourism sites. This literature-based chapter aims to answer my first research question: **What are virtual tourism experiences (VTEs), and what are common contemporary types of virtual tourism experiences during the user journey (pre, during, and post-trip)?** It also provides background information on VTE types, features, functions, and applications, with special emphasis on parks and museums.

2.2 Research Design

To find research articles on VTE use in tourism, I used the Web of Science academic database and employed search terms such as "virtual" AND "tourism", "virtual" AND "travel", and "virtual" AND "tour". This first general search yielded 6,164 articles. I then refined the search to emphasize the tourism industry and to exclude overly technology-focused articles on VTE product design, development, and optimization. I further refined the results by selecting the following categories for inclusion: Hospitality Leisure Sport Tourism, Geography, Archaeology, Geology, Humanities Multidisciplinary, and Social Sciences Interdisciplinary. The search was limited to English-language articles, and early access

articles (articles available online with publication pending). This process narrowed the results to 588 eligible articles (Table 1).

Next, I read the titles and abstracts and further screened selections. I only retained review papers and studies discussing VTE products, product definitions, forms, types, features, functions, application scenarios, impacts, advantages and disadvantages, and comparisons of two or more VTEs. Over and above general articles about VTEs in a tourism context, I selected articles about VTEs used to enhance destination image, tourist experiences, and accessibility as those represent partner interests. Through this further refinement, I narrowed the sample to 105 relevant articles. I then began reading papers more deeply in order to respond to the research questions. The first goal I had was to define and explain the various forms of VTEs. To do this, I drew heavily on review papers. Of the 105 relevant papers from Web of Science, I focused on 8 review papers to provide this foundational piece (Table 2).

Then, to meet partner needs about specific existing and potential virtual relevance for the Museum and Geopark, I used another two rounds of Web of Science searching. I used combinations of search terms such as: 1. "virtual" AND "museum"; 2. "virtual" AND "park", "virtual" AND "nature", "virtual" AND "outdoor", "virtual" AND "mountain", and "virtual" AND "geopark". I refined results using the same categories and criteria from the first round of searching (See Table 1). This produced 345 results about VTEs and museums, while the VTEs and park/nature combination yielded 579 results. Since my research partners are a museum and a Geopark, I chose to exclude articles emphasizing VTE in hotels, restaurants, and other hospitality settings. For the same reason, articles about games, online communities, booking agencies, and themed tourism (e.g., wine tastings, theme parks, slum tourism, dark

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tourism, etc.) unrelated to nature or museums were excluded. After checking abstracts for relevance and removing duplicates, I identified 10 articles about VTEs and museums (Table 3) and 6 about VTEs and parks and nature-based tourism (Table 4) for further analysis.

Search terms	For definition and types of VTEs during the user journey	"virtual" AND "tourism", "virtual" AND "travel", and "virtual" AND "tour"
	For VTEs for the Museum	"virtual" AND "museum"
	For VTEs for the Geopark	"virtual" AND "park", "virtual" AND "nature", "virtual" AND "outdoor", "virtual" AND "mountain", and "virtual" AND "geopark"
Web of Science categories	Hospitality Leisure Sport Tourism, Geography, Archaeology, Geology, Humanities Multidisciplinary, and Social Sciences Interdisciplinary	
Document Types	Articles, Early Access	
Languages	English	

Table 1 *Criteria used for Web of Science search*

No.	Authors	Title of article	VTE types covered
1	Beck et al., 2019	Virtual Reality In Tourism: A State-Of-The-Art Review	VR
2	Liang & Elliot, 2021	A Systematic Review Of Augmented Reality Tourism Research: What Is Now And What Is Next?	AR
3	Lin et al., 2022	Live Streaming In Tourism And Hospitality: A Literature Review	Live streaming
4	Moro et al., 2019	Analysing Recent Augmented And Virtual Reality Developments In Tourism	VR, AR
5	Pratisto et al., 2022	Immersive Technologies For Tourism: A Systematic Review	VR, AR
6	Wei, 2019	Research Progress On Virtual Reality (VR) And Augmented Reality (AR) In Tourism And Hospitality A Critical Review Of Publications From 2000 To 2018	VR, AR
7	Yung et al., 2021	Virtual Reality And Tourism Marketing: Conceptualizing A Framework On Presence, Emotion, And Intention	VR
8	Yung & Khoo-Lattimore, 2019	New Realities: A Systematic Literature Review On Virtual Reality And Augmented Reality In Tourism Research	VR, AR

Table 2 *Included review papers*

No.	Authors	Title of article	VTE types covered
1	Angeloni, 2023	Digitization And Virtual Experience Of Museum Collections. The Virtual Tour Of The Civic Art Gallery Of Ancona	360° photo view
2	Carrozzino & Bergamasco, 2010	Beyond Virtual Museums: Experiencing Immersive Virtual Reality In Real Museums	VR
3	Errichiello et al., 2019	Exploring The Implications Of Wearable Virtual Reality Technology For Museum Visitors' Experience: A Cluster Analysis	VR
4	He et al., 2018	When Art Meets Tech: The Role Of Augmented Reality In Enhancing Museum Experiences And Purchase Intentions	AR
5	Lee et al., 2020	Experiencing Immersive Virtual Reality In Museums	VR
6	Resta et al., 2021	The Impact Of Virtual Tours On Museum Exhibitions After The Onset Of COVID-19 Restrictions: Visitor Engagement And Long Term Perspectives	360° photo view
7	Serravalle et al., 2019	Augmented Reality In The Tourism Industry: A Multi-Stakeholder Analysis Of Museums	AR
8	Trunfio & Campana, 2020	A Visitors' Experience Model For Mixed Reality In The Museum	MR
9	Trunfio et al., 2022	Mixed Reality Experiences In Museums: Exploring The Impact Of Functional Elements Of The Devices On Visitors' Immersive Experiences And Post-Experience Behaviours	MR
10	Zollo et al., 2022	How Do Museums Foster Loyalty In Tech-Savvy Visitors? The Role Of Social Media And Digital Experience	VTEs including VR, AR, videos, touchscreens, and 'smart' devices

Table 3 *Included research papers on VTEs and museums*

No.	Authors	Title of article	VTE types covered
1	Clark & Nyaupane, 2022	Understanding Millennials' Nature-Based Tourism Experience Through Their Perceptions Of Technology Use And Travel Constraints	VR/AR (and non-VTE types of technology, including GPS, digital cameras, video cameras, music devices, cell phones, drones, wi-fi at site, and laptops with wireless access)
2	Jarratt, 2021	An Exploration Of Webcam-Travel: Connecting To Place And Nature Through Webcams During The COVID-19 Lockdown Of 2020	Webcam-travel
3	Orru et al., 2019	Satisfaction With Virtual Nature Tour: The Roles Of The Need For Emotional Arousal And Pro-Ecological Motivations	The type of the virtual tour was not clarified in the research methods, but it might be VR or semi-immersive VR video, since VR was discussed in the literature.
4	Skard et al., 2021	How Virtual Reality Influences Travel Intentions: The Role Of Mental Imagery And Happiness Forecasting	360° photo view using VR headsets VS 2D pictures of the same images on smart phones
5	tom Dieck et al., 2018	Tourists' Virtual Reality Adoption: An Exploratory Study From Lake District National Park	VR
6	Wu & Lai, 2022	The Use Of 360-Degree Virtual Tours To Promote Mountain Walking Tourism: Stimulus-Organism-Response Model	VR

Table 4 *Included research papers on VTEs and parks and nature-based tourism*

2.3 Findings and Discussion

2.3.1 VTE Use Throughout The User Journey (Before, During, And After Trip)

Aspects of the tourism and travel process begin before a visitor arrives on site, and they continue after a visitor has returned home. It is, therefore, not surprising that VTEs can be included in various ways at different points in the tourism experience (Figure 1). They can be incorporated pre-trip to prepare and plan, such as, using a 360-degree view map to explore

a destination and determine what to visit. They can also be employed during a trip to enhance

experiences. This might include using VR headsets in a museum to gain additional

information and perspectives. VTEs can also be used post-trip to recall memories or to share

experiences with others. For example, this might include revisiting a destination via an online

video tour or sharing such a tour with friends and family unfamiliar with the destination.
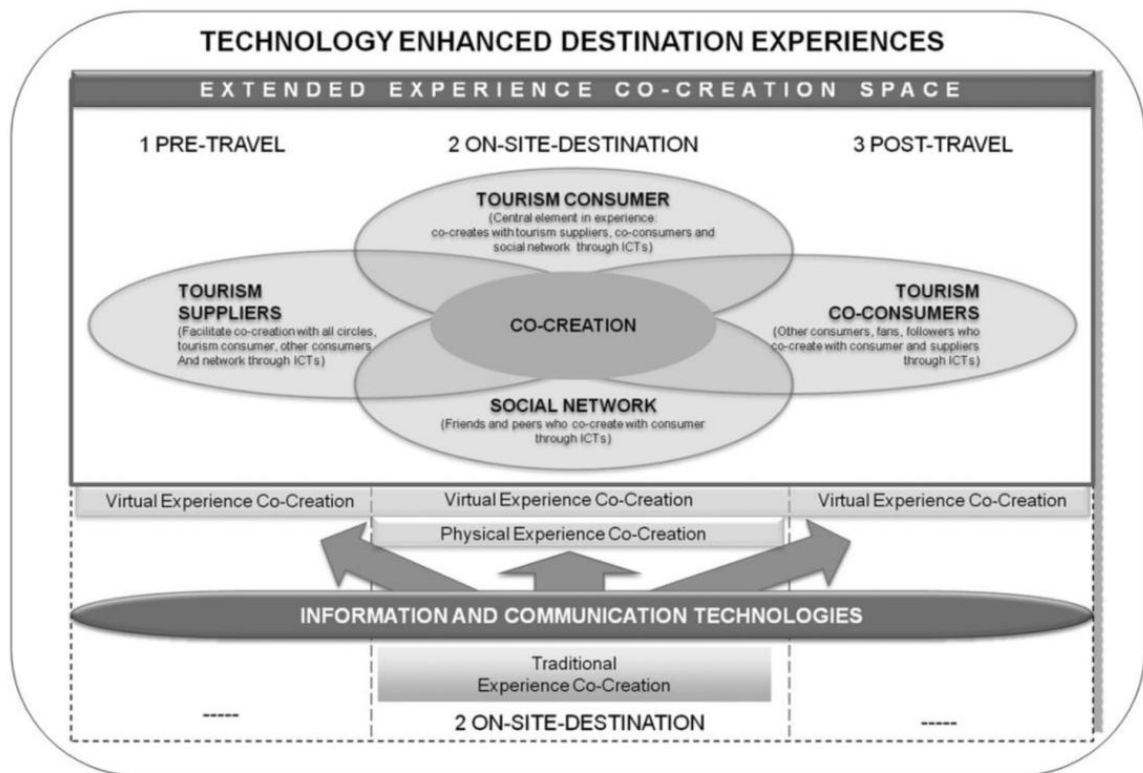
Figure 1 *Virtual and physical travel experiences as they relate to travel stages*

(Conceptual Model: Technology Enhanced Destination Experiences, Neuhofer et al., 2012, p.

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In addition to being used across multiple trip phases, VTEs can be used to supplement

trips or as standalone experiences that act as tourism replacements. For example, people can

pre-explore a destination using a 360-degree view map to help them decide if they want to

add a destination or activity to an upcoming trip. People can also choose to watch a TikToker

travel around the world for pure entertainment value rather than for trip preparation purposes.

VTEs can be used on-site and remotely. For instance, a VR tour can be taken from one's

home with personal VR headsets, or on-site, as part of the overall suite of activities in a

museum or other venue. This study explored documented VTE uses across travel stages.

In addition to proposing the unifying term VTE, I suggest a modified

conceptualization of VTEs, how they fit with each other, how they can be used at various

stages of travel (and non-travel), and experienced on and off-site. Building on Neuhofer et

al.'s (2012) conceptual model, I am proposing this conceptualization of VTE use in travel:
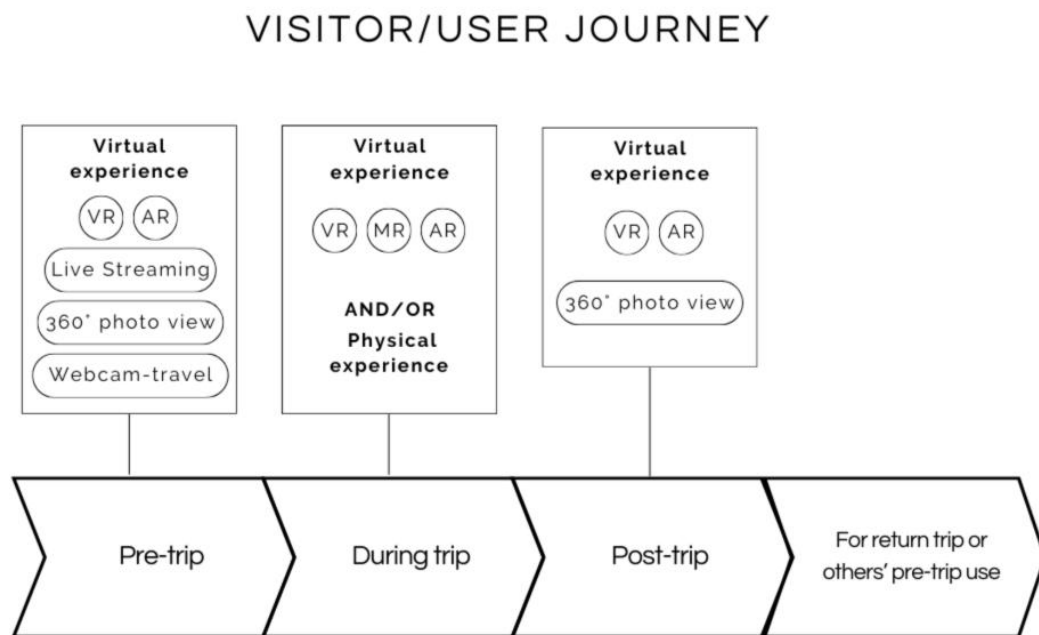
Figure 2 *Potential VTE adoption during main travel stages*

Pre-trip, VR, AR, 360° photo view, live streaming, and webcam-travel offer ways for travellers in the planning stages to explore places, do research, and to make choices about their forthcoming visits. During a trip, VR, AR, and MR can enhance traveller experiences by offering additional immersive engagements and/or adding virtual environments on top of physical environments. In the post-trip stage, travellers can recapture memorable moments using VR, AR, 360° photo view, or Webcam-travel, share them with others, and create long-lasting recollections.

I did not find evidence of 360° photo view, live streaming, and webcam-travel use during trip in the articles I reviewed. One of the reasons could be that these three types of VTEs offer actual real-world scenes. While visitors are on-site, real-world scenarios are nearby. Therefore, they might not need assistance with or simulation of the very same scenes via VTEs. Furthermore, live streaming and webcam-travel can be time-consuming. Users typically have to spend a certain amount of time on devices watching live streaming or webcams (Jarratt, 2021, p. 121). While on site, visitors might prefer to focus on physical movement and experiences rather than to spend time on screen. Post-trip, live streaming might be less appealing because visitors might prefer to share photos and videos collected during their own trip since those represent unique travel moments rather than generic footage.

2.3.2 VTE Types And Technologies Used In Tourism

In conducting this review, I could not find a clear, unified, agreed upon or oft-cited definition for VTE. Further, there were no clearly defined or agreed upon categories or types of VTEs. The common types of VTE applications in the literature reviewed include Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), 360° photo view, live

streaming, and webcam-travel. I will now offer details on these types of VTEs and how they might be used.

2.3.2.1 Virtual Reality. Of the 8 review articles I examined, 6 specifically address VR. Within the 24 articles I reviewed in all, VR is discussed in 15. In contrast, the combined number of articles covering 360° photo view, live streaming, and webcam use only amounted to 5. These imbalances indicate the uneven coverage and treatment that exist within this literature.

Inconsistent terminology also emerged in terms of how VR is discussed in the articles I reviewed. For one, the terms virtual environment, VR, and virtual worlds are used inconsistently and without clear definitions provided (Yung & Khoo-Lattimore, 2017). Despite this, VR can generally be understood as "the use of a computer-generated 3D environment that the user can navigate and interact with, resulting in real-time simulation of one or more of the user's five senses" (Yung & Khoo-Lattimore, 2017, p. 2, citing Burdea & Coiffet, 2003; Gutierrez, Vexo, & Thalmann, 2008; Guttentag, 2010).

Focusing on tourism, Beck et al. (2019) state that VR:

creates a virtual environment by the provision of synthetic or 360-degree real life captured content with a capable non-, semi-, or fully-immersive VR system, enabling virtual touristic experiences that stimulate the visual sense and potentially additional other senses of the user for the purpose of planning, management, marketing, information exchange, entertainment, education, accessibility, or heritage preservation, either prior to, during, or after travel. (Beck et al., 2019, p. 591)

In addition to understanding VR, its different possible formats, and how it is typically experienced, it is important to consider the range of immersion levels. There are three levels of immersion: non-immersive, semi-immersive, and fully immersive (Beck et al., 2019). The main types of VR used in tourism include:

1) Fully immersive virtual use a headset and 360-degree video views for artificial experiences;

2) Semi-immersive VR tours display 360-degree movies on a projector's screen or wall; and

3) Non-immersive VR tours involve 360-degree synthetic or realistic images displayed on regular-size computer screens (Beck et al., 2019)

The application of VR in tourism contexts can span all stages of the travel experience. It can be used in pre-trip preparation, as part of during-trip exploration, and also as part of post-trip information sharing. Firstly, VR can be used pre-trip, to provide information (Beck et al., 2019, citing Rainoldi et al., 2018; Tussyadiah et al., 2018), as well as to pre-test or compare destinations during trip planning (Yung & Khoo-Lattimore, 2017, citing Cheong, 1995; Berger et al., 2007; Guttentag, 2010). Secondly, VR can be utilized during-trip, in the form of on-site VR experiences at sites such as museums (Beck et al., 2019, citing Cheong, 1995; Hobson and Williams, 1995; Guttentag, 2010; Loizides et al., 2014; Jung et al., 2016). Last, post-trip VR allows users to share user-generated content from their trip (Marasco et al., 2018, as cited in Beck et al., 2019).

In addition to facilitating trip planning, trip activities, and trip memory sharing, VR also has destination marketing applications. VR can be used to increase engagement, evoke

favourable feelings, produce suggestions, support sustainability objectives, enable virtual access to varied destinations, and to reduce barriers to access (e.g., physical, financial, cultural, and temporal). VR is an effective tool for destination marketing because enhanced engagement can heighten emotional connections to a place (Yung & Khoo-Lattimore, 2017, citing Huang et al., 2012; Huang et al., 2016; Kim & Hardin, 2010). According to research by Skard et al. (2021), participants using VR had greater "predicted happiness" than those limited to 2D experiences (p. 4). Building on prior research, they also suggest links between VR use, predictive happiness, mental imagery, and increased purchase intentions (ibid). Furthermore, the use of VR can increase positive word-of-mouth (Griffin et al., 2017, as cited in Beck et al., 2019 and Yung et al., 2021) as well as users' curiosity to compare the real place to the VR version (Pantano and Servidio, 2011, as cited in Yung & Khoo-Lattimore, 2017). Therefore, allowing potential visitors to explore remote destinations such as Tumbler Ridge via VR may stimulate their desire to visit. VR can also increase accessibility to sites and attractions for individuals who would normally face obstacles in trying to reach them (Beck et al., 2019, citing Hobson and Williams, 1995; Salter and Sanchez-Vives, 2016), by bringing destinations or elements of sites to them.

VR can be used in lieu of travel as well. VR can be interpreted as a form of sustainable travel since it does not include the same degree of negative impacts associated with actual travel (Wiltshier and Clarke, 2016, as cited in Beck et al., 2019). VR can also be used to offer virtual access to protected areas, including those with limits to visitation (e.g., science-only areas of parks with limited entry). It can also be used to travel to imaginary places and places that no longer exist (Beck et al., 2019, citing Hobson and Williams, 1995; Sussmann and Vanhegan, 2000; Egger, 2016) as well as places that are now closed to visitors.

In addition to possible uses and benefits, VR also has shortcomings. VR raises challenges to do with authenticity for some visitors and some destinations (Beck et al., 2019, citing Hobson & Williams, 1995; Dewailly, 1999). VR travel can be characterised as less authentic than actual travel experiences because it cannot fully replicate travel and visitation experiences in terms of physicality, sensory richness (e.g., smelling and tasting food), and chance encounters with people. A prospective tourist's willingness to embrace VR as a replacement for traditional tourism is a key factor and varies widely (Guttentag, 2010, as cited in Beck et al., 2019). Therefore, although VR can bring benefits such as increasing accessibility and reducing undesirable environmental impacts, many are not yet ready to embrace it as a replacement for travel. With this in mind, viewing VR as a possible complement to travel and visitation rather than a substitute makes more sense for some scholars (Beck et al., 2019, citing Musil and Pigel, 1994; Hobson and Williams, 1995; Sussmann & Vanhegan, 2000; Guttentag, 2010; Mura et al., 2017; Slater and Sanchez-Vives, 2016).

In addition to psychological and sensory limitations, not all bodies react equally well to VR technology and equipment. Motion sickness and related symptoms such as discomfort, dizziness, nausea, and vomiting feelings can detract from VR use and satisfaction with VR experiences (Williams and Hobson, 1995, as cited in Beck et al., 2019). Since motion sickness remains a barrier to uptake, use, and satisfaction, more research should be conducted on its presence in VR use. The resulting information could be used to refine user experiences. It could also be used to improve its accessibility of individuals with physical or mobility restrictions—a group that could particularly benefit from travel and visitation via VR.

2.3.2.2 Augmented Reality. I analyzed AR applications in 9 of the reviewed articles. AR is generally defined as "the enhancement of a real-world environment using layers of computer-generated images through a device" (Guttentag, 2010 and Jung et al., 2015, as cited in Yung & Khoo-Lattimore, 2019, p. 3). AR typically adds additional virtual elements to real life user experiences (Azuma et al., 2001, as cited by Liang & Elliot, 2020). This is in contrast with VR, which completely immerses the user in a virtual environment. AR usually requires the use of equipment such as smartphones, smart glasses, laptops, or tablets (Liang & Elliot, 2020). For example, people might use a smartphone camera viewfinder to scan a poster or sign to gain additional information about the attraction or something within it (Yung & Khoo-Lattimore, 2017). Museums can use AR to bring exhibits to life. Via AR applications on mobile devices (a phone or a tablet, for example), visitors can be invited to access extra information, experience interactive displays, or view 3D reconstructions associated with real-life items or exhibits. Wearable smart glasses with a built-in AR system can be employed in museums as well, but these entail additional costs (Pratisto et al., 2022). Smart glasses-associated AR provides a more immersive experience for users than AR applications linked only to mobile devices. The glasses can also offer a more appealing balance between the physical item and the AR add-ons (Mason 2016, as cited in Pratisto et al., 2022). Another form of AR adoption in tourism is the use of an AR destination guide that allows tourists to scan their surroundings with AR applications on phones or AR-enabled devices. In doing this, the user typically receives information about nearby attractions, restaurants, and points of interest. Visitors can gain historical context, fun facts, and reviews of the places as they interact with scan-ready elements of their surroundings.

My review did not yield many details about the phased use of AR (pre, during, and post-trip). When the user is physically situated at a tourism destination, AR is considered the most appropriate technology to adopt (Pratisto et al., 2022). It is also a sound choice for increasing user satisfaction while on site, bolstering their desire to re-visit (Jung et al., 2016; tom Dieck and Jung, 2018; Tussyadiah et al., 2018, as cited by Liang & Elliot, 2020). For instance, lingering scannable entrance tickets can act as souvenirs that can be used to re-ignite AR content post-trip (Lee et al., 2017, as cited in Pratisto et al., 2022).

Whether employing AR in museums or other environments, the most essential requirement is high quality content (Dueholm & Smed, 2014, Jung et al., 2015, and tom Dieck & Jung, 2015, as cited in Yung & Khoo-Lattimore, 2017). Since AR can be used to augment information provision in an interactive way, it is a good fit with heritage and museum-type settings (Yung & Khoo-Lattimore, 2017). For example, the participants in a study at a Danish museum welcomed the use of novel AR components in the space and responded positively to the associated increased engagement (Dueholm & Smed's, 2014, as cited in Yung & Khoo-Lattimore, 2017).

2.3.2.3 Mixed Reality. MR is an integration of VR and AR that is designed to combine reality and the virtual world. This allows users to interact with objects in both the virtual world and the real world as part of the user experience (Yusoff et al., 2011, as cited in Beck et al., 2019). The most advanced current MR product is the newly released Apple Vision Pro. Apple Vision Pro does not require a screen, keyboard, or mouse. Instead, digital material is displayed on top of the physical surroundings, mixed in with the actual environment. Users use their hands, voice, and eyes to navigate through this combined world. Rather than acting like blinders to the real world, MR headsets such as the Apple Vision Pro

allow people around them to see each other, moving freely between virtual and real components.

MR and its effects are analyzed in 2 of the articles I reviewed, and the lead author on both of them is Trunfio. Both investigate MR use in Italian museums. In each, they conducted research with users who had experienced MR on site. Trunfio & Campana (2020) built a new model to assess the impact of MR on visitor experiences and satisfaction. They highlighted the potential of human-technology interaction in the museum to enhance cultural preservation, virtual accessibility, and cultural diffusion. Trunfio et al. (2022) also examined the relationship between MR experiences and post-experience intentions and behaviours. They inquired about the intention to revisit, links to the museum's authenticity, and participant intentions to engage with technologies. However, my review highlights a lack of research on MR use pre-trip and post-trip.

2.3.2.4 360° Photo View. My review did not capture much information on the use of 360° photo view. Only 3 of the 24 papers focus on the 360° photo view. These articles are also illustrative of the confusing and inconsistent use of terminology in VTE scholarship as they contain inconsistent definitions and uses of the term "virtual tour." Resta et al. (2021) and Angeloni (2023) both use "virtual tour" to label 360° photo view tours. It is important to note that virtual tours can also refer to VR tours, video tours, etc. For this reason, I think it is useful to separate out 360° photo views as distinct from other kinds of virtual tours. Typical 360° photo view examples are Google Earth and Google Street View on Google Maps. Some 360° photo views can be experienced through VR devices, but VR devices are not required for all. Visual effects are the primary experience that a 360° photo view offers, while sound effects are optional. Voiceovers, videos, and other types of popup content are available upon

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clicking (Resta et al., 2021; Angeloni, 2023). These research papers indicate that some 360°

photo views are compatible with VR headsets (Skard et al., 2021). Google Arts & Culture

(formerly Google Art Project) is also mentioned as a way to let users "walk" virtually around

galleries, enjoying works of art (Proctor, 2011, as cited in Angeloni, 2023).

Museums can also incorporate 360° photo views (Resta et al., 2021; Angeloni, 2023).

The 360° photo view documented in these papers cited above allows visitors to interactively

move around museums. By clicking the mouse or touching the screen, users can control the

tour and the visual landscape they move through. 360° photo view can also be adopted in

outdoor nature-based destinations. Compared with 2D still images, the use of 360° photo

view via VR headsets can facilitate participants' mental imagery of a destination and

"predicted happiness" (Skard et al., 2021, p. 2), even when image content is the same. 360

photo view can also be used pre-trip and post-trip. It can be used to facilitate travel planning,

add to pre-trip excitement, to prompt ticket purchases, and to augment post-trip memories

(Resta et al., 2021; Skard et al., 2021). I did not encounter much discussion about the use of

360° photo view during trips.

2.3.2.5 Live Streaming. Lin et al. (2022) conducted a systematic review of the

literature on the use of live streaming in tourism and hospitality. Although live streaming is

popular on social media in the tourism sector, this is the only review article I found that

focuses on the use of live streaming in tourism. In tourism and travel, live streaming is

currently used to display real-time scenery, to capture and share experiences, and to advertise

travel destinations and tourism products (Deng et al., 2019 and Jiménez-Barreto et al., 2020,

as cited in Lin et al., 2022: p. 298-299). This includes offering online tours of hotel rooms in

collaboration with celebrities or influencers. This allows for leveraging the "celebrity effect"

to attract user attention (Lau, 2020, as cited in Lin et al., 2022). It also allows for the incorporation of in-stream associated discounts.

Live streaming can be used pre-trip as well. Lin et al. (2022) analyzed user perspectives on the use of live streaming in different stages of trips. Pre-trip, live streaming may inform and speed up potential visitors' decision-making processes (Dai et al., 2022, as cited in Lin et al., 2022). First, live streaming encourages pre-trip visitation, adding "travel inspiration" (Dai et al., 2022, p. 1). By presenting beautiful vistas or destination features during live streaming, tourism providers can create a positive destination image for viewers. This in turn can help to stimulate the desire for a return visit (Xu et al., 2021, as cited in Lin et al., 2022). Tourism providers can employ live streaming's unedited nature to create real-time videos and audio effects that contribute to an immersive, authentic, trustworthy environment before visitors arrive (Deng et al., 2019, Jiménez-Barreto et al., 2020, and Zhang et al., 2021, as cited in Lin et al., 2022). Moreover, the unedited nature of live streaming guarantees authenticity. The focus is on actual places and events, fostering connection and trust. This authentic peek into a destination enhances destination image and encourages visitation (Jiménez-Barreto et al., 2020 and Zhang. et al., 2021, as cited in Lin et al., 2022). Second, live streaming provides information about the destination, attractions, accommodations, and tourism activities, which can aid in trip planning (pre-trip). Live streaming can also facilitate direct communication between tourism providers and potential visitors. Viewers can ask questions and receive instant responses from the liver steaming host, providing a personalized touch to their pre-trip planning and saving them research time (Parise et al., 2016 and Buhalis & Sinarta, 2019, as cited in Lin et al., 2022). Third, live streaming can also offer special discounts to incentivize purchases (Zhou et al., 2021 and Xie

et al., 2022, as cited in Lin et al., 2022). Such interactions and time-limited exclusive benefits can foster a sense of urgency. This can prompt potential visitors to make reservations before the live streaming ends (Zhou et al., 2021, as cited in Lin et al., 2022).

During trips, live streaming can help viewers experience places and activities that they might not be able to access, afford, or otherwise experience in reality. Live streaming, therefore, represents an alternative to travel for those facing physical accessibility, financial, or temporal challenges to taking trips or visiting sites they are interested in (Lin et al., 2022). Dolnicar & Talebi (2020) suggest that live streaming can offer deeper insights into culture than firsthand travel (as cited in Lin et al., 2022)

Research on the post-trip impacts of live streaming is still limited (Lin et al., 2022). There is some scholarship that suggests that live-streamed videos can also be recorded, replayed, and shared to recall memories and emotions related to travel experiences (Tussyadiah & Fesenmaier, 2009 and Fan et al., 2020, as cited in Lin et al., 2022).

In addition to pre, during, and post-trip use, live streaming can be a standalone experience. This strategy has the potential for protected geo-heritage sites and terrains and vistas that are less accessible (Tormey, 2019, as cited in Lin et al., 2022). It can also act as a tool for alleviating overcrowding by offering a digital alternative, as well as providing a more pristine or solitary experience than a crowded real-life experience might offer for the same site (Alshawaaf & Lee, 2021, as cited in Lin et al., 2022). Such options might be very useful for sites under pressure to decrease visitation and crowding. In overcrowded destinations, implementing live streaming can help reduce the stress on local and nearby traffic, resources, and infrastructure. Additionally, using live streaming as a substitute for travel reduces tourism-associated carbon emissions created by transportation (Lin et al., 2022). This fits

with ongoing efforts to reduce the negative impacts of tourism and to increase the industry

sustainability, particularly given the ongoing climate crisis. Live streaming offers a

sustainable way to display natural beauty and historical assets in protected areas and geo-

heritage type sites without further contributing to undesirable impacts or endangering a site.

Redirecting some people to online experiences can alleviate pressure while still maintaining

connections with visitors (prospective, current, and past). With this approach, the beauty and

cultural value of places can be preserved for present and future generations.

  2.3.2.6 Webcam-Travel. While many of us might associate webcams with virtual

work meetings, or with online socializing, webcams can also be used in tourism. They are

currently employed at *Niagara Falls* in Canada, at the *Statue of Liberty* and at the *Grand

Canyon* in the US, at the *Abbey Road Crossing* in the UK, and at *Pattaya Beach* in Thailand.

Many tourist attractions have webcams on www.earthcam.com that offer virtual connections

and help to promote visitation. Despite this use, I could not find much information on such

uses in the scholarly literature. As with the live streaming-related search, I could only find

one article specifically about webcam use in tourism. The article was written by Jarratt in

2021 and examines the webcam travel experiences during COVID-19 lockdown. Jarratt

(2021) suggests the term "webcam-travel" as the activity of observing places or destinations

via a place-based webcam. Place-based webcams are usually fixed in one place. Sometimes,

they allow users to move within a horizontal or vertical plane, extending their control and

viewscape to the surroundings around the webcam (Koskela, 2011, as cited in Jarratt, 2021).

The footage or feed from such cameras is usually live and unedited. However, the experience

differs from live streaming since there is less potential for interaction because there is no

interactive live streamer or host on the other end—simply a piece of equipment. Webcams

may also have a minor delay. For instance, *Yellowstone National Park* has one live-streaming webcam of the *Old Faithful Geyser* and nine static webcams of other scenes on the Park's official website (Yellowstone National Park, n.d.). The webcam footage of *Old Faithful Geyser* is live (Yellowstone Forever, n.d.), while the other 9 are static, only refreshing every 30 seconds or so.

When compared with VR, webcam travel has some unique features, as identified by Jarratt (2021): 1) webcams are typically used to show unedited 2D footage of the real world, whereas VR provides a curated 3D virtual immersive environment; 2) webcams are live, while VR is usually not real-time; and 3) a webcam is easy to use and has minimal costs, whereas VR technology is more complicated and costs much more.

Despite the reduced potential for interaction and user-directed control, webcam travel has many benefits. Furthermore, some webcams are quite popular. For example, EarthCam is one of the most popular webcam-centered websites, and it is visited by 7 million users every month (Crunchbase, 2020, as cited in Jarratt, 2021). According to Jarratt's study, webcam travellers reported feeling positive and relaxed, as well as experiencing a sense of freedom. Participants who had been there before experienced nostalgia while watching. Further, participants reported a sense of connection to places they travelled to via webcams, with 69% sharing a willingness to visit the physical spaces in person (Jarratt, 2021, p. 161). Jarrat's study also suggested that 66% of participants were interested in using webcam footage to travel to places that they had already visited, and 83% of that 66% reported that viewing through the webcams evoked happy memories (Jarratt, 2021, p. 165). This suggests that webcam-travel can be used post-trip to augment place attachment, which may bring return visits and/or visitation to new places.

This documented webcam-associated sense of connection has implications for areas such as Tumbler Ridge. Webcam travel could be used as a travel substitute, virtually drawing people into the area, and/or as a destination marketing tool where people might interact virtually first and follow up by visiting in person. For places like Tumbler Ridge, with a limited local population size and tourism infrastructure in place, catering to virtual visitors might also be easier and/or put less strain on the actual place.

2.3.3 VTE Use In Museums

My literature review yielded 10 articles about VTE adoption in museums. These articles discuss various combinations of VR, AR, and MR, and two of them focus on the use of 360° photo view (Resta et al., 2021; Angeloni, 2023). For museums and galleries, VTEs can help to enhance online visitor experiences, on-site museum visits, or a combination of both (Angeloni, 2023; Bekele et al., 2018; Carrozzino & Bergamasco, 2010; Errichiello et al., 2019; Lee et al., 2020; Resta et al., 2021; Trunfio & Campana, 2020).

First, VTEs provide added value to museum visits. For example, a relatively recent study examined visitor perceptions after their use of on-site VR at the cultural attraction of the *San Teodoro Palace* in Naples, Italy (Errichiello et al. 2019). Results indicate that the VR application enhanced the visitor experience and had a positive effect on related behaviour intentions after visiting the Palace (ibid). A study conducted in the *Museum of Pure Form* (Carrozzino & Bergamasco, 2010) highlighted that visitors invited to "touch" statues via a VR haptic interaction, reported an enhanced experience. VR touching in this case allowed visitors to engage in an activity typically prohibited for curatorial reasons. The VR haptic interaction also helps to overcome the barrier that prevents blind and visually challenged individuals from enjoying artwork in visual form. The haptic device requires trained

operators, representing a significant expense and a barrier for some organizations and facilities (Carrozzino & Bergamasco, 2010).

Museum exhibitions with AR features can also allow people to put themselves into exhibitions. For example, the recent KAWS: FAMILY exhibition at the *Art Gallery of Ontario*, Canada, invited people to use their phones to make iconic statues Augmented Reality by artist Kaws appear on empty platforms. Visitors could then move their arms through them and take photos with them (Cox, 2023-2024). A study on MR at the *Ara Pacis Museum* in Rome emphasized the novelty and innovation that an MR component can add increasing visitor satisfaction (Trunfio & Campana, 2020). This museum's MR visitor experience model measures museum information, customization, format, usability, information saving, interaction, and experiences that MR brings to visitors.

Another way that VTEs can be used to augment visitor experiences and add to visitor satisfaction is by expanding visitor access to museum collections. VTEs can be used to grant visitors access to items in museum storage (Resta et al., 2021). This is useful since it is common for museums to host travelling exhibitions, keeping some of their collections in storage at all times. In the study by Resta et al. (2021) at the *Troya Müzesi* (*Troy Museum*) in Çanakkale, Turkey, a participant noted that VTEs allow museums to digitally display items that would otherwise be restricted to archives or storage spaces. Visitors can experience unique "behind the scenes" materials and explanations as well, on or offsite, via VIP access and information provision. In another study, visitors to the *Civic Art Gallery of Ancona* in Italy reported enjoying the enhanced authenticity provided by a museum 360° photo view tour of museum contents (Angeloni, 2023). The use of a 360° photo view can provide visitors with gigapixel image experiences that allow them to explore greater details about existing

exhibits. For example, gigapixel images can show visitors pieces or exhibition features that are invisible to the naked eye by zooming in and out on items of interest. Virtual elements can also be added to complement physical features or service amenities, extending a museum's capacity beyond its actual physical limits. For example, related YouTube videos or audio components can be added as additional information to the physical museum contents (Angeloni, 2023). The virtual options can go beyond current timelines, taking visitors back to historical eras.

Moreover, in museums, as is the case more generally, VTEs can offer complementary experiences pre-trip or post-trip (Resta et al., 2021). Used as part of pre-trip preparation, VTEs have the potential to encourage and inform visitation. For example, Lee et al. (2020) suggest that the use of an immersive VR environment can improve virtual museum tour experiences, positively shaping intentions to visit museums in person. Angeloni (2023) also found users who have tested the 360° photo view are interested in visiting exhibitions in person and engaging in additional VTE experiences. VTEs can also be used to facilitate memory sharing and word-of-mouth marketing post-trip. In Errichiello et al.'s (2019) research, respondents who experienced wearable VR applications at the *San Teodoro Palace* reported being likely to use VR applications in the future. They also wanted to share their VR visit experiences via social media. This was especially true for participants who rated the VR experience highly (Errichiello et al., 2019).

Those in charge of visitation to galleries, museums, and other tourist destinations might be concerned that investing in VTE available off site could detract from actual on-site visitation. In the literature reviewed, this concern does not seem to play out as a negative impact of VTE use. Following participant use of off-site VTEs, they are generally reported as

interested in actual exhibits and other on-site features. Users are also enthusiastic about trying other VTEs (Angeloni, 2023). For example, in one study in Çanakkale, Turkey, most participants (62%) virtually visiting the *Troya Müzesi (Troy Museum)*, did not report a reduction in their willingness to visit in person (Resta et al., 2021). Participants affirmed that museums function as places for cultural enjoyment and social interaction—sites that they wanted to continue visiting in person. They suggested that virtual experiences could not act as substitutes for actual visits. For example, one participant emphasized the "materiality of an object, its nuances, and details" (Resta et al., 2021, p. 157). The spatial presence, the smells, the sound, and the light in the physical environment were reported as qualities not yet easily reproduced virtually. Study participants suggested on-site virtual experiences in physical museums as preferable to fully online experiences (Resta et al., 2021).

2.3.4 VTE Use In A Nature-Based Context

As indicated, I was particularly interested in VTE applications that fit well with nature-based tourism features and areas because my research partners are linked to geological features, natural landscapes, hikes, fossils, tracks, trails, etc. My literature review yielded 6 articles about research on VTEs in parks or nature-based destinations. The articles I found address VR, 360° photo view, and webcam-travel. I found examples of using VR with nature-based content, such as trying out trails' pre-visit VR videos of *Dinghu Mountain*, China using a VR headset in shopping malls (Wu & Lai, 2022). I also found an article on the use of a bird's-eye view of the *Lake District* area in the UK (tom Dieck et al., 2018). The use of such a perspective is an example of how VTE can be used to add an additional vantage point or viewscape for wildlife encounters or nature-based tourism move broadly.

2.3.4.1 Advantages Of VTEs In Nature-Based Tourism

The reported advantages of VTE use in nature-based settings are similar to those regarding on VTEs and museums. VTEs are seen as a way to enhance the tourist experience in nature-based settings (Jarratt, 2021; tom Dieck et al., 2018; Wu & Lai, 2022). For example, in some studies, VTE users reported that their experiences elicited emotional responses and immersed them in the natural setting (tom Dieck et al., 2018, Wu & Lai, 2022). Further, participants described their experiences in nature-based VTEs as interesting, creative, positive, and freeing. Nature-based VTEs also have the potential to make some participants feel nostalgic and connected to the place that they viewed (Jarratt, 2021).

VTEs can be used to encourage new visitation and return visits to nature-based sites (Jarratt, 2021; Skard et al., 2021; tom Dieck et al., 2018; Wu & Lai, 2022). Wu & Lai (2022) explored the role of VR mountain walking tours in motivating users to take a walk in the Dinghu mountains, China. They found that the VR experience's vividness created a "sense of presence" (Wu & Lai, 2022, p. 89) which influenced emotional engagement, flow state, and enjoyment. This in turn fed user intentions to walk mountains in real life. In Jarratt's (2021) research on webcams, the types of webcams that participants viewed were categorized into different types, including nature webcams (showcasing wildlife, beaches, zoos, the countryside, etc.), built environment webcams (displaying city centres, buildings, etc.), and others (representing various other types of webcams). The study's findings show that participants paid more attention to the cameras that showed natural landscapes. Particularly, 68% of the participants expressed more interest in nature-themed webcams (especially wildlife cams) than other webcam categories (Jarratt, 2021, p. 161). This study suggests that nature-based destinations, especially areas full of wildlife, can use webcams to showcase various highlights for offsite users. In fact, many already do.

It is important to remember that while VTE options can be very high tech, they can also be flexible in terms of the technologies, equipment, and networks required. For instance, in places with connectivity challenges such as Tumbler Ridge, asynchronous cams are an option—a combination of static, live, and delayed footage can be used so that access can be extended despite such challenges. Additionally, studies such as tom Dieck et al. (2018) illustrate that in addition to VTEs prompting on-site visits, a positive VTE experience can also leave users wanting to engage with VTE again, in terms of re-experiencing the same VTE or looking forward to new uses and different sites. Research participants also stressed the multi-faceted opportunities that VTEs can represent, even when it comes to one site. They revealed that VTEs can inspire them to explore various locations in new and different ways. Experiencing a VR bird's eye view (seeing a destination from up above), for example, can prompt people to consider new ways of visiting a site or moving through it, such as taking a helicopter ride (tom Dieck et al., 2018), which could prompt or add to experiences on the ground.

In addition to encouraging visitation and improving visitor experiences, VTEs can also facilitate word-of-mouth and be used to increase intentions to purchase trips and related goods and services (tom Dieck et al., 2018; Skard et al., 2021). A study found that VTE experiences of Norwegian fjord scenery elicited a more positive response in terms of novel mental imagery and planned purchases among those without prior visitation to such destinations (Skard et al., 2021).

2.3.4.2 Target Audiences For VTEs In Nature-Based Tourism. VTEs might not be of interest to or appropriate for all potential tourists or on-site visitors. Nature-based VTEs can be perceived and received differently between different groups. First, for those seeking to

largely disconnect from technology and devices while travelling, VTEs might not be a good fit as they would cause people to interact with technologies they were trying to temporarily escape. For example, a prior study revealed that some nature-based tourism providers assumed that Millennial tourists wanted to use technology in nature-based tourism environments (Clark & Nyaupane, 2022). However, Millennials sought to reduce virtual interruptions seen as disrupting their in-person enjoyment of nature. For example, some Millennial participants expressed that they did not enjoy seeing people use selfie sticks, VR, or AR while out in nature, as they found it took away from the experience. Also, VTEs may not meet the demands of adventure seekers. Orru et al. (2019) investigated visitor travel preferences and VTE satisfaction. Those seeking adventurous experiences and social engagement reported dissatisfaction with VTEs in great numbers (ibid).

When it comes to demographics and preferences, there is no clear pattern in the literature about VTEs in nature-based tourism. For example, Orru et al. (2019) suggest that men and well-educated people showed less interest in VTEs, challenging previous studies. Unfortunately, Orru et al. (2019) did not explain the reasons behind this result, so little is known about how or why the purported differences exist. Additionally, Skard et al. (2021) found that participants who had never been to a destination seemed to enjoy the nature-related VTE more than those who had previously visited the actual site. However, Jarratt's (2021) results challenge this finding by suggesting that participants who used VTEs to explore places they had visited before felt nostalgic appeal and place attachment. Because of such inconsistencies, it is impossible to draw definitive conclusions about demographics best suited for VTE use.

2.4 Discussion

Key goals in conducting this review included looking for clear definitions and uses, as well as information on main VTE types to provide critical background information to project partners. The focus of this chapter is to provide a synthesis of existing information on VTEs, and to inform related recommendations in Chapter 4.

2.4.1 No Agreement On Terminology And Taxonomy

I noticed a lack of consistency and clarity in the use of VTE-related terms. This impedes comprehension and review, rendering the literature's results, findings, and patterns less accessible, to the detriment of those interested in VTEs. For example, Cho et al. (2002) defined "virtual tour" as "a particular type of virtual experience that includes a computer-mediated experience while visiting a travel destination" (Cho et al., 2002, p. 4). In reading for the review, however, I noted that virtual tours as a term are used to refer to AR tours (Chou and ChanLin, 2012, cited by Wei, 2019), 360° photo view (Resta et al., 2021), live streaming tours (Lin et al., 2022), and more virtual experiences. This ambiguous use of terminology blurs distinctions between different types of VTE and presents a barrier to reader comprehension.

To address this issue, I am proposing a new umbrella term: **virtual tourism experiences (VTEs)**. I propose this term as a way of including all of the various types of technology-based tourism activities that use multimedia elements to create or enhance interactive or immersive experiences for visitors that can be included. This term will assist practitioners and academics in overcoming the lack of consistency and clarity in how VTE-related terms are discussed in the literature. It will offer a unifying term for those seeking to understand, explore, or refer to the entire range of options. Consistent terminology allows for

more accurate distinctions between various types, and can facilitate cross-type comparison studies. The use of consistent terminology would facilitate related literature reviews as well.

In addition to this absence of consistent terminology, there is no defined taxonomy for VTEs. It is challenging to identify and analyze the wide variety of VTEs without an established category system. For instance, based on Beck et al.'s (2019) category of VR in tourism, 360° photo view should also be counted as VR (Slater and Sanchez-Vives, 2016, as cited in Beck et al., 2019). However, I argue that the term VR does not sufficiently describe this experience because computer screens cannot provide the same degree of seamlessness immersion and engagement as VR headsets, particularly when realistic 360° images are used. Instead of defining it as VR, I find the 360° photo view better fits as another type of VTE. If there were a well-defined taxonomy based on clear criteria, such as the type of technology used or the level of immersion, there would not be such confusion like this.

The demand for a consistent taxonomy is beyond an academic issue; it also has implications for the applied tourism sector. A clear taxonomy will allow practitioners to easily access and comprehend discussions of features, advantages and disadvantages of each type of VTEs. This will benefit tourism destination practitioners interested in comparing various of VTEs and selecting the best option for their needs. For example, staff from museums and galleries might appreciate a specific category for VTEs suitable for displaying details about static items. On the other hand, another type of VTE might be more effective for capturing real-time images useful for marketing purposes. Creating a unified framework with logical categories, clearly defined terms, and specified criteria for each type of VTE would facilitate comparisons and could eventually increase the effectiveness of VTEs in enhancing visitor experiences.

2.4.2 Limitations Of VTE Research And Implementation In Tourism

While the initial literature review yielded hundreds of articles on VTEs, I ended up reducing the sample size several times, looking for only the *most* applicable articles. As noted, there is also very uneven coverage of different VTEs within the literature. For instance, VR appeared the most in the articles I encountered. Other VTE types seem to receive far less attention in the literature. Almost 3/5 (15 of 24) of the publications I looked at mentioned VR. By comparison, only 5 articles (5 out of 24, or close to 1/5) discussed using 360° photo view, live streaming, and webcams. The concentration of academic research in the VTE literature appears disproportionately focused on VR.

Similarly, while I found some research comparing two forms of VTEs (e.g. Skard et al., 2021) and more holistic VTE-related papers (e.g., see Griffin et al., 2022), the literature could benefit from more review papers on the subject. The lack of comprehensive comparative studies across VTE formats, covering topics such as different use scenarios, evidence of the advantages and disadvantages of different VTE adoptions for both visitors and providers, and costs of various of VTEs limits the literature's utility for partners like mine interested in incorporating expert research into decision-making about VTEs. Lastly, VTEs in nature-based tourism are relatively underexplored by academia, implying a gap in our knowledge that should be addressed.

Despite VR receiving the most attention in the literature I reviewed, I am curious about whether VR is the mainstream format in real-world tourist scenarios. It is possible that there is a research bias towards VR, offering it more coverage in the literature. Alternatively, it might be because VR is used more often than other types of VTE. My literature review did not offer an answer to this question. Also, I found little information on the economic aspects

of VTE adoption (e.g. costs of implementation; return on investment), use, or purported benefits/returns. Case studies and detailed information about implementing and maintaining VTEs are topics that receive little academic attention. But these too could play essential roles in decision-making processes about the use of VTEs in tourism. This is especially the case for small tourism businesses or non-profit organizations such as museum and park foundations. We need more research addressing the applied "nuts and bolts" of VTEs, particularly the kind that compares across VTE types (e.g., VR versus others), discussing associated costs and benefits, and considering impacts on visitor experiences (on and off-site).

2.4.3 Key Considerations For Tumbler Ridge, And Other Destinations With Museums And Nature-Based Attractions

This research indicates that VTEs can enhance visitor engagement at museums, which is inspirational for the Tumbler Ridge Museum. Pre-trip, guests can use VR and 360° photo views to "see" the museum, plan their visit, and develop enthusiasm for the trip. During the trip, VR, AR, and MR can be used to enhance on-site experiences by offering interactive, immersive exhibit information. On-site VR experiences can also enable guests to better recall their time there. This might in turn allow them to share with friends and family post-trip, creating long-term memories. Since visitor satisfaction is crucial when adapting VTEs, the Tumbler Ridge Museum and other museums should consider factors like ease of use, audiovisual quality, and interactive potential in terms of how they impact user experiences. Knowledge of associated visitor willingness to pay is also critical for cost recovery and estimating revenues from adding VTEs.

My findings show that VTEs in nature-based environments can enhance visitor experiences. VTEs could also be used to promote initial and repeat visits to Tumbler Ridge and other nature-based settings. This can be done via the use of immersive VR experiences and webcam footage of landscapes and wildlife. This can improve accessibility, promote visitor engagement, and encourage positive word-of-mouth via VTE sharing and discussion. VTE incorporation can influence travel decisions and thereby support local businesses, which is particularly beneficial to remote areas like Tumbler Ridge with limited economic diversification potential. However, VTEs may not appeal to all potential visitors in a nature-based area. For instance, some may be looking to unplug from their daily lives; others may view VTE type additions as incompatible with authentic nature-based experiences (see 4.3.4.1). Hence, locations like Tumbler Ridge should carefully consider how they would promote uses and aspects of VTEs when working to incorporate them. Tailored work must be done to sell them as compatible with other visitor-desired elements, and to reduce fears about authenticity or substitution—VTEs must be positioned as desirable counterparts or augmentations, not as threats to the destination or experiences within it.

2.5 Conclusion

This work contributes to the study of virtual experiences in tourism, with special considerations for museums and nature-based attractions. This chapter proposes a new umbrella term called virtual tourism experiences (VTEs). This encapsulates a diverse array virtual elements across all travel stages (pre-trip; during trip; post-trip) and between them. To offer a practical list of media and platforms commonly used in VTEs, this chapter also includes a comprehensive list of options, including VR, AR, MR, 360° photo views, live

streaming, and webcam travel. I also included existing and potential future applications in museums and natural settings, while considering their potential for Tumbler Ridge.

One of the main reasons for conducting this review was to get a sense of what has been written and what work remains to be done. Several weaknesses in the existing literature on VTEs should be addressed by future research. The use of agreed upon consistent terminology and an overall taxonomy for VTEs would increase the accessibility of related work and the ease of future research. Future research should also look beyond the overwhelming focus on VR, and examine alternative VTE forms, including 360° photo views, live streaming, webcam travel, and other possible types, which have received far less academic attention. Comparative studies examining various VTE formats and their effects on visitor experiences would be helpful for tourism destination organizations and decision-makers. In addition, more in-depth and practical case studies are needed, including those that discuss the costs, advantages, and adoption strategies of VTEs in real-world tourism settings. This would provide valuable information on investments and returns associated with VTEs for tourism providers and related organizations.

Chapter 3 Visitor Perceptions of Tumbler Ridge and Virtual Tourism Experiences

3.1 Introduction

In 2022, I launched a visitor survey through an MITACS-funded internship in partnership with The Tumbler Ridge Museum Foundation and the Tumbler Ridge UNESCO Global Geopark. The survey was designed to generate Tumbler Ridge-specific data for the second research question guiding this project: What are Tumbler Ridge visitors' experiences, and what are their perceptions of potential VTE use in Tumbler Ridge? This chapter contains survey results about:

1) Visitor demographics, motivations, activities, and preferences; and

2) Visitor perspectives on virtual tourism experiences (VTEs) and their potential future use in Tumbler Ridge.

In this chapter, I discuss survey design and implementation. I also present the results and discuss patterns within them by grounding them in the literature and by comparing them with existing visitation data. I collected the survey data to inform my VTE recommendations. My tailored recommendations based on the literature and survey data are detailed later when I bring both data chapters together in Chapter 4.

3.2 Background

Northern British Columbia (northern BC), west of the Alberta border and north of 100 Mile House in Canada, embodies a rural and small-town ambiance (Markey et al., 2012). This region features "nature beauty, rich history, fascinating indigenous culture, and genuine people" (Northern BC Tourism Association, 2019, p. 4) and attracts diverse tourists. Northern BC Tourism Association marketing highlights travellers who enjoy adventure sports, cycling, culture & history, culinary aspects, and hiking & backpacking as target groups for local businesses, communities and travel organizations (Northern BC Tourism Association, n.d.). In the literature,

there is a lack of comprehensive and up-to-date information on visitor demographics, motivations, experiences, and preferences specific to Tumbler Ridge, a small town in northern BC. Research is needed to augment our understanding of visitors to Tumbler Ridge and to get beyond marketing data about visitors. Understanding why visitors choose the area and what they experience and enjoy is critical for informed tourism sector decisions and strategies. This chapter will offer insights into Tumbler Ridge visitor patterns and preferences, contributing to the literature and ultimately—providing information that can be used to improve the visitor experience in Tumbler Ridge.

3.3 Methods: Visitor Surveys And Observation

3.3.1 Data Collection

I investigated visitor experiences and VTE-related perceptions in Tumbler Ridge, BC, in 2022. I carried out my fieldwork in July and August, peak season for visitors to Tumbler Ridge. My partner-informed survey questionnaire (Appendix D) is 22 questions long, includes both open and closed questions, and took about 20 minutes to complete. It consisted of three sections: demographics; preferences and activities; and perspectives on virtual tourism and potential future virtual inclusions for Tumbler Ridge.

Participant recruitment was strategic as I wanted to collect data at different sites, and to recruit different types of tourists. To increase my chances of capturing this diversity, I used purposive and convenience sampling across various types of locations in the area, including the Tumbler Ridge Visitor Information Centre (survey code VC), the Tumbler Ridge Museum (survey code M), popular trailheads (survey code TH), local small businesses (for example, survey code LD for Lush Dessert), and other most-visited spots in town (for example, survey codes RV for the Monkman RV Park and TMH for Trend Mountain Hotel). I wanted to survey in Tumbler Ridge while people were visiting it in order to capture their thoughts and perspectives during their trips,

with experiences fresh in their minds. With assistance from my supervisor Dr. Zoe Meletis and summer students working at the Tumbler Ridge Visitor Information Centre, I collected 384 completed questionnaires, resulting from a participation rate of approximately 76%. My on-site observations also allowed me to gain a more proximal understanding of Tumbler Ridge, which enriched the depth of my analysis and understanding.

3.3.2 Data Analysis

For data entry purposes, each completed anonymous survey was given an alphanumeric code. These codes are used as survey identifiers when presenting quotes in this document (e.g. TH011). Although demographic data was collected with each survey, it is used to describe the overall sample of respondents rather than for any intra-survey comparison between age groups, genders, etc. The visitor data was collected to offer a new set of visitor data to inform the VTE recommendations. Partners did not request any additional analysis on a question-by-question basis but this could be done in future analyses. The main purpose in this case was to offer a demographic profile to accompany survey question data so that the sample of participants could be described and compared with prior visitor profiles.

To analyze the resulting data, I used two rounds of coding for open-ended questions in Excel. For each open-ended question, the first round coding approach included initial and descriptive codes (Cope, 2021); I was grouping responses with similar content or patterns into groups. The second-round codes included analytic codes developed from the initial codes. I created analytic based on themes from the literature that informed the project, and/or from partner input (e.g. accessibility, education/information, enhanced experiences, entertainment/leisure as reasons for willingness to try VTE inclusion). I also identified other patterns emerged in the data while I was coding. One such code is nature/culture conflict, rising from explanations for a lack of willingness to try VTE inclusion. I grouped codes into themes as appropriate, flagging

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representative and outlying quotes as ones that could be used in the text to explain patterns in the survey data. My supervisor assisted with code checking and refining, and we sometimes collapsed related codes and themes to reduce the number of codes and to consolidate codes under a representative label (e.g. responses about roads ended up under the code infrastructure). The resulting patterns were later compared with prior visitation studies and claims in the literature.

3.3.3 Limitations

It is critical to recognize limitations in project design and implementation. I conducted this survey during a limited time frame (July-August 2022), at a variety of sites, with a 1–2-person team. I purposefully conducted the surveys at several key sites. As such, there may be groups of tourists who are not represented or who are under/overrepresented. Additionally, this field season occurred during the COVID-19 era, which may have impacted visitation, participation, and results. Further, I did not include potential visitors or past visitors; I focused on surveying visitors on site. Another important consideration is that participation was largely limited to active, able-bodied visitors, given the locations I chose to approach visitors. Also, the Geopark emphasizes outdoor trails and sites, the majority of which offer no real adaptations or site hardening for those with mobility challenges. I do not know how the demographics or answers of those who were not reached by my survey or chose not to participate would compare with those who did participate. Lastly, I observed an interesting pattern in terms of on-site survey completion: when a family or group of visitors agreed to fill out the survey, reporting tasks were often delegated to a woman. So, whereas multiple genders and ages are represented in the sample, and in some responding groups within the sample, women seemed to have played more of a role in physically filling in the survey.

3.4 Results

3.4.1 Tumbler Ridge Visitor Profile (Summer 2022)

  3.4.1.1 Visitor Demographics. When collecting data on perspectives, it is useful to collect data on participant demographics so that you can describe the sample of participants, and so you can better understand how it compares with other relevant demographics. For this reason, I collected demographic information. I present the main results on the following page, in table form (Table 5).

Age ranges (n=384)	Number	Percentage
18-29 years old	90	23.4%
30-39 years old	76	19.8%
40-49 years old	66	17.2%
50-59 years old	58	15.1%
60-69 years old	51	13.3%
> 70 years old	35	9.1%
Chose not to answer	8	2.1%
Gender (n=384)	**Number**	**Percentage**
Male	168	43.8%
Female	203	52.9%
Non-binary	1	0.3%
Transgender	0	0%
Two-spirit	0	0%
Other	2	0.5%
Chose not to answer	10	2.6%
Education levels (n=384)	**Number**	**Percentage**
Some high school	6	1.6%
High school	60	15.6%
Some university/college/trade school	105	27.3%
Bachelor's degree, college or trades	145	37.8%
Master's degree or PhD	56	14.6%
Chose not to answer	12	3.1%
Household income ranges (n=384)	**Number**	**Percentage**
< $35,000	37	9.6%
$35,001-$70,000	73	19.0%
$70,000-$100,000	73	19.0%
> $100,000	157	40.9%
Chose not to answer	44	11.5%
Main residence (n=384)	**Number**	**Percentage**
British Columbia	201	52.3%
Alberta	104	27.1%
Other provinces	38	9.9%
Other Countries	33	8.6%
Chose not to answer	8	2.1%

Table 5 *Participant demographics*

The majority of survey participants (79.4%) were visiting from BC and Alberta. Other provinces and countries contributed 18.5% of participants, and the top three sources of international visitors were the United States, the United Kingdom, and continental Europe. Among participants, 79.7% reported post-secondary education. The age distribution was rather diverse, ranging from 18 to 70+ years old.

3.4.1.2 Visitor Trips And Activities. To learn more about types of trips and trip components, I asked participants about their number of visits, frequency of visits, and type of group they were visiting with. Out of 384 participants, 54.7% stated that it was their first visit to Tumbler Ridge, and 44.5% indicated a return trip (0.8% chose not to answer). Out of the total respondents who answered this question, 120 individuals, or 31.3%, reported having visited Tumbler Ridge three or more times. Among return visitors (n=153), 53.6% visited Tumbler Ridge at least once a year. And, 91.7% of responses (396 responses were collected) show that respondents were travelling in groups (e.g. with family), and some were travelling with multiple families and/or in a caravan (e.g. of multiple trailers/RVs.)

I also wanted to know how Tumbler Ridge fits with travel plans and established regional circuits, so I asked if Tumbler Ridge was the only destination participants were visiting or if they were on multiple-destination trips. Here, I was looking for greater insights into travel routes, and pairings of destinations and attractions that bring people to Tumbler Ridge. One reason such information is useful is because it might suggest where promotional material should be placed. Among participants, 58.1% or 223 identified Tumbler Ridge as their sole trip destination (see Table 6), with 194 out of 223 (87.0%) of these participants travelling from BC and Alberta. For 41.7% of participants (n=160), Tumbler Ridge was part of a multi-stop journey (see Table 6), and 68.8% or 110 of these 160 participants travelled from BC and Alberta. Other destinations on travel routes included places along the way to the Alaska Highway and on the Great Northern

Circle Route. Participant responses reveal five common ways to travel to and around Tumbler

Ridge (Table 7) Most participants seemed to be on relatively short, regional trips. A small number

of participants were on multi-stop global trips travelling across Canada or the world.

Singal Destination vs. Multi-Stop Trip Preferences (n=384)	Number	Percentage
One-stop trip	223	58.1%
Multiple-stop trip	160	41.7%
Chose not to answer	1	0.3%

Table 6 *Single destination vs. multi-stop trips*

Common routes of a multiple-stop trip above (n=160)	Number	Percentage	Details
Regional travel	68	42.5%	Peace River and Northeast Region BC, Grande Prairie, etc.
Travel further north	26	16.3%	Alaska/Yukon/ Northwest Territories - Fort Nelson - Dawson - TR
A BC Interior route	22	13.8%	Vancouver/Kamloops - PG - TR (Highway 97)
An Alberta route	20	12.5%	Banff/Valemount - Jasper - TR
Did not indicate any specific route	13	8.1%	
BC Coastal route (Coastal route + other stops)	5	3.1%	Vancouver Island - Haida Gwaii - Smithers - PG -TR
Across Canada	3	1.9%	
Multi-stop global trip	3	1.9%	

Table 7 *Ways participants traveled to Tumbler Ridge*

I wanted to know about accommodation type and length of stay as well (Table 8 and Table

9). I found that while some day trippers were included, most of my sample was staying one or

more nights in the Tumbler Ridge Area. Of those staying overnight (311 responses), more than

89% of paid for accommodation in the area stayed in hotels, campgrounds, or RV parks.

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Accommodation type (387 responses were collected)			Responses	Percentage	
Not staying overnight			76	19.6%	
Overnight stay (311 responses)	Paid accommodation (279 responses)	Campground	172	72.7% of all types	89.7% of overnight stay
		Hotel	94		
		Guesthouse/B&B/Airbnb	13		
	Unpaid accommodation (32 responses)	Family/Friends	22	8.3% of all types	10.3% of overnight stay
		Other	10		

Table 8 *Participant accommodation types* (Respondents could select overnight accommodation types and therefore totals do not add up to 100%.)

Length of stay (n=384)	N	Percentage
Day visitors	76	19.8%
1-2 days	65	16.9%
2-3 days	127	33.1%
4-7 days	71	18.5%
>7 days	44	11.5%
Chose not to answer	1	0.3%

Table 9 *Participant length of stay*

My data suggests the potential to extend some visitor stays. Whereas most participants were staying overnight or longer, I found that roughly 70% of participants intended to stay at Tumbler Ridge for three days or less. On-site conversations and participant survey answers revealed that some short-stay visitors would have stayed longer or if they would have had better knowledge of the range of experiences possible in the Tumbler Ridge area. For example, respondents commented:

> "We only stopped for one day because we didn't know this was here, but we would like to see more of the geopark" (M069)

> "I wasn't expecting such a beautiful location and will make an effort to stay here again and explore more of the area" (TMH001)

> "It's very beautiful and unique. I'd like to visit again to do more outdoor activities or stay overnight" (M022)

These quotes illustrate the potential for using expanded offerings to result in longer stays.

3.4.1.3 Information Sources, Visitor Draws, And Intended Return Visits. I wanted to learn about how and where visitors learn about Tumbler Ridge, its attractions, and its activities. For this reason, I asked participants which sources of information they had encountered and which they preferred. I also tested brand recognition for the Tumbler Ridge UNESCO Global Geopark as per a partner request. I received 692 responses about how participants had learned of the area and aspects of it: via word-of-mouth (25.4%), general internet searches (11.1%), and Visitor Centres including the Tumbler Ridge Visitor Centre (10.6%) played key roles. Participants also accessed printed promotional materials including pamphlets (6.9%). They reported choosing those sources over social media (5.5%). In terms of social media preferences (n=55), 78.2% indicated Facebook as their preferred social media platform. Interestingly, 15.2% of responses (n= 692) had never heard of the Tumbler Ridge UNESCO Global Geopark before visiting.

With my project partners, I made a list of factors that might have attracted people to Tumbler Ridge. I invited participants to select all of those that applied in their case. I did this to learn about main draws and relative rankings (Table 10).

Factors (1267 responses)	Responses	Percentage
Nature/the outdoors	311	81.0%
Dinosaur footprints and fossils	203	52.9%
Kinuseo Falls	166	43.2%
Tumbler Ridge as a unique location/spot off the beaten track	142	37.0%
The Tumbler Ridge UNESCO Global Geopark	104	27.1%
The Tumbler Ridge Museum	91	23.7%
Visiting family/friends	47	12.2%
Work	45	11.7%
Other	41	10.7%
It is a stop on the way to my next destination	38	9.9%
Small-town lifestyle	33	8.6%
Indigenous culture	24	6.3%
Researching places to live or play	22	5.7%

Table 10 *Factors that attracted participants to Tumbler Ridge* (Respondents could select multiple items so totals do not add up to 100%).

I also asked participants to choose which activities they were planning to include in their visit. They could choose as many as they liked. Results are presented in Table 11 below.

Activities (1475 responses)	Responses	Percentage
Hiking	299	77.9%
Driving to enjoy scenery	194	50.5%
Visiting the Tumbler Ridge Museum	190	49.5%
Camping	187	48.7%
Looking for tracks/fossils	168	43.8%
Wildlife viewing	140	36.5%
Taking tours	46	12.0%
Golfing	44	11.5%
Taking part in watersports	41	10.7%
Cycling	39	10.2%
Hunting/Fishing	37	9.6%
Motorbiking/ATVing	34	8.9%
Other	25	6.5%
Emperor's Challenge 2022	17	4.4%
Geocatching	14	3.6%

Table 11 *Participants' planned activities* (Respondents could select multiple items so totals do not add up to 100%.)

I asked an open-ended question about travel motivations. Standout motivations for visiting in terms of participant responses (561 responses collected) include outdoor activities (38.5%), nature/views (28.1%), and the Tumbler Ridge Museum/dinosaur attractions (22.9%). Also, participants noted Tumbler Ridge's unique location and offered responses about the "community vibe," with 7.6% mentioning its location as a draw and 1.8% mentioning the community itself as appealing. Other reported travel motivations included visiting friends or family, being attracted by the small-town lifestyle, travelling to the area for work, visiting for general curiosity/exploration/general interest, attending events and festivals, and enjoying the unique location of Tumbler Ridge.

I was also interested in learning about potential return visits to Tumbler Ridge. In my survey, 75% of participants expressed a desire to return (3.1% chose not to answer this question). Outdoor activities, nature/views, and exploration were cited among key motivating factors for return visits. Shared reasons for not returning to Tumbler Ridge included: living far away, having seen everything in the area or wanting to explore new places and or, the remoteness/location off the beaten track, and comments about aging and travel. Age-related issues and travel distance are represented in comments such as:

"I would like to. Too far away" (TH063)

"We are seniors, and although we would love to visit again, our future travel agenda and age may not allow us for a return visit" (TH070)

3.4.1.4 Suggested Improvements And Recommendations For Tumbler Ridge. My research partners and I also wanted to invite visitor suggestions about how tourism experiences in Tumbler Ridge might be improved. To do this, I used the open-ended question *"Is there anything about tourism in Tumbler Ridge that you would improve? Please provide details"*. I categorized resulting answers into themes. The top themes that emerged were suggested improvements (292

responses were collected) about: 1) existing sites/activities (30.5%, including the Geopark, the Museum, the Golf course, etc.); 2) the service base/services (20.6%); and 3) infrastructure (13.5%).

Positive Comments About Tumbler Ridge. In addition to suggested improvements and changes, participants forwarded positive comments about Tumbler Ridge (118 responses). These included comments about a generally favorable impression, and remarks about particular sites and activities (e.g. the Tumbler Ridge UNESCO Global Geopark and the Tumbler Ridge Museum). The survey also captured positive reviews of services such as accommodation, food, and restaurants. Participants shared appreciation for Tumbler Ridge's community and natural beauty as well:

> "…good access. Accommodation is OK. Food, attractions... No suggestions" (TMH008)
> "Had a great time - very friendly people, great experience" (M084)
>
> "Very pretty town AND love the beauty in this area" (RV002)
>
> "I LOVE it here." (LD003)

Suggestions For The Tumbler Ridge UNESCO Global Geopark (91 Responses). The most common type of suggestion was about improvements for existing sites and/or activities. Among them, suggestions for the Tumbler Ridge UNESCO Global Geopark emerged as a focal point, with a sizable number of participants (91 responses or 77.8%) offering specific suggested improvements. These included the following categories of suggestions:

1) calls for trail enhancements including physical and informational elements (48 responses)

Suggestions included improved trail maintenance; better signage and communication about and along trails; and requests for improved kilometer/trail markers and dinosaur track enhancements. The following quotes are reflective of this category:

"…maintenance of Kinuseo Falls trail past Upper Viewpoint (walked to Leake Viewpoint and was very overgrown)" (TH011)

"…Really think better interpretive information would be great at the dinosaur tracks, riverside trail, most especially a diagram of the immediate area and what you are seeing. We found some tracks but really not many. As in 'you are here and here's what you're looking at'…" (R005)

2) calls for improved information provision and communication (28 responses)

Participants requested increased integration of digital resources like applications; improved maps of the area and trails; and the addition of new/specific information (for example, dinosaur information, geo knowledge, and outhouse information, etc.). Participant comments in this category include:

"Things to consider - app to provide info or other" (TMH007)

"Better maps" (RV010)

"Brochures and online info should be more clear regarding: 1) whether there are pit toilets at trailheads or not (this was especially challenging to discover some trails without toilets with younger children) 2) that people must bring their own toilet paper when there are pit toilets…" (TH011).

3) calls for improvements to the Tumbler Ridge Visitor Information Centre (9 responses), such as requests for expanded business hours, and suggestions about enhancing staff training and knowledge. For instance, participants wrote:

"…As much as I hate to say this, tourism centre could be open an hour or so later, until 7-8 for people who get off work and go straight to Tumbler Ridge..." (TH022)

"…I have been to the visitor center. It would be great if there was staff super enthusiastic who were outgoing and would promote the area…" (TH025)

Suggestions For The Tumbler Ridge Museum (21 Responses). Additionally, 21 respondents (18% of the Existing sites/activities theme answers) were about the Tumbler Ridge Museum, focusing on two aspects: 1) a desire for enhanced exhibitions, and 2) calls for expanded or modified business hours. For example, 2 participants offered these ideas:

> "…Would love to see the museum continue to enhance its exhibits. Perhaps some more info on how fossils are made, video interviews with paleontologists, and info on any current explorations/digs?" (M017)

> "Museum was closed for 2 of the 3 days we were in TR (Tues, Wed) and so we weren't able to visit…" (R005)

Suggestions For The Local Service Base (79 Responses). Participants also pointed out desired general or broad improvements to the local service base. These included **suggestions about accommodation, restaurants, and retail, focusing on improvements to quantity and quality**. Representative comments include:

> "We could not find accommodation and had to stay in Dawson Creek" (M003)

> "…Was not informed restaurant would be closed for whole weekend. Super bummer!" (M021)

> "We have found it hard to support the community - grocery shopping…is lacking. No interesting restaurants/cafes/coffee shops." (LC014)

Suggestions For The Infrastructure And Future Sites (52 Responses). In addition, participants identified infrastructure shortcomings and related improvements that they would like to see, specifically regarding road maintenance, road signage (non-trail), and facilities. These stood out as critical areas for improvement, according to participants. Particularly, many suggested that the road to Kinuseo Falls, one of the most popular attractions in the area, should be paved. It is about 50km away from Tumbler Ridge, and once off the highway, the road is a compressed gravel road. Participants included comments such as:

> "The beef I have is with the road conditions of the Kinuseo Falls. It should be paved if you want tourists to come to spend time and money. At the very least the road should be

graded much more. And with the Motor Home we drove 20-30 km and it was still terrible. We have traveled gravel roads in AK, NWT, YT, AB and northern BC and this was the worst gravel road we have traveled." (TH099)

Comments on other infrastructure included:

"…the street signs are very confusing (especially the Nesbitt's Knee Falls, it is too far for the correct road, which made us get into the wrong entrance) …" (R003)

"Public restroom in town…" (is needed) (M098)

Participants also indicated an interest in future/potential sites and services that Tumbler Ridge does not currently provide, such as a ski hill, bike/canoe/cottage rental, mountain guides services, and an annual hiking festival. And, they discussed the need to improve marketing efforts to promote Tumbler Ridge. They suggested expanding social media use and increasing targeted advertising in other cities and provinces.

3.4.2 Participant Perspectives On Virtual Tourism Experiences

A key goal in conducting the survey was to ask visitors to Tumbler Ridge about the potential for integrating VTEs into Tumbler Ridge tourism. The questionnaire included a section with several questions about participant familiarity, prior experiences, and interest in virtual inclusions (existing and hypothetical). These questions were included to complement the literature review on VTE options with "real life data" from visitors to the area (2022).

3.4.2.1 Prior VTE Experiences. I wanted to know how many participants had prior experiences with virtual tourism, which types they had experienced, where, and what their impressions were. Among those surveyed, just over a third or 35.7% (137) of participants had prior experience with VTEs (1.6% chose not to answer this question). They gave examples of their prior VTE experiences as well (see Table 12). 61 out of 130 responses mentioned the travel stages that they had used VTEs (see Table 13). This question about prior VTE use yielded 87 responses about why they had use VTEs. Reasons included education/information, entertainment,

accessibility and marketing, etc. (see Table 14). Negative comments (16 responses) included were

mostly about preferences for in-person/real-life experiences and lack of interest, as the examples

below illustrate:

> "Not the same as in person. Concentrates on thing that curator finds interesting. Not
> necessarily what I find interesting." (VC025)

> "It's a nice way to see cool spots to go see. But I'm not a big virtual guy" (VC055)

Prior VTE experiences	Responses (130)
Google Earth/Google Maps/Google Street View	62
Did not give examples	26
"Virtual tours"	16
Videos/Livestreaming	13
VR	8
Others	5

Table 12 *Participant prior VTE experiences*

Stage of Prior VTE experiences	Responses (61)
Pre-trip	33
Standalone	19
During-trip	6
Post-trip	3

Table 13 *Stage of prior participant VTE experiences*

Reasons For Prior VTE Use	Responses (87)
Education/information	49
Not mentioned	19
Entertainment	10
Accessibility	7
Marketing	1

Table 14 *Purposes behind prior VTE use*

3.4.2.2 Opportunities And Barriers To VTE Inclusion. To explore how VTE offerings in Tumbler Ridge might be used to increase access to its sites and activities for people on and off site, I included this question: *"If the Tumbler Ridge Museum and the Tumbler Ridge UNESCO Global Geopark could provide a virtual way to 'travel' beyond your capabilities and skills, such as a live online virtual tour of an extreme expert-level, would you be interested in trying it?"*

The response pattern to this question, as well as additional qualitative information collected by the survey and in conversation with participants, revealed that almost 2/3 or 57.8% of participants reported interest in virtual travel (3.9% did not answer this question). Response patterns indicate that participants did view VTEs as a tool for expanding access to Tumbler Ridge and other locations, particularly for individuals who are physically or geographically challenged. For example, one participant recognized that:

> "I think that it may be beneficial for people who have physical limitations based on age or disability to enjoy/experience the area and see things that would otherwise be inaccessible to them" (LC018).

Another wrote:

> "I would try it because I can't leave home often so it be way easier" (BL005).

To further investigate participant attitudes towards VTE use in Tumbler Ridge, I included the following question in my survey: *"Imagine an application/app that you could download to your phone and take with you on the trails of Tumbler Ridge. You could access additional experiences linking local landscapes to prehistoric times (e.g. dinosaurs popping up; information about prehistoric plants and animals). Does that sound like something you would like to include in a visit?"* Over three quarters or 74.2% of participants answered "Yes" to this question (6.8% skipped this question). Participants were also asked why they were interested in potential virtual additions. I coded the responses (473 responses were collected) and found the top three reasons

for their interest in using the VTE example I offered were: 1) education/information (35%), 2)

enhanced experiences (14.4%), and 3) specific use scenarios (for example, for outdoor use, for

offline use, etc. 10.16%). They offered additional comments about potential additions such as the

following:

> "I think this would be awesome and super educational/helpful especially being offline – so you can understand what you're seeing." (M035).

> Another wrote:

> "That sounds like a very unique immersive experience that would add depth and interest to the experience for young and old alike." (LC018).

> A third participant offered this:

> "Both of my friend and I have said multiple times, 'man, I wish I had service so I could Google Image this.' I think the app would be a fantastic idea." (TH022).

I also recorded voices of opposition. 176 response components indicate a lack of

willingness to try VTE inclusions. For example, 108 response components suggest that

participants viewed the proposed VTE inclusion as a threat/in contrast to/incompatible with

authentic, in-person experiences in nature. Participant elaborations stressed a perceived

technology/nature clash or conflict by stating things such as:

> "I prefer/would rather see it in person" (GC015, etc.)

> "I'd rather experience it in real life. And see the nature" (LD007)

> "Because that's dumb. Go outside nerd" (RV012)

> "I am the outdoors type. Not so much into technology" (BL008)

3.4.2.3 Preferences For VTE Types. To gain finer grain information on types of VTE inclusions participants might be willing to try, I included specific examples of existing and prospective inclusions that could be integrated to outdoor and indoor activities and sites in Tumbler Ridge. I asked participants to rank their preferences for each type, using a 5-point Likert scale. The result patterns for that question follow in Table 15 and Figure 3.

Preferences for various VTE types (n=384)	Least interested	Not very interested	Neutral	Interested	Most interested	Chose not to answer
AR in the museum	11.5%	7.8%	20.1%	22.4%	**31.3%**	7.0%
A 360° photo view of trails	16.4%	7.8%	20.6%	23.7%	**24.7%**	6.8%
Influencers' YouTube/ TikTok short videos	15.4%	7.8%	21.6%	26.0%	**22.9%**	6.3%
VR about the museum collection, in the museum	16.2%	12.0%	20.9%	22.4%	21.9%	6.8%
VR about nature/trails, in the museum	22.4%	12.2%	21.9%	16.7%	19.8%	7.0%
VR that can be used at home	18.5%	1.0.7%	23.4%	22.4%	18.0%	7.0%
An audio guide for moving through the museum	20.3%	14.8%	26.6%	18.8%	12.2%	7.3%

Table 15 *Participant preferences for VTE Types*
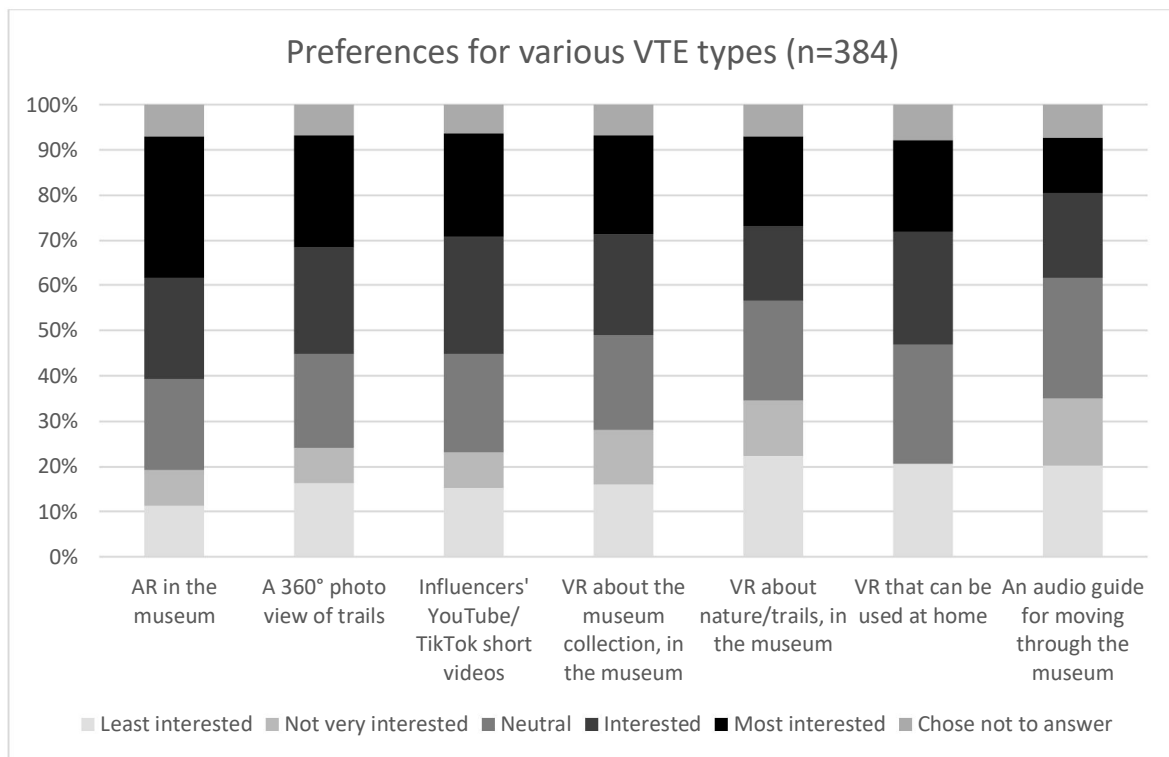
Figure 3 *Participant preferences for VTE Types*

In addition, I specifically asked particularly about participant interest in VTEs in a museum environment, with the Tumbler Ridge Museum in mind. Survey participants indicated preferences for AR over options such as "VR about the museum collection in the museum" (44.3%), "VR about nature/trails in the museum" (36.5%), and "An audio guide for moving through the museum" (31.0%). Over fifty percent of respondents (53.7%) either chose the option "interested" and "most interested" for suggested AR use in the museum.

3.4.3 Additional Observations, And Unexpected Benefits Of An In-Person Paper Survey

3.4.3.1 Visitor Accessibility Issues: Observational Data And Survey Data. While on site, I was able to observe and hear about accessibility challenges. For example, I routinely noticed and noted incidents where visitor experiences were visibly impacted by such issues. In particular, I saw people being forced to avoid certain trails or to end their trail

experiences earlier than planned, including without being able to reach key attractions. For example, I witnessed folks turning back on trail without having reached the bottom or seen the tracks. Barriers to access included health conditions and mobility challenges faced by individual visitors, unexpected shifts in elevation at some sites/on some trails, and a lack of trail hardening (e.g. steps and/or railings). I also witnessed families who had to turn back or cut visits to certain sites and trails short because some members of their parties (e.g. elders; children) could not navigate the site completely. Such observations confirmed that accessibility is an ongoing challenge in the Tumbler Ridge UNESCO Global Geopark. Many sites are not very accessible at all, including some of the relatively easy/moderate sites and some of its most popular trails. By contrast, the Museum and the Visitor Information Centre both have accessible bathrooms. The Museum also have a loaner wheelchair and offers generous space to move through the exhibitions.

3.4.3.2 Participant Reactions To Suggestions About Technology. While observing tourists and visiting sites, I witnessed a range different type of technologies being employed, as well as a range of reactions to their actual or suggested use. For example, I routinely observed and was told about visitors using cars, bicycles, motorbikes, motorhomes, ATVs, boats, navigation systems, phones, cameras, and other types of technologies during their visits. I know from observational data that visitors to Tumbler Ridge use applications such as All Trails and social media sites (Facebook; Instagram) to ask questions and share information about Tumbler Ridge (e.g. re: wildlife presences; trail accessibility and quality; road types and condition; etc.)

At the same time, I collected survey responses and additional annotations on the surveys, and in-person comments indicating some strong visitor reactions to suggested

additional VTEs and technology integration into the Tumbler Ridge experience. For example, my paper surveys included a participant slashing through all of the VTE questions, crossing out the entire section (e.g. TH013, TH047), and writing comments such as "Not interested" (TH047). Some nature/culture conflict comments collected suggested that VTE technology and nature are like "oil and water" in that participants wrote about VTEs as incompatible to authentic outdoor experiences. It is important to note that these came as additional comments or comments in open-ended questions; I did not ask directly about this. These comments are indicative of this pattern:

"I don't see VTE as a true tourism experience" (LC004)

"Fake!" (TMH020)

I also noticed similar comments in the VTEs & accessibility answers. Although the survey did not ask about VTEs as substitutes for being in nature, answers revealed related fears and dislikes. Some participants made it clear that they were not interested in scenarios where VTEs might replace travel:

"Just not a replacement for the real thing..." (LC008)

"I would much rather travel in real life..." (LD003)

3.5 Conclusion

Despite its semi-remote location, Tumbler Ridge is attractive to driving travellers within and nearby the region. Further, participants suggest that for some, driving is seen as part of an enjoyable experience rather than as an obstacle. Visitors are attracted because of the natural beauty, outdoor activities, and dinosaur-related elements. Participants emphasized the strengths of the destination and also acknowledged its limitations. They

called for service base and infrastructural upgrades, improvements to signage and other forms of communication, and trail enhancements (physical and informational). They also identified some potential avenues for targeted marketing in terms of their points of origin, the routes they took to/from Tumbler Ridge, and their activity and communication preferences. Such findings provide direction for enhancing the destination experience and tourist satisfaction.

One of my main goals in conducting this research was to explore the potential of integrating VTEs into Tumbler Ridge tourism. Although the majority of respondents indicated interest in virtual travel, the survey data suggests a divide in visitor openness or interest with respect to potential VTEs in Tumbler Ridge. While some were open to their possible inclusion, others reported viewing virtual experiences as incompatible with their concept of authentic outdoor connection. Understanding these different viewpoints is critical for destination management and for balancing destination and visitor needs. To consider applying VTEs to a nature-based destination like Tumbler Ridge, it is critical to address concerns about the authenticity and compatibility of VTEs with outdoor activities. Educating visitors about the complementary nature of virtual and real-world experiences and challenging the new of them as contradictory might help to bridge this gap and to create wider acceptance of VTEs among targeted audiences.

It is also important to provide an array of options to meet diverse visitor needs. VTEs offer visitors additional ways to interact with sites and destinations. Destinations can successfully widen their audience and accommodate varied visitor preferences via careful integration of VTEs as supplement to in-person encounters, adding new elements and enriching interactions. Also, using VTEs to increase accessibility is crucial for communities

and attractions interested in equity, diversity, and inclusion. For example, seniors and other people facing physical or logistical challenges could experience enhanced connections to sites and activities. VTEs can lessen the need for physical capabilities, and can also direct or encourage contact with particular attractions. They can also offer new options to people on site, enjoying the area but finding themselves unable to access certain trails and vantage points. They could be invited to experience them virtually. This is particularly important in communities like Tumbler Ridge, where local residents looking to continue enjoying landscapes and features could also benefit from such visitor-directed enhancements while aging in place. In such cases, VTEs could represent a shared set of assets or resources for both residents and visitors, representing a tourism investment with wider community benefits.

Chapter 4 Discussion and Implications

In this chapter, I discuss some of the overarching themes in the data, and I bring these together with my literature review to consider implications for Tumbler Ridge, and to make tailored recommendations—my ultimate project goal.

4.1 Regional Appeal And Drive Tourism

My demographic findings are consistent with prior data and patterns identified in previous northern BC tourism data (Northern BC Tourism Association, n.d.). For example, the *Northern BC 2023 Year In Review of Northern BC Region* notes the main markets for northern BC tourism as being from BC and Alberta (British Columbia Reginal Tourism Secretariat et al., 2023), matching my data. The northeastern BC destination development strategy (Destination BC, 2019) identifies the main modes of transportation for tourists in northeastern BC as cars, motorcycles, and recreational vehicles (RVs). With driving as the only way to access Tumbler Ridge, attracting inter-province tourists beyond Alberta as well as international tourists is a challenge for the area (Prideaux, 2000), with no international airport nearby.

Tumbler Ridge is renowned both as a stand-alone attraction and a sought-after stop along driving routes such as the Alaska Highway and the Great Northern Circle Route. My sample of participants also emphasizes drive tourism along known driving routes. Visitation to the area, according to my survey participants is both pre-planned and spontaneous. Like visitation to Morden, Manitoba, visitors coming to Tumbler Ridge include purposeful tourists seeking nature and/or dinosaurs and incidental tourists — those passing through without prior planning (Ramsey & Malcolm, 2018).

Some survey participants reported driving as a key tourism activity as well as a means of transportation. Participants reported driving as a pleasant and welcomed aspect rather than casting it as a hassle or shortcoming. Participants reminded me that driving can be about enjoying the scenery, not just about getting around. They noted distance as an added appeal rather than a barrier, adding to prior research on driving as a desirable vacation experience for drive tourists (Hardy, 2003). Participants also signaled the remote location as a distinct part of the appeal, again emphasizing that driving for long distances is valued by some. This aligns with previous research that notes visitor imaginations of distant places as being coupled with unique peoples, cultures, and places (Duffield & Long, 1981, as cited in Hall & Boyd, 2005; Brown & Hall, 2000).

These findings stress the importance of car-based tourism to Tumbler Ridge and underscore the potential for tailored marketing initiatives for regional residents, as well as the need to find ways to connect with and attract visitors from further afield. Tumbler Ridge could choose to further target marketing campaigns and infrastructure improvements for drive tourism. Strategies might include promoting scenic driving routes, enhancing signage along major circuits, disseminating tourism information in towns along routes further south (to draw people to northern routes, and link drive tourism destinations), playing upon a "hidden gem" destination image, and leveraging digital resources to inspire and inform travellers who embrace the drive/distance as part of travelling. Offering alternatives for those without access to their own vehicles (e.g. shuttles; connections with nearby towns and bus routes) is another possibility but a more costly one. It would, however, allow for growing drive tourism while also keeping sustainability in mind.

4.2 VTEs As A Way To Address Concerns About Distance And Age

When asked about the likelihood of return visits, survey respondents identified two barriers: distance (from where they live) and their age (limiting their likelihood of returning). Both of these factors are beyond the control of destination management. Tumbler Ridge's semi-remote geographical position is not something that can be changed. Also, it brings a certain appeal to some visitors like drive tourists and those seeking destinations "off the beaten path". Its location away from big cities and major routes does however result in long travel times and logistical challenges associated with visiting the area, and such factors can constrain visitation (Prideaux, 2000). While infrastructure improvements like more transit alternatives may reduce some of these difficulties, they cannot fully eliminate the challenge of distance/location. Aging is also an unavoidable fact of life. Physical restrictions associated with aging (McGuire et al.,1986) and decreased mobility (Nordbakke, 2013) can make travel more difficult and less desirable for seniors. Seniors' reduced incomes can also limit travel.

Such barriers to travel emphasize opportunities that VTEs can bring in terms of improving accessibility and inclusion. Guttentag (2010) named accessibility as a dimension of tourism that VR can support. Gharibi et al. (2023) investigated disabled people's intentions and attitudes about AR, VR, and MR technologies in museums. They recommended the integration of VR, AR, and 360-degree videos to enhance accessible tourism (Gharibi et al., 2023). Yu et al. (2020) studied changes in middle-aged and older individuals' physiological, psychological, and attention performance by showing them natural surroundings through VR. Their findings suggest that VTEs can be used as both an alternative to going outside *and* as a method for encouraging or enhancing outdoor exploration. Although most survey participants did not report having experienced physical or mobility challenges, they did acknowledge that

others face accessibility challenges. Further, a few participants suggested that they might also face mobility issues in the future. The dual recognition of current and future needs speaks to the potential of VTE use in Tumbler Ridge as a way to improve accessibility.

4.3 VTES As Perceived Threats To Nature-Based Authenticity

Project results and observations indicate a polarization in participant perspectives on VTEs in Tumbler Ridge. Some participants expressed interest in VTEs as a way to overcome physical limits and to improve access. At the same time, some participants demonstrated strong objections to the integration of VTEs into nature-based tourism. I and others note that strong negative reactions about VTE integrations seem to stand in contrast to the overall use of other technologies, tools and equipment in outdoor environments, such as GPS, satellite phones, cameras, carbon fiber trekking poles, waterproof clothing and hiking boots (e.g., see Elmahdy et al., 2017). The recorded strong objections to the proposed combination of VTEs and nature can be explained in the following ways:

1) Perceptions of VTEs as incompatible with nature-based destinations

Destination image significantly impacts visitor behaviour and perceptions before, during, and after travel (Agapito et al., 2013; Wang et al., 2016). Launching VTEs can shape destination images by adding dynamic or interactive experiences on top of visualized landscapes and attractions (Chang, 2022; Cho & Fesenmaier, 2000; Griffin et al., 2022; McFee et al., 2019; Tsai, 2022; Wu & Lai, 2022; Zhang et al., 2021). However, if the destination image is nature-based, tourists may expect a "wild" outdoor landscape with "unmodified" natural habitats, even in a branded Geopark. This is because the history and underlying philosophy of North American parks emphasized wilderness and "nature," as being in contrast with urban centres (and technology) (Reis & Shelton, 2011). For some

visitors, the use of virtual technology interrupts a dream of pure unspoiled wilderness. It interferes with authenticity and disrupts the tourist gaze (Urry & Larsen, 2011). This disruption may result in resistance to VTEs, the destination itself, or sites within it, if they are perceived as contradicting the destination image, related visitor imaginations, or expected experiences.

2) VTEs and technologies as part of everyday life rather than vacation time

Escape from a routine environment is one of the primary motivations for travel (Crompton, 1979; Iso-Ahola, 1982). "Enjoying the natural environment and escaping from daily life" is also listed as one of the four motivations for hiking travellers (Kim et al., 2014, p.90), a key demographic in nature-based destinations. As mobile technology has become part of modern daily life, tourists may feel that the use of some forms of technology used during a vacation prevents truly escaping everyday life. Everyday technology use such as phone-based apps might represent the banal everyday, bringing back constraints and responsibilities of home and work life (Neuhofer, 2016). While some people like to continue technology use while on vacation (Nautiyal et al., 2023), others do not. Research suggests that up to 50% of camping tourists have some willingness to disconnect (Dickinson et al., 2016). Collected participant comments from my project align with this work — participants mentioned choosing a nature-based vacation destination to escape from electronic devices and screens. Some participants also mentioned leaving their phones in the car to ensure that trail experiences were not interrupted by (unacceptable) technology. This might explain some reluctance to engage with the idea of virtual tourism in Tumbler Ridge.

3) VTEs as threat to authenticity

Previous research suggests that visitor perceptions of authenticity can influence their acceptance of virtual tourism (Guttentag, 2010). Creators and proponents see virtual tourism experiences as partially authentic (Mura et al., 2017). My participants, however, shared imaginations of authentic outdoor experiences that require freedom from technological interference to be considered genuine. VTEs may disrupt nature-based expectations by challenging visitor expectations and their conceptualizations of genuine or authentic nature-based experiences. However, humans are drawn to natural environments for diverse reasons, and perceptions of authenticity are impacted by cultural and individual personality traits (Guttentag, 2010). While some visitors prefer "unspoiled natural habitats" to satisfy their appetite for adventure and exploration, others may be open to integrating virtual and realistic tourism (Mura et al., 2017). My results reflect these two visitor dispositions. To satisfy these two visitor preferences, nature-based destinations must plan in careful and informed ways, balancing visitor expectations while also aiming to embrace innovation. The goal of adopting VTEs should be to enhance rather than reduce visitor experiences of nature — such goals must be communicated carefully to prospective and on-site visitors so as not to detract from visitor experiences or word-of-mouth.

4.4 VTE Recommendations For The Tumbler Ridge Museum

VISITOR/USER JOURNEY
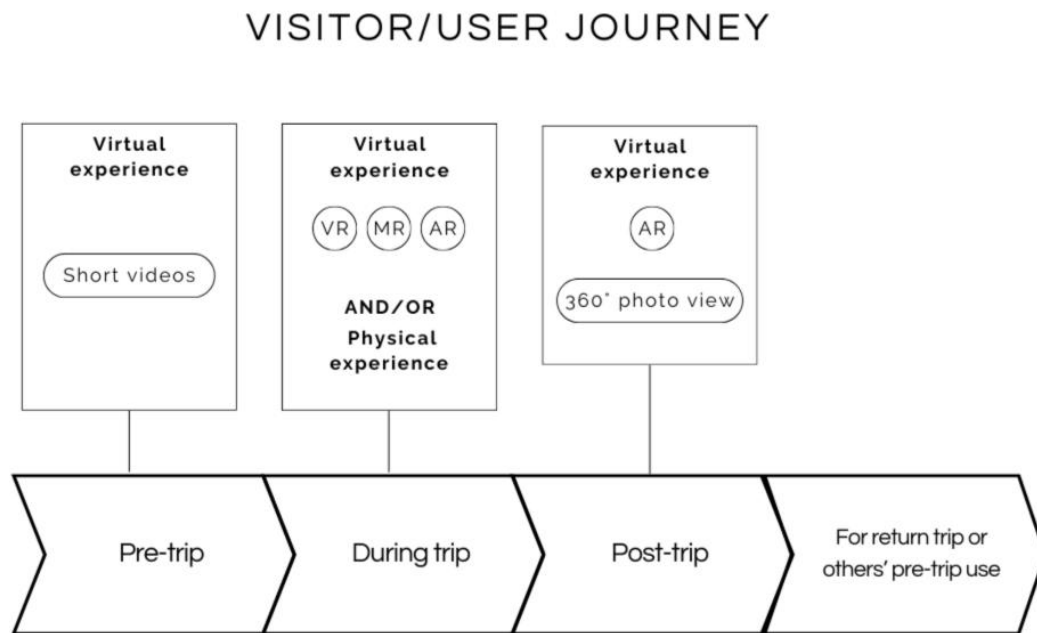
Figure 4 *Recommended VTEs for the Tumbler Ridge Museum*

For the **pre-trip stage**, while the literature review identified five types of VTEs—VR, AR, 360° photo views, live streaming, and webcam-travel— not all of them are the best fit for Tumbler Ridge Museum. My literature review suggests that live streaming and webcam-travel are more associated with nature-based settings than museums. Also, pre-trip VTEs should aim to encourage visitors to visit rather than to detract from visitation. Considering the Tumbler Ridge Museum's small size and its interest in increasing visitation, I would rather not risk decreasing in-person visitation by providing too much content online. For this reason, I recommend VTEs designed to enhance interaction without pre-disclosing too much of the in-person museum experience. In this case, short videos could offer a great pre-trip option. Despite not being highlighted in the literature review, short videos were highly rated

by survey participants. They ranked them among their top three preferred VTEs. The museum could use its existing social media platforms (TikTok, Instagram, Facebook) to share creative, low-cost, and entertaining videos, especially after the success of its pilot TikTok project with dinosaur videos (in summer 2022). Short videos could capture the interest of younger people and serve as an effective (re)branding tool. Again—rather than duplicating the museum experience, short videos would encourage visitors to visit the museum in person by only offering windows into or elements of the museum rather than all of it.

My recommendations for the **during trip stage** are consistent with the literature. I recommend the use of VR, AR, or MR, as "VR or AR in the museum" was the top choice among survey responses. Visitors could interact with immersive VR videos in the Tumbler Ridge Museum theatre by wearing VR headsets provided by the museum. These could provide dynamic reconstructions of prehistoric environments or in-depth information about the museum's collections, complementing exhibits present. AR technology could also enhance visitor experiences by allowing people to scan skeletons or fossils with their smartphones, resulting in digital reconstructions or relevant educational content popping up on their phone screens. This could include videos or detailed information about fossils. MR, which combines VR and AR, offers a more immersive experience. Visitors could wear a headset that adds digital reconstructions to the actual physical environment, making interactions with museum displays more entertaining and informative.

For the **post-trip stage**, I recommend 360° photo views of key exhibits or the whole Museum, using AR scan technology. These would allow prior visitors to virtually revisit their favourite exhibitions and to share their experiences with others. Both current and past visitors could, for example, scan a picture or logo printed on their museum ticket using phones or

tablets, to access 360° views of featured exhibitions or the entire museum. This is a form of "virtual souvenir," which allows visitors to further capture or recapture the moment. When shared with future visitors, these experiences would enhance word-of-mouth, assist with pre-trip preparation, and influence potential visitors to the Tumbler Ridge Museum.

4.5 VTE Recommendations For The Tumbler Ridge UNESCO Global Geopark
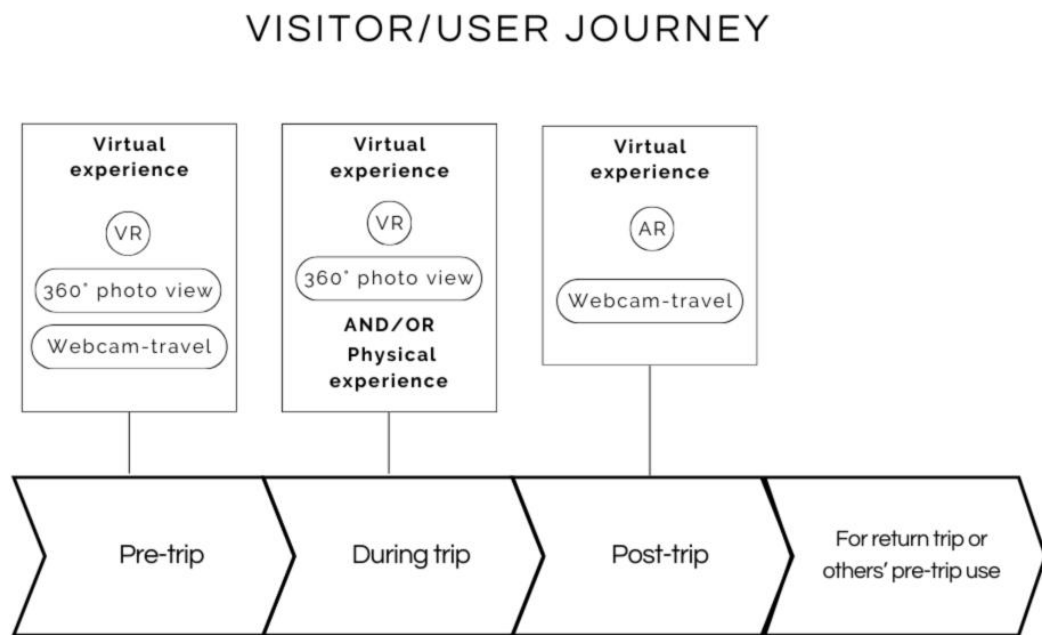
Figure 5 *Recommended VTEs for the Tumbler Ridge UNESCO Global Geopark*

Based on the survey and my literature review, I suggest a variety of VTEs for the Tumbler Ridge UNESCO Global Geopark for the various points in the user journey (Figure 5).

Pre-trip: Not every one of the five pre-trip VTE types found in my literature review (VR, 360° photo views, live streaming, and webcam-travel) are suited to the Tumbler Ridge UNESCO Global Geopark. Given the Geopark's nature and emphasis on trails and wildlife

experiences, the most fitting VTEs for the pre-trip stage are 360° photo views and webcam-travel, with VR as a supplementary option. These pre-trip VTEs could be used to better inform potential visitors and those already planning trips to the area. According to my survey results, many visitors have never heard of the Geopark before arriving. Others also said that they would have planned to stay longer in the area if they had known about all of Tumbler Ridge's offerings beforehand. Pre-trip VTEs might encourage longer stays, thereby increasing local tourism revenue. Better informing visitors pre-trip can also lessen the "information-experience" gap between what visitors expect of a destination and what they experience on site. A narrower gap is often associated with greater satisfaction (Wang et.al, 2024), ultimately increasing positive word-of-mouth.

360° photo views of trails, which came in second place among survey respondents, are handy for future visitors who want to preview trail conditions. Trail difficulty varies depending on individual perspectives. Providing complete 360° views of trails, including the steepest and most challenging sections, will assist visitors in determining whether the trails meet their expectations and capabilities. Furthermore, 360° photo views of trails during different seasons might help visitors better prepare for conditions and for essential equipment by previewing seasonal trail conditions of future adventures. Some trails already have partially 360° photo views available on the Geopark's website (e.g. Google Trekker View of Cabin Pool Trackway Site on www.tumblerridgegeopark.ca), making this a low-cost option for the Geopark. VR is also accessible off site in that it can be compatible with equipment some potential visitors already have. For example, people with access to VR headsets at home. VR can be used to provide an immersive preview of the trails, allowing potential visitors to evaluate their interests, to earmark particular attractions, and to otherwise

prepare for their visit. For example, VR can mimic the trail experience, emphasizing features and challenges, as well as sharing compelling views that people might want to later see in person.

Webcam-travel can also be helpful. For example, a colleague's experiment in Mackenzie, BC, employed a solar-powered webcam with a satellite connection to upload footage of caribou. Uploading such streams to social media platforms can draw interest and provide real-time information on the Geopark's natural environment (Jarratt, 2021). Placing webcams can also monitor trail conditions, as well as use patterns and traffic levels. Wildlife footage is also a great way to engage potential visitors (Jarratt, 2021).

During trip: For those who have made it to Tumbler Ridge, I recommend on-site use of 360° photo views of the routes. The Tumbler Ridge Visitor Information Centre can employ its existing screens to display 360° photo views of trails, allowing visitors to check trail conditions before starting on hikes. This strategy enables visitors to make informed decisions, especially when they are unsure about the grade of trail or the level of skill needed. Similarly, providing seasonal views of trail conditions on site in the Visitor Information Centre could also be used to prime visitors regarding necessary equipment and preparation. VR can be an optional upgrade for individuals who are interested. While the primary focus should be on using 360° photo views, VR may provide an additional immersive experience for those who want to explore more detailed or more challenging trail portions.

Furthermore, these VTE offerings could be used to alleviate the workload at the Visitor Information Centre. Instead of always seeking guidance from staff members, some questions might be answered be online footage. Visitors could be empowered to form their own opinions about trail conditions and difficulty levels, via online resources. The desire for

better, more immediate, and dynamic information on trails and conditions was mentioned by survey participants. To enhance knowledge of and use of existing 360° photo views already in existence at the park, the Geopark should increase their visibility on the website, on social media platforms, and in the Visitor Information Centre. Many visitors are likely unaware of existing options. Advertising them well could improve the overall visitor experience. However, it is necessary that the Geopark adjusts its promotional strategies for on-site VTE options carefully. Both the literature review and survey results suggest that certain visitors may not be interested in VTEs. For example, some Millennials seek to reduce virtual interruptions in nature (Clark & Nyaupane, 2022), some adventure seekers prefer physical challenges and social engagement (Orru et al., 2019), and some view VTEs as threatening nature and authenticity (survey results). Strategies for these groups should balance promoting VTEs with respecting nature and authenticity, ensuring that visitors can engage with VTEs without feeling that the core experience has been or will be weakened via their use.

Post-trip: Based on the literature, webcam travel is advised for the post-trip stage. Webcam-travel can help visitors recreate their experiences and connect with the Geopark. Promoting webcam travel allows past visitors to remotely view the Geopark, fostering nostalgia and strengthening their connection to the place (Jarratt, 2021). Although the Geopark does not sell tickets, it has a physical item that could incorporate a VTE-related QR code—the Geo Explorer Passport (Tumbler Ridge UNESCO Global Geopark, 2024). The Geo Explorer Passport is designed for hiking enthusiasts to collect stickers when they complete trails listed in the passport and get the opportunity to win prizes. By placing a QR code in the passport, previous visitors could watch live or recorded videos of wildlife or trail conditions where they hiked through a webcam. This AR technology encourages post-trip

interactions. This not only helps visitors recall their memories but also motivates them to share about their visit, encouraging positive word of mouth and future visits, and contributing to a sense of place attachment (Jarratt, 2021) —three key desirable aspects for tourism destinations.

Chapter 5 Conclusion

My thesis project explored the potential integration of virtual tourism experiences (VTEs) into the Tumbler Ridge UNESCO Global Geopark and the Tumbler Ridge Museum. It was undertaken with these two research partners in the hopes of enhancing visitor engagement and accessibility. It was conducted to inform key planning exercises over the next few years. A contribution of my research is the introduction of the term "virtual tourism experiences" (VTEs). This new term addresses the inconsistencies and multiple meanings found in existing literature by offering an umbrella term that acts as a clearer framework for understanding technologies such as VR, AR, MR, 360° photo views, live streaming, webcam-travel as related and as a suite of potential combinations. In addition to proposing this term, I suggested a modified conceptualization building on Neuhofer et al.'s (2012) conceptual model that details how these technologies can fit within and be used during different stages of the visitor/user journey (pre-trip, during-trip, and post-trip). Clearer terminology and taxonomy will increase access to and understanding of the VTE literature.

A key goal in writing up this project was to produce useful chapters for my research partners—chapters that would simplify patterns in the literature, and allow for combining these with Tumbler Ridge-specific data. By integrating a review of existing literature with results from a visitor survey, I propose a tailored set of VTE recommendations that respectively address various stages of the visitor/user journey (pre-trip, during-trip, and post-trip) for the Tumbler Ridge Museum and Tumbler Ridge UNESCO Global Geopark. The survey results indicate a polarized reaction to VTEs, with some embracing the technology and others questioning its fit with "authentic" nature experiences. This emphasizes the importance of recommending a balanced strategy that would include VTEs as a supplement

to physical visits rather than a substitute for them. Educating visitors on how virtual and real-life activities can and do coexist might reduce concerns, and encourage acceptance.

My study also highlights the potential role of VTEs in improving accessibility, picking up on an initial theme of interest for my partners and the communities they serve. Using VTEs to improve accessibility allows more people to connect with and enjoy a destination's natural beauty, regardless of their background, location, or capacity (Guttentag, 2010)). For example, people with disabilities or mobility challenges can virtually visit trails and geological sites that might otherwise be inaccessible to them (Gharibi et al., 2023). Future research could investigate how VTEs can further address accessibility. This could include asking both local and distant potential users about barriers keeping them from enjoying Tumbler Ridge as well as key activities and sites within it. Furthermore, research on motion sickness in VR use is needed as motion sickness can be a barrier to user acceptance and satisfaction (Beck et al., 2019). Better understanding and addressing motion sickness and its impacts on the user experience is needed to improve accessibility and enjoyment of VR.

Additionally, future research should involve designing and testing specific tailored VTE inclusions for Tumbler Ridge. This could include performing field experiments or pilot testing of inclusions at the Geopark and the Museum. Making on-site VTE equipment available for testing different VTE options, such as VR, AR, and 360° views, and collecting data on experiences and satisfaction could inform technological investments and refinements. Such experiments would provide useful details about user experience and the practical challenges of introducing VTEs to semi-remote places such as Tumbler Ridge. With on-site equipment, future research could also investigate the technological and infrastructural limitations, such as how connectivity issues affect VTEs in rural areas like Tumbler Ridge.

This could provide important information about the practicality of new technologies like satellite-driven live streaming or solar-powered webcams in places with limited connectivity. Learning how to manage these logistical challenges is crucial for successfully integrating VTEs into rural and nature-based tourism locations.

Another area for further exploration is demographic analysis. Taking a more in-depth look into visitor demographics and VTE preferences might yield useful information. Understanding how different groups perceive VTEs across demographic factors such as age, gender, education level, household income, and geographic point of origin (e.g. urban versus rural backgrounds) could help identify target groups who are more or less accepting of VTEs. Research could also explore the opposition to VTEs among those who see it as a threat to nature-based authenticity, as well as investigate the preferences of more tech-savvy groups. Analysis of such differences could inform strategies to tailor VTE inclusions for particular demographics for increased satisfaction.

Future research could also investigate VTEs' longitudinal outcomes, and the particular relationships between VTE use and different trip stages. For example, it would be useful to examine whether and how pre-trip VTEs increase on site visits. It would also be good to if and how post-trip VTEs such as webcam-travel serve to grow place attachment and to encourage return visits. This kind of research could help places like Tumbler Ridge find VTE-related ways to foster strong connections with their visitors. Measuring trends in visitor engagement, word-of-mouth marketing, and loyalty over time, as they are connected to VTEs across travel stages would offer insights into the long-term influence of VTEs on place attachment, satisfaction, word-of-mouth, and return visits—all key considerations.

Lastly, considering the dominance of VR in existing literature, more research is needed on other types of VTEs, such as 360° photo views, live streaming, and webcam-travel. This is needed so that readers can have a better idea of the true range of options, combinations, and outcomes. More assessments of VTE impacts on visitor engagement, satisfaction, implementation costs, and the overall economic impact are needed as well. Comparative case studies of VTE adoption could also prove useful, particularly for readers considering which VTEs to adopt and integrate. It is essential for decision-makers in the tourism sector to consider the costs of implementing and maintaining any type of VTEs, along with their potential to encourage visits or enhance visitor experience. Research that includes such elements could facilitate decision-making with respect to VTE types. This would be particularly useful for small, resource-limited places like Tumbler Ridge.

Addressing these main issues could offer a more comprehensive understanding of VTEs and their potential fit within regional aspirations to increase accessibility and engagement in Tumbler Ridge. Despite project limitations and gaps in the VTE literature, I hope that this document provides the type of starter document that partners wanted as general resource about VTEs and specific suggestions about how they might work in Tumbler Ridge. Both the literature review and the survey data suggest that VTE incorporation could enrich visitor experiences with and connections to sites like the Museum and the Geopark. Survey respondents also provided key insights into factors that would have to be incorporated into VTE integration into Tumbler Ridge. This includes working within the confines of technological and communications limitations in the greater area, and marketing VTEs as complementary and desirable way to augment a nature-based experience, not a threat to them. Existing literature and the survey data also suggest that VTEs might benefit both

visitors and local people looking to experience Tumbler Ridge and its main attractions in new and different ways. Including VTEs as new shared resource bridging local and visitor use could help to improve the long-term success of tourism to the area by expanding its benefits for both "hosts" and "guests".

Bibliography

Agapito, D., Oom do Valle, P., & da Costa Mendes, J. (2013). The Cognitive-Affective-Conative Model of Destination Image: A Confirmatory Analysis. *Journal of Travel & Tourism Marketing*, *30*(5), 471–481. https://doi.org/10.1080/10548408.2013.803393

Angeloni, R. (2023). Digitization and Virtual Experience of Museum Collections. The Virtual Tour of the Civic Art Gallery of Ancona. *SCIRES-IT - SCIentific RESearch and Information Technology*, *12*(2). https://doi.org/10.2423/i22394303v12n2p29

Babbie, E. R. (2016). *The practice of social research* (Fourteenth ed). Cengage Learning.

Bailey, C. (2018). observations. In *A Guide to Qualitative Field Research* (Third Edition ed., Vol. 0, pp. -). SAGE Publications, Inc, https://doi.org/10.4135/9781071909614

Beck, J., Rainoldi, M., & Egger, R. (2019). Virtual reality in tourism: A state-of-the-art review. *Tourism Review*, *74*(3), 586–612. https://doi.org/10.1108/TR-03-2017-0049

British Columbia Reginal Tourism Secretariat, Symphony Tourism Services & Northern BC Tourism Association. (2023). *Northern BC 2023 Year In Review of Northern BC Region.* https://www.travelnbc.com/wp-content/uploads/2024/04/Northern-BC-2023-Year-In-Review-Canada-USA-International.pdf

Brown, F., & Hall, D. R. (2000). Tourism in peripheral areas: case studies. Channel View Publications.

Çakar, K., & Aykol, Ş. (2021). Case Study as a Research Method in Hospitality and Tourism Research: A Systematic Literature Review (1974–2020). *Cornell Hospitality Quarterly*, *62*(1), 21–31. https://doi.org/10.1177/1938965520971281

Carrozzino, M., & Bergamasco, M. (2010). Beyond virtual museums: Experiencing immersive virtual reality in real museums. *Journal of Cultural Heritage*, *11*(4), 452–458. https://doi.org/10.1016/j.culher.2010.04.001

Chang, H. H. (2022). Virtual reality, YouTube, or social media? Assessing promotional effects on tourism destination. *Journal of Vacation Marketing*, *28*(2), 211–227. https://doi.org/10.1177/13567667211038960

Cho, Y.-H., & Fesenmaier, D. R. (2000). A Conceptual Framework for Evaluating Effects of a Virtual Tour. In D. R. Fesenmaier, S. Klein, & D. Buhalis (Eds.), *Information and Communication Technologies in Tourism 2000* (pp. 314–323). Springer Vienna. https://doi.org/10.1007/978-3-7091-6291-0_28

Cho, Y.-H., Wang, Y., & Fesenmaier, D. R. (2002). Searching for Experiences: The Web-Based Virtual Tour in Tourism Marketing. *Journal of Travel & Tourism Marketing*, *12*(4), 1–17. https://doi.org/10.1300/J073v12n04_01

Clark, C., & Nyaupane, G. P. (2022). Understanding Millennials' nature-based tourism experience through their perceptions of technology use and travel constraints. *Journal of Ecotourism*, 1–15. https://doi.org/10.1080/14724049.2021.2023555

Cope, M. (2021). Organizing, Coding, and Analyzing Qualitative Data. In I. Hay,, & M. Cope,. (Eds.), *Qualitative research methods in human geography* (Fifth ed, pp. 355–375). Oxford University Press.

Creswell, J. W., & Creswell, J. D. (2023). *Research design: qualitative, quantitative, and mixed methods approaches* (Sixth ed). SAGE Publications, Inc.

Crompton, J L. (1979). Motivations for Pleasure Vacation. *Annals of Tourism Research*, *6*(4), 408-424. https://doi.org/10.1016/0160-7383(79)90004-5

Dai, F., Wang, D., & Kirillova, K. (2022). Travel inspiration in tourist decision making. *Tourism Management*, *90*, 104484. https:// doi.org/10.1016/j.tourman.2021.104484

Deng, Z., Benckendorff, P., & Wang, J. (2019). Blended Tourism Experiencescape: A Conceptualisation of Live-Streaming Tourism. In J. Pesonen & J. Neidhardt (Eds.), *Information and Communication Technologies in Tourism 2019* (pp. 212–222). Springer International Publishing. https://doi.org/10.1007/978-3-030-05940-8_17

Destination BC. (2019). *Northeastern BC Destination Development Strategy*. Destination BC Corp. https://www.travelnbc.com/wp-content/uploads/2021/08/Northeastern-BC-Destination-Development-Strategy_Final.pdf

Dickinson, J. E., Hibbert, J. F., & Filimonau, V. (2016). Mobile technology and the tourist experience: (Dis)connection at the campsite. *Tourism Management*, *57*, 193–201. https://doi.org/10.1016/j.tourman.2016.06.005

Elmahdy, Y., Haukeland, J., & Fredman, P. (2017). Tourism megatrends, a literature review focused on nature-based tourism. *MINA fagrapport, 42*. https://doi.org/10.13140/RG.2.2.32481.66402.

Errichiello, L., Micera, R., Atzeni, M., & Del Chiappa, G. (2019). Exploring the implications of wearable virtual reality technology for museum visitors' experience: A cluster analysis. *International Journal of Tourism Research*, *21*(5), 590–605. https://doi.org/10.1002/jtr.2283

Gharibi, N., Mirtaghian Rudsari, S. M., Ali, F., & Ryu, K. (2023). Understanding XR

    technology acceptance by physically disabled tourists in museums. *Tourism and*

    Hospitality Management, *28*(3), 661–682. https://doi.org/10.20867/thm.28.3.10

Griffin, T., Guttentag, D., Lee, S. H. (Mark), Giberson, J., & Dimanche, F. (2022). Is VR

    always better for destination marketing? Comparing different media and styles.

    Journal of Vacation Marketing, 135676672210782.

    https://doi.org/10.1177/13567667221078252

Grigsby, R. (2001). Participant observation. In *The Handbook of Social Work Research*

    Methods (pp. 333-343). SAGE Publications, Inc.,

    https://doi.org/10.4135/9781412986182

Guest, G., Namey, E., & Mitchell, M. (2013). Sampling in qualitative research. In *Collecting*

    Qualitative Data: A Field Manual for Applied Research (Vol. 0, pp. 41-74). SAGE

    Publications, Ltd, https://doi.org/10.4135/9781506374680

Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism*

    Management, *31*(5), 637–651. https://doi.org/10.1016/j.tourman.2009.07.003

Hall, C. M., & Boyd, S. W. (2005). *Nature-based tourism in peripheral areas: development*

    or disaster?. Channel View Publications.

Halseth, G., & Sullivan, L. (2002). *Building community in an instant town: a social*

    geography of Mackenzie and Tumbler Ridge, British Columbia. UNBC Press.

Hardy, A. (2003). An investigation into the key factors necessary for the development of

iconic touring routes. *Journal of Vacation Marketing*, *9*(4), 314–330.

https://doi.org/10.1177/135676670300900402

He, Z., Wu, L., & Li, X. (Robert). (2018). When art meets tech: The role of augmented

reality in enhancing museum experiences and purchase intentions. *Tourism*

Management, *68*, 127–139. https://doi.org/10.1016/j.tourman.2018.03.003

Hewlett, D., & Brown, L. (2018). Planning for tranquil spaces in rural destinations through

mixed methods research. *Tourism Management*, *67*, 237–247.

https://doi.org/10.1016/j.tourman.2018.01.011

Iacono, J., Brown, A., & Holtham, C. (2009). Research methods—A case example of

participant observation. *Electronic journal of business research methods, 7*(1), pp39-

46.

Iso-Ahola, S. E. (1982). Toward a social psychological theory of tourism motivation: A

rejoinder. *Annals of Tourism Research*, *9*(2), 256–262. https://doi.org/10.1016/0160-

7383(82)90049-4

Jackson, T., & Illsley, B. (2006). Tumbler Ridge, British Columbia: The mining town that

refused to die. *Journal of Transatlantic Studies*, *4*(2), 163–186.

https://doi.org/10.1080/14794010708656846

Jarratt, D. (2021). An exploration of webcam-travel: Connecting to place and nature through

webcams during the COVID-19 lockdown of 2020. *Tourism and Hospitality*

Research, *21*(2), 156–168. https://doi.org/10.1177/1467358420963370

Jingen Liang, L., & Elliot, S. (2021). A systematic review of augmented reality tourism research: What is now and what is next? *Tourism and Hospitality Research*, *21*(1), 15–30. https://doi.org/10.1177/1467358420941913

Cox, J. (2023-2024). *KAWS: FAMILY [Exhibition]*. Art Gallery of Ontario, Toronto, Canada. https://ago.ca/exhibitions/kaws-family

Kim, H., Lee, S., Uysal, M., Kim, J., & Ahn, K. (2015). Nature-Based Tourism: Motivation and Subjective Well-Being. *Journal of Travel & Tourism Marketing*, *32*(sup1), S76–S96. https://doi.org/10.1080/10548408.2014.997958

Lee, H., Jung, T. H., tom Dieck, M. C., & Chung, N. (2020). Experiencing immersive virtual reality in museums. *Information & Management*, *57*(5), 103229. https://doi.org/10.1016/j.im.2019.103229

Lin, K., Fong, L. H. N., & Law, R. (2022). Live streaming in tourism and hospitality: A literature review. *Asia Pacific Journal of Tourism Research*, *27*(3), 290–304. https://doi.org/10.1080/10941665.2022.2061365

Louvre Museum. (n.d.). *Virtual Tours.* Louvre Museum Official Website. Retrieved April 23, 2022, from https://www.louvre.fr/en/online-tours

Markey, S. P., Halseth, G., & Manson, D. (2012). *Investing in place: economic renewal in northern British Columbia*. UBC Press.

May, T., & Perry, B. (2022). *Social research: Issues, methods and process* (Fifth ed). Open University Press.

McFee, A., Mayrhofer, T., Baràtovà, A., Neuhofer, B., Rainoldi, M., & Egger, R. (2019). The Effects of Virtual Reality on Destination Image Formation. In J. Pesonen & J. Neidhardt (Eds.), *Information and Communication Technologies in Tourism 2019* (pp. 107–119). Springer International Publishing. https://doi.org/10.1007/978-3-030-05940-8_9

McGuire, F. A., Dottavio, D., & O'Leary, J. T. (1986). Constraints to participation in outdoor recreation across the life span: a nationwide study of limitors and prohibitors. *The Gerontologist, 26*(5), 538–544.

McGuirk, P. M. & O'Neill, P. (2021). Using Questionnaires in Qualitative Human Geography. In Hay, I. & Cope, M. (Eds.), *Qualitative research methods in human geography* (Fifth ed, pp. 244–270). Oxford University Press.

McLafferty, S. L. (2016). Conducting questionnaire surveys. In Clifford, N. J., Cope, M., Gillespie, T. W., & French, S. (Eds.), *Key methods in geography* (Third ed, pp. 77-88). SAGE.

Moro, S., Rita, P., Ramos, P., & Esmerado, J. (2019). Analysing recent augmented and virtual reality developments in tourism. *Journal of Hospitality and Tourism Technology*, *10*(4), 571–586. https://doi.org/10.1108/JHTT-07-2018-0059

Mura, P., Tavakoli, R., & Pahlevan Sharif, S. (2017). 'Authentic but not too much': Exploring perceptions of authenticity of virtual tourism. *Information Technology & Tourism*, *17*(2), 145–159. https://doi.org/10.1007/s40558-016-0059-y

Nautiyal, R., Polus, R., Tripathi, A., & Shaheer, I. (2023). "To use or not to use"—Mobile

    technology in nature-based tourism experience. *Journal of Outdoor Recreation and*

    Tourism, *43*, 100667. https://doi.org/10.1016/j.jort.2023.100667

Neuhofer, B. (2016). Value Co-creation and Co-destruction in Connected Tourist

    Experiences. In A. Inversini & R. Schegg (Eds.), *Information and Communication*

    Technologies in Tourism 2016 (pp. 779–792). Springer International Publishing.

    https://doi.org/10.1007/978-3-319-28231-2_56

Neuhofer, B., Buhalis, D., & Ladkin, A. (2012). Conceptualising technology enhanced

    destination experiences. *Journal of Destination Marketing & Management*, *1*(1–2),

    36–46. https://doi.org/10.1016/j.jdmm.2012.08.001

Nordbakke, S. (2013). Capabilities for mobility among urban older women: Barriers,

    strategies and options. *Journal of Transport Geography*, *26*, 166–174.

    https://doi.org/10.1016/j.jtrangeo.2012.10.003

Northern BC Tourism Association. (2019, April 5). *Northern British Columbia Travel Guide*

    2019. https://issuu.com/travelnbc/docs/2019_northern_bc_travel_guide

Northern BC Tourism Association. (n.d.). *Research Programs.* Northern BC Tourism

    Association. Retrieved April 23, 2024, from

    https://www.travelnbc.com/programs/research

Orru, K., Kask, S., & Nordlund, A. (2019). Satisfaction with virtual nature tour: The roles of

    the need for emotional arousal and pro-ecological motivations. *Journal of*

    Ecotourism, *18*(3), 221–242. https://doi.org/10.1080/14724049.2018.1526290

Pahlevan-Sharif, S., Mura, P., & Wijesinghe, S. N. R. (2019). A systematic review of systematic reviews in tourism. *Journal of Hospitality and Tourism Management*, *39*, 158–165. https://doi.org/10.1016/j.jhtm.2019.04.001

Paulus, T., Lester, J., & Dempster, P. (2014). *Digital Tools for Qualitative Research*. SAGE Publications Ltd. https://doi.org/10.4135/9781473957671

Petersen, H. (2024, September 09). Northern B.C. coal mine comes back to life after 24 years. *CBC News*. https://www.cbc.ca/news/canada/british-columbia/quintette-mine-conuma-resources-open-24-years-1.7317288

Pratisto, E. H., Thompson, N., & Potdar, V. (2022). Immersive technologies for tourism: A systematic review. *Information Technology & Tourism*, *24*(2), 181–219. https://doi.org/10.1007/s40558-022-00228-7

Prideaux, B. (2000). The role of the transport system in destination development. *Tourism Management*, *21*(1), 53–63. https://doi.org/10.1016/S0261-5177(99)00079-5

Ramsey, D., & Malcolm, C. D. (2018). The importance of location and scale in rural and small town tourism product development: The case of the Canadian Fossil Discovery Centre, Manitoba, Canada. *Canadian Geographies / Géographies Canadiennes*, *62*(2), 250–265. https://doi.org/10.1111/cag.12409

Reis, A., & Shelton, E. (2011). The Nature of Tourism Studies. *Tourism Analysis, 16*(3), 375-384. https://doi.org/10.3727/108354211X13110944741361.

Resta, G., Dicuonzo, F., Karacan, E., & Pastore, D. (2021). The impact of virtual tours on museum exhibitions after the onset of COVID-19 restrictions: Visitor engagement

and long-term perspectives. *SCIRES-IT - SCIentific RESearch and Information Technology*, *11*(1). https://doi.org/10.2423/i22394303v11n1p151

Sarantakos, S. (2013). *Social Research* (Fourth ed). Red Global Press.

Serravalle, F., Ferraris, A., Vrontis, D., Thrassou, A., & Christofi, M. (2019). Augmented reality in the tourism industry: A multi-stakeholder analysis of museums. *Tourism Management Perspectives*, *32*, 100549. https://doi.org/10.1016/j.tmp.2019.07.002

Skard, S., Knudsen, E. S., Sjåstad, H., & Thorbjørnsen, H. (2021). How virtual reality influences travel intentions: The role of mental imagery and happiness forecasting. *Tourism Management*, *87*, 104360. https://doi.org/10.1016/j.tourman.2021.104360

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

tom Dieck, D., tom Dieck, M. C., Jung, T., & Moorhouse, N. (2018). Tourists' virtual reality adoption: An exploratory study from Lake District National Park. *Leisure Studies*, *37*(4), 371–383. https://doi.org/10.1080/02614367.2018.1466905

Trunfio, M., & Campana, S. (2020). A visitors' experience model for mixed reality in the museum. *Current Issues in Tourism*, *23*(9), 1053–1058. https://doi.org/10.1080/13683500.2019.1586847

Trunfio, M., Jung, T., & Campana, S. (2022). Mixed reality experiences in museums: Exploring the impact of functional elements of the devices on visitors' immersive

experiences and post-experience behaviours. *Information & Management*, *59*(8),

103698. https://doi.org/10.1016/j.im.2022.103698

Truong, D., Xiaoming Liu, R., & Yu, J. (2020). Mixed methods research in tourism and

hospitality journals. *International Journal of Contemporary Hospitality

Management*, *32*(4), 1563–1579. https://doi.org/10.1108/IJCHM-03-2019-0286

Tsai, L.-L. (2022). Factors That Influence Virtual Tourism Holistic Image: The Moderating

Role of Sense of Presence. *Sustainability*, *14*(1), 467.

https://doi.org/10.3390/su14010467

Tumbler Ridge UNESCO Global Geopark. (2024, August 30). *Just one month left in the

Tumbler Ridge Global Geopark Passport Contest! Get out on those trails, snap some

epic* [Image attached] [Status update]. Facebook.

https://www.facebook.com/share/p/JLJKt3RtLssnpsuu

Tumbler Ridge UNESCO Global Geopark. (n.d.). *Top 10 Geosites*. Tumbler Ridge UNESCO

Global Geopark. Retrieved April 23, 2023,

from https://www.tumblerridgegeopark.ca/index.php/top-10-geosites

Urry, J., & Larsen, J. (2011). *The tourist gaze 3.0* (Third ed)*. SAGE.

http://public.eblib.com/choice/publicfullrecord.aspx?p=786870

Veal, A. J. (2006). *Research methods for leisure and tourism: a practical guide* (Third ed).

Prentice Hall/Financial Times.

Wang, C., Qu, H., & Hsu, M. K. (2016). Toward an integrated model of tourist expectation

formation and gender difference. *Tourism Management*, *54*, 58–71.

https://doi.org/10.1016/j.tourman.2015.10.009

Wang, R., Wu, C., Wang, X., Xu, F., & Yuan, Q. (2024). E-Tourism Information Literacy and

Its Role in Driving Tourist Satisfaction With Online Travel Information: A Qualitative

Comparative Analysis. *Journal of Travel Research*, *63*(4), 904–922.

https://doi.org/10.1177/00472875231177229

Watson, A. (2021). "Placing" Participant Observation In I. Hay,, & M. Cope,. (Eds.),

Qualitative research methods in human geography (Fifth ed, pp. 125–147). Oxford

University Press.

Wei, W. (2019). Research progress on virtual reality (VR) and augmented reality (AR) in

tourism and hospitality: A critical review of publications from 2000 to 2018. *Journal

of Hospitality and Tourism Technology*, *10*(4), 539–570.

https://doi.org/10.1108/JHTT-04-2018-0030

Wu, X., & Lai, I. K. W. (2022). The use of 360-degree virtual tours to promote mountain

walking tourism: Stimulus–organism–response model. *Information Technology &

Tourism*, *24*(1), 85–107. https://doi.org/10.1007/s40558-021-00218-1

Xiao, H., & Smith, S. L. J. (2006). Case studies in tourism research: A state-of-the-art

analysis. *Tourism Management, 27*(5), 738–749.

https://doi.org/10.1016/j.tourman.2005.11.002

Yellowstone Forever. (n.d.). *Old Faithful Streaming Webcam*. Yellowstone Forever.

> Retrieved April 23, 2022, from https://www.yellowstone.org/old-faithful-streaming-
>
> webcam

Yellowstone National Park. (n.d.). *Webcams*. Yellowstone National Park (U.S. National Park

> Service). Retrieved April 23, 2022, from
>
> https://www.nps.gov/yell/learn/photosmultimedia/webcams.htm

Yu, C.-P., Lee, H.-Y., Lu, W.-H., Huang, Y.-C., & Browning, M. H. E. M. (2020).

> Restorative effects of virtual natural settings on middle-aged and elderly adults.
>
> *Urban Forestry & Urban Greening*, *56*, 126863.
>
> https://doi.org/10.1016/j.ufug.2020.126863

Yung, R., & Khoo-Lattimore, C. (2019). New realities: A systematic literature review on

> virtual reality and augmented reality in tourism research. *Current Issues in Tourism*,
>
> *22*(17), 2056–2081. https://doi.org/10.1080/13683500.2017.1417359

Yung, R., Khoo-Lattimore, C., & Potter, L. E. (2021). Virtual reality and tourism marketing:

> Conceptualizing a framework on presence, emotion, and intention. *Current Issues in*
>
> *Tourism*, *24*(11), 1505–1525. https://doi.org/10.1080/13683500.2020.1820454

Zhang, W., Wang, Y., & Zhang, T. (2021). Can "Live Streaming" Really Drive Visitors to

> the Destination? From the Aspect of "Social Presence." *SAGE Open*, *11*(1),
>
> 215824402110066. https://doi.org/10.1177/21582440211006691

Zollo, L., Rialti, R., Marrucci, A., & Ciappei, C. (2022). How do museums foster loyalty in

> tech-savvy visitors? The role of social media and digital experience. *Current Issues in*
>
> *Tourism*, *25*(18), 2991–3008. https://doi.org/10.1080/13683500.2021.1896487

Appendix A Research Ethics Board (REB) Approval

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

RESEARCH ETHICS BOARD

MEMORANDUM

To: Zoë Meletis
CC: Yihang Zhang

From: Davina Banner-Lukaris, Chair
Research Ethics Board

Date: July 15, 2022

Re: **E2022.0630.039.00**
Growing our knowledge of tourism to Tumbler Ridge (BC)

Thank you for submitting revisions to the Research Ethics Board (REB) regarding the above-noted proposal that includes in-person research. Your proposal has now been approved by the REB. Your Safe Research Plan has also been approved by the Safety Department, a copy of which is attached.

We are pleased to issue approval for the above-named study for a period of 12 months from the date of this letter. Continuation beyond that date will require further review and renewal of REB approval. Any changes or amendments to the protocol or consent form must be approved by the REB.

Good luck with your research.

Sincerely,

Davina Banner-Lukaris
Chair, Research Ethics Board

3333 University Way, Prince George, BC, V2N 4Z9, Telephone (250) 960-6735

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Safe Research Plan for new and resuming in-person research

PLEASE NOTE
1. The purpose of the Safe Research Plan is to demonstrate to the University that the necessary precautions and protocols are in place to protect research participants as well as the research team.
2. Please review the Guidelines for In-Person Research – Safe Research Plan before completing your Plan.
3. The Safe Research Plan is not intended to replace any safety protocols required by UNBC.
4. If a section is not applicable, indicate n/a.
5. The sections below are expandable. Use as much space as you need to explain the steps being taken to ensure the safety of participants and team members.
6. The Safe Research Plan should be a stand-alone document, so please ensure that you include all required details even if you have already provided this information in your Research Ethics Board application.

Introduction	
PI name	Dr. Zoë A. Meletis and Yihang Zhang
Dept/Faculty	Department of Geography, Earth, and Environmental Sciences; Natural Resources and Environmental Studies
Study Jurisdiction	British Columbia, Canada
Study Settings	Specific sites with permission, e.g. hotel lobbies; at trail heads; in the Tumbler Ridge Museum. A full list will be returned to the REB once it is confirmed with permission on site.
Start Date	July 11, 2022

Suggested Details to include based on the Safe Research Guidelines
Population Description
Describe the risk profile of the research participant group (e.g., age, underlying medical conditions) and how risk will be managed for high risk members of the community as they relate to the COVID pandemic. Contact tracing will change the privacy for participants and this needs to be acknowledged.
Other general risks not directly related to COVID-19 and their mitigation should be described in Item #15 of the ethics application and do not need to be repeated here.
N/A
Gatherings (focus groups, meetings, presentations, etc.)
Describe physical distancing arrangements and detail planned control measures.
N/A. We will be distributing a self-administered survey. We will wear masks when indoors and wipe down pens/pencils with sanitizer between uses. We will keep safe distances.
Research within community and healthcare settings
Describe who has been involved in developing the Safe Research Plan.
Please include all elements from Section 3 that apply to your research.
N/A

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Research Involving Indigenous Communities
Indicate in your Safe Research Plan if your research involves Indigenous communities and describe who has been involved in developing the Safe Research Plan.
Letters of agreement (MOUs, etc.) will need to be attached to the ethics application before approval can be granted.
Please include all elements from Section 4 that apply to your research.

N/A

Interviews
What safety precautions will be taken for in-person interviews?
Please include all elements from Section 5 that apply to your research.

N/A

Travel and Accommodation
Describe how any required travel will be managed both for members of the research team and participants.
Please include all elements from Section 6 that apply to your research.

Since there is no public transportation from Prince George to Tumbler Ridge. Zhang will have travel to/from Chetwynd by public bus. She will have a mask on during all the trips to reduce exposure to COVID-19. When our research partner picks her up to carry on to Tumbler Ridge, she will keep my mask on.

Meletis will travel by private vehicle.

Surface Transmission and PPE
How will the risk of COVID-19 transmission be mitigated in your research setting?
Please include all elements from Section 7 that apply to your research. (Have you developed sanitization procedures for all shared equipment and touchpoints in the research location? Have you removed all unnecessary items such as magazines, flyers, office supplies in the research location?)

We will use paper prints of the questionnaire. COVID-19 is now understood to not be much of a concern in terms of transmission via paper.

For additional safety, we will carry sanitizer and team members will be advised to wash our hands before and after touching surveys and pens.

Research team member and participant safety protocols
What interactions will the research team and research participants have with each other?
Please include all elements from Section 8 that apply to your research.
Confirm whether self-assessment questions or other methods of assessment will be used.

The research team members will invite potential participants to fill in the questionnaire in person. The participants might have some inquires for the team member before and during the filling process. Therefore, all the research team members will be suggested to wear a mask when they talk to any (potential) participants, particularly when indoors.

We will also remind team members to self-assess their health condition every day.

Once any research team member becomes sick or develops any symptoms of COVID-19, they should avoid working with participants and other team members to prevent from COVID-

[Jan. 11, 2021]

19 spreads. If any research team member experiences worsening symptoms, we will suggest accessing medical assistance as appropriate.

Communications
Describe how your Safe Research Plan will be distributed to fellow researchers and participants. Researchers must retain records for the purposes of research and also contact tracing, which must be communicated to the participants.
Please include all elements from Section 9 that apply to your research.

We will give them a copy of this document and instruct them verbally with reminders at the start and end of every surveying day.

Reporting [See Step 4 in the Guidance]
Describe how adherence to the Safe Research Plan will be ensured
- How will changes to the plan be recorded?
- How will safety issues be reported?
- Who will be responsible for maintaining safe research protocols?

If changes to the plan are needed, we will let the Research Ethics Board know of changes or unanticipated problems that arise during research.

[Jan. 11, 2021]

Appendix B TCPS 2: CORE 2022 Certificate

PANEL ON
RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE 2022

Certificate of Completion

This document certifies that

Yihang Zhang

successfully completed the Course on Research Ethics based on
the Tri-Council Policy Statement: Ethical Conduct for Research
Involving Humans (TCPS 2: CORE 2022)

Certificate # 0000824739   15 June, 2022

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TUMBLER RIDGE VISITATION SURVEY 2022

SURVEY ID: _____

DATE: _____

Information Letter / Consent Form For Visitors

Project Title
Bringing dinosaurs into the 2020s: considering current visitation and future virtual tourism possibilities for the Tumbler Ridge Museum and Geopark (BC)

Who is conducting the study?
Yihang Zhang   yihangz@unbc.ca
Masters Student, Natural Resources and Environmental Studies
University of Northern British Columbia
Prince George, BC V2N 4Z9

Dr. Zoë A. Meletis   zoe.meletis@unbc.ca
Associate Professor, Geography, Earth, and Environmental Sciences
University of Northern British Columbia
Prince George, BC V2N 4Z9

What is the purpose of this study?
The purpose of this study is to collect new information on visitors, the activities they engage with in Tumbler Ridge, and their preferences and motivations—including with respect to virtual tourism. This research is being conducted in collaboration with The Tumbler Ridge Museum and the Tumbler Ridge UNESCO Global Geopark. It is part of Zhang's Masters project, and part of Meletis' research as well. It is also part of a MITACS internship. The information you provide will be used as part of Zhang's thesis and may also appear in academic presentations and papers, and popular media. We will return data and information to participants and other audiences including the Tumbler Ridge Museum and the Tumbler Ridge Geopark and other interested actors.

Who is funding this study?
The study includes funding from The Tumbler Ridge Museum Foundation, the MITACS Accelerate program, and UNBC. Partial funding has also been provided by the BC Real Estate Foundation.

Why are we doing this voluntary low risk study?
This study will help us learn more about visitation to Tumbler Ridge during the summer of 2022. We will collect data on visitor motivations, activities, perceptions, and demographics. We are inviting people like you to help us better understand what tourists are interested in, including when it comes to virtual options.

Participation in this study is entirely voluntary. You are free to stop participating at any time during the survey and to skip any questions you like. A completed survey will be considered consent, and all answers will be kept anonymous and confidential. Contact information for follow-up and prizes will be removed and stored separately from the survey.

This is a low risk study that has been reviewed by the UNBC Research Ethics Board. We will provide you with a self-administered survey that should take you about 15 minutes to complete. We can assist you if you like. Please hand it to us when done.

There is nothing in this study that is likely to harm you. You can stop at any time, and skip any questions you like.

What are the benefits of participating?
This study will generate new data on visitation to Tumbler Ridge. This will be shared with the Tumbler Ridge UNESCO Global Geopark and the Tumbler Ridge Museum, who will consider it when developing future plans. We will also return data summaries to project participants and other interested actors (e.g. Chambre of Commerce; Northern BC Tourism). We also plan to make contributions to academic literature and to teaching.

How will your privacy be maintained?
Your anonymity will be respected. Surveys will only be identified by a code number, will be entered into digital format, and kept on a password-protected computer; they will also be stored separately from voluntarily shared contact information. Subjects will not be identified by name in any reports, papers, or presentations from the completed study.

Demographic information is only used to describe our sample and to compare it to known data about visitors to

Tumbler Ridge. All survey answers are anonymous and confidential. Your contact information will only be

used as you have indicated (e.g. for prize consideration and/or data return). It will be stored securely and will

not be shared. Once the project has ended, data has been returned and prizes awarded, contact information will

be destroyed.

Will you be paid for taking part in this research study?
We will offer you a gift/sticker in appreciation for participating. You will also have a chance to win a set of binoculars ($400 value).

Study Results
The results of this study will be reported in a graduate thesis and may also be published in academic journal articles, books and be presented in academic conferences, community meetings and reports in Tumbler Ridge and BC, Canada. Data from the project will also be used in teaching and may be shared with related government actors. No visitor contact information will be shared. Study participants (businesses and visitors) can also provide us with an email address where we can send a resulting data summary (1-2 pages) and an infographic.

Questions, Concerns or Complaints about the project
If you have any questions, please ask us at any time during the survey or afterwards. You can contact us at yihangz@unbc.ca and zoe.meletis@unbc.ca. If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, please contact the UNBC Office of Research at 250 960 6735 or e-mail reb@unbc.ca.

Participant Consent and Withdrawal
Taking part in this study is entirely up to you. You have the right to refuse to participate in this study. If you decide to take part, you may choose to pull out of the study without reason or repercussions. In order to withdraw from the study, you can do so until September 15, 2022. Please contact us and we would be happy to remove your survey from the data. To do so, we will need you to provide us with the code on your information letter. Otherwise, your anonymous data will remain part of the project.

CONSENT

I have read or been described the information presented in the information letter about the project:

YES   NO

I have been offered this information letter and had the opportunity to ask questions about the project.

YES   NO

I understand that a completed survey will indicate consent. No signature will be collected.

YES   NO

Appendix D Tumbler Ridge Visitation Survey 2022

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TUMBLER RIDGE VISITATION SURVEY 2022

SURVEY ID: _____

DATE: _____

Thank you for agreeing to participate in this voluntary survey. While some questions might seem repetitive, they have been strategically designed to answer academic and practical questions, in collaboration with The Tumbler Ridge Geopark and the Tumbler Ridge Museum. Please answer as fully and completely as you can, but also feel welcome to skip any question that you do not want to answer. You can stop at any time. The survey begins with project information.

Section 1. Trips to and activities in Tumbler Ridge

1. Is this your first visiting time Tumbler Ridge?
   a) Yes. **(Please jump to Q2)**   b) No. This is my _____ time visiting here.
   1a. If not, how often do you visit Tumbler Ridge?
      a) Monthly or every few months   b) Yearly   c) Less than once/year

2. Where did you hear about the Tumbler Ridge UNESCO Global Geopark? Please check all that apply.

☐ Before arriving, I had not heard of the Tumbler Ridge UNESCO Global Geopark

☐ General Internet search

☐ Tourism websites like TripAdvisor or Expedia

☐ Tourism websites like Hello BC

☐ The Geopark's official website

☐ Visitor centers (e.g. Dawson Creek): _____

☐ Printed promotional materials including pamphlets

☐ Popular media (TV; radio; magazines; newspapers)

☐ Billboards along highways

☐ Friends, family, colleagues and/or other travelers

☐ Social media:

    ☐ Facebook   ☐ Instagram   ☐ Twitter

    ☐ Tiktok   ☐ YouTube

☐ Other: _____

3. In Tumbler Ridge, are you travelling as:

a) A family/or families with children present

b) A group of friends or colleagues

c) An adult couple or set of couples

d) A solo/independent traveler

4. How long are you spending in Tumbler Ridge this trip?

a) less than 2 days   b) 2-3 days   c) 4-7 days   d) more than 7 days

5. Where are you staying in Tumbler Ridge? Please check all below that apply,

OR ☐ I'm not staying overnight in Tumbler Ridge.

☐ Hotel   ☐ Guesthouse/B&B/Airbnb   ☐ Family/Friends

☐ Campground ☐ Other: _____

6. Does this trip include other stops/stays?

a) Yes. Other destinations on this trip are:

_____

b) No. Tumbler Ridge is the only stop this time.

7. What drew you to Tumbler Ridge? Why are you visiting?

8. Please circle all the reasons for your visit, and rank your **TOP 3 REASONS**, with 1 being the top reason:

<div style="text-align: right">RANK</div>

a) Nature/the outdoors (e.g. trails)   _____

b) Indigenous culture   _____

c) The unique location / spot off the beaten track   _____

d) Dinosaur footprints and fossils   _____

e) The UNESCO Geopark   _____

f) Kinuseo Falls   _____

g) The Tumbler Ridge Museum   _____

h) It is a stop on the way to my next destination   _____

i) Visiting family/friends   _____

j) Small-town lifestyle   _____

k) Work (e.g. mining; energy; research)   _____

l) Researching places to live or play   _____

m) Other: _____

_____

9. Which of the activities below will you take part in (or have you already taken part in) while in Tumbler Ridge on this trip? Please check all that apply, and circle the activity that you most enjoy while you are in Tumbler Ridge.

☐ Hiking   ☐ Cycling   ☐ Motorbiking/ATVing

☐ Camping   ☐ Wildlife viewing   ☐ Hunting/ Fishing

☐ Taking part in watersports   ☐ Looking for tracks/fossils   ☐ Visiting the museum

☐ Taking tours   ☐ Driving to enjoy scenery   ☐ Geocaching

☐ Golfing   ☐ Emperor's Challenge 2022

☐ Other: _____

10. Is there anything about tourism in Tumbler Ridge that you would improve? Please provide details.

11. Do you think you will visit Tumbler Ridge again?

a) Yes. Why: _____

_____
_____
_____

b) No. Why: _____

_____
_____
_____

c) Not sure. Why not: _____

_____
_____
_____

Section 2. Tumbler Ridge and virtual tourism

This section is about existing and potential virtual tourism experiences. Virtual tourism experience (VTE) is a category of technology-based activities that can include pre-trip, during trip, and after-trip entertainment such as independent and official videos; video tours; virtual reality activities; 360 degree online "visits"; and more. These are not promotional videos or products but rather tourism activities online and/or on site. Please answer as best you can, whether or not you have engaged with virtual tourism.

12. Have you ever tried a virtual tourism experience? For example, Google Map's 360 degree street view; video museum tours; immersive experiences in a museum using VR equipment. Please circle your answer, and share a story below, about an experience if you like.

    a) Yes.   b) No.

    Please share a story about a virtual tourism experience(s):

13. If the Tumbler Ridge Museum and the Geopark could provide a virtual way to "travel" beyond your capabilities and skills, such as a live online virtual tour of an extreme expert-level, would you be interested in trying it? Please circle one and provide details:

    a) Yes. Why: _____

    _____

    _____

    _____

    _____

    b) No. Why: _____

    _____

    _____

    _____

    _____

14. Imagine the following virtual experiences as potential options in or for Tumbler Ridge. Please indicate your interest in each activity type (1=least interested; 3= neutral; 5= most interested)

a) 2D/two dimensional 360 degree tours that invite you to explore Tumbler Ridge's trails using a webpage and zooming/clicking on key details

1   2   3   4   5

b) Short videos of Tumbler Ridge's scenery or activities shot by a Youtuber/Tiktoker

1   2   3   4   5

c) Pre-trip/post-trip virtual reality (VR) outdoor experiences of Tumbler Ridge that you could watch at home

1   2   3   4   5

d) During-trip/on site virtual reality (VR) experiences in the Tumbler Ridge Museum where you could wear a VR headset and enjoy trails

1   2   3   4   5

e) During-trip/on site virtual reality (VR) experiences in the Tumbler Ridge Museum where you could wear a VR headset and or explore "behind the scenes" in the Museum collection

1   2   3   4   5

f) App-based artificial reality (AR) experiences in the Tumbler Ridge Museum (e.g. point your phone at a skeleton and experience a reconstruction of the dinosaur's appearance, and receive related information)

1   2   3   4   5

g) Audio-only experiences in the Tumbler Ridge Museum (e.g. you could access more information about aspects of the museum by scanning a QR code and listening along)

1   2   3   4   5

15. Imagine an application/app that you could download to your phone and take with you offline on the trails of Tumbler Ridge. You could access additional experiences linking local landscapes to prehistoric times (e.g. dinosaurs popping up; information about prehistoric plants and animals). Does that sound like something you would like to include in a visit?

a) Yes. Why: _____

_____

_____

_____

_____

b) No. Why: _____

_____

_____

_____

_____

16. Which of virtual tourism experiences below do you think would most enhance a visit to Tumbler Ridge? Please choose only **ONE** answer.

a) VR experiences of trails or outdoor activities that you could experience pre or post trip

b) VR experiences of trails or outdoor activities that you could try while in Tumbler Ridge.

c) AR experiences in the Tumbler Ridge Museum like the dinosaur reconstruction.

d) Phone-based app experiences that could be used offline outdoors in Tumbler Ridge.

17. Is there anything else you would like to add about Tumbler Ridge and/or virtual tourism experiences?

Section 3. Demographics

Like the rest of this survey, answering these questions is voluntary (thank you!), and you can skip any question. We collect information about age, gender, etc. so that we can describe the group that answered our survey and how they compare with other groups (e.g. prior visitors).

1. Where do you live for most of the year?

   a) British Columbia   b) Alberta

   c) Other province: _____   d) Other country: _____

2. Please choose the age range that you belong to (only the person completing the survey):

   a) 18-29 years   b) 30-39 years   c) 40-49 years

   d) 50-59 years   e) 60-69 years   f) over 70 years

3. Please choose the gender that you most identify with.

   a) Male   b) Female   c) Non-binary   d) Transgender

   e) Two-Spirit   f) Other: _____

4. Please choose the last level of formal education that you have completed.

   a) Some High School   b) High School

   c) Some university/college/trade school   d) Bachelor's degree, college or trades

   e) Master's Degree or PhD

5. Please choose your annual household income (household = household for tax purposes).

   a) under $35,000 b) $35,001-$70,000   c) $70,001-$100,000   d) More than $100,000

(WILL BE DETACHED TO STORE CONTACT INFORMATION SEPARATELY)

PLEASE LEAVE YOUR **EMAIL ADDRESS and indicate/check which options you are interested in.**

Or, leave this section blank if none of the options interest you:

_____

1) To be contacted with the **results of this survey**   ☐

2) To be entered into a **draw to win a pair of binoculars** worth approximately 400$ ☐

3) To be contacted with the results of this survey AND to be entered into a **draw to win a pair of binoculars** worth approximately 400$ ☐

Email addresses provided here will ONLY be used as indicated above. They will not be shared or used for any additional purposes.

Thank you very much for contributing to this project!

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Information Letter / Consent Form For Businesses

Project Title
Bringing dinosaurs into the 2020s: considering current visitation and future virtual tourism
possibilities for the Tumbler Ridge Museum and Geopark (BC)

Who is conducting the study?
Yihang Zhang   yihangz@unbc.ca
Masters Student, Natural Resources and Environmental Studies
University of Northern British Columbia
Prince George, BC V2N 4Z9

Dr. Zoë A. Meletis   zoe.meletis@unbc.ca
Associate Professor, Geography, Earth, and Environmental Sciences
University of Northern British Columbia
Prince George, BC V2N 4Z9

What is the purpose of this study?
The purpose of this study is to collect new information on visitors, the activities they engage
with in Tumbler Ridge, and their preferences and motivations—including with respect to
virtual tourism. This research is being conducted in collaboration with The Tumbler Ridge
Museum and the Tumbler Ridge UNESCO Global Geopark. It is part of Zhang's Masters
project, and part of Meletis' research as well. It is also part of a MITACS internship. The
information you provide will be used as part of Zhang's thesis and may also appear in
academic presentations and papers, and popular media. We will return data and information
to participants and other audiences including the Tumbler Ridge Museum and the Tumbler
Ridge Geopark and other interested actors.

Who is funding this study?
The study includes funding from The Tumbler Ridge Museum Foundation, and the MITACS
Accelerate program, and UNBC. Partial funding has also been provided by the BC Real
Estate Foundation.

Why are we doing this voluntary low risk study?
This study will help us learn more about visitation to Tumbler Ridge during the summer of
2022. We will collect data on visitor motivations, activities, perceptions, and demographics.
We are inviting people like your guests/customers to help us better understand what visitors
to Tumbler Ridge are interested in doing on site and virtually.

Participation in this study is entirely voluntary. Survey respondents are free to stop
participating at any time during the survey and to skip any questions they like. A completed

survey will be considered proof of their consent, and all answers will be kept anonymous and confidential. Contact information for follow-up and prizes will be removed and stored separately from the survey.

This is a low risk study that has been reviewed by the UNBC Research Ethics Board. We will provide the participants with a self-administered survey. It should take them about 15 minutes to complete it and we will be on site to assist them and answer questions.

There is nothing in this study that is likely to harm the participants. They can stop at any time, and skip any questions they like.

What will you be expected to do during this study?
We are requesting your permission to conduct the visitation survey (attached) on and/or near your business premises during the summer of 2022. We will inquire you about the survey times and locations on and/or near your business premises for your convivence. You can also direct questions about the project from potential participants to our research team.

Permission Consent and Withdrawal
Permission to this study on and/or near your business premises is entirely up to you. You have the right to refuse to permit this study on and/or near your business premises. If you decide to give the permission, you may choose to withdraw the permission at any time that we are surveying in Tumbler Ridge without reason or repercussions.

What are the benefits of allowing the research team to conduct this study?
This study will generate new data on visitation to Tumbler Ridge. This will be shared with the Tumbler Ridge UNESCO Global Geopark and the Tumbler Ridge Museum, who will consider it when developing future plans. We will also return data summaries to project participants and other interested actors (e.g. Chambre of Commerce; Northern BC Tourism). We also plan to make contributions to academic literature and to teaching.

How will the participants' privacy be maintained?
The participants' anonymity will be respected. Surveys will be identified only by a code number, will be entered into digital format, and kept on a password-protected computer; they will also be stored separately from voluntarily shared contact information. Subjects will not be identified by name in any reports, papers, or presentations.

Demographic information is only used to describe our sample and to compare it to known data about visitors to Tumbler Ridge. All survey answers are anonymous and confidential. The participants' contact information will only be used as they have indicated (e.g. for prize consideration and/or data return). It will be stored securely and will not be shared. Once the project has ended, data has been returned and prizes awarded, contact information will be destroyed.

Will you be paid for allowing the research team to conduct this research study?
We will offer you our thanks and the same small gift/sticker we are offering participating visitors. You can also ask to be entered into the draw for a pair of binoculars (approx. $400 value).

Study Results
The results of this study will be reported in a graduate thesis and may also be published in academic journal articles, books and be presented in academic conferences, community meetings and reports in Tumbler Ridge and BC, Canada. Data from the project will also be used in teaching and may be shared with related government actors. No visitor contact information will be shared. Study participants (businesses and visitors) can also provide us with an email address where we can send a resulting data summary (1-2 pages) and an infographic.

Questions, Concerns or Complaints about the project
If you have any questions, please ask us at any time during the survey or afterwards. You can contact us at yihangz@unbc.ca and zoe.meletis@unbc.ca.

If you have any concerns or complaints about your rights and/or your experiences during this study, please contact the UNBC Office of Research at 250 960 6735 or e-mail reb@unbc.ca.

BUSINESS CONSENT/PERMISSION TO SURVEY

I have read or been described the information presented in the information letter about the project:

YES   NO

I have been offered a copy of this form and had the opportunity to ask questions about the project.

YES   NO

I allow this research team to conduct this study ON and/or NEAR my business premises during the summer of 2022. Please circle the option(s) that apply.

YES   NO

I understand that the study will be conducted in different locations on rotation and that the research team will maintain good communications with me about times/days that work for both parties.

YES   NO

Business Name: _____

Address: _____

Additional Notes Regarding Surveying
Locations and Times: _____

Date: _____

Email address for data return: _____

Appendix F Confidentiality and Non-Disclosure Agreement

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Confidentiality and Non-Disclosure Agreement

The study **Bringing dinosaurs into the 2020s: considering current visitation and future virtual tourism possibilities for the Tumbler Ridge Museum and Geopark (BC)** is being conducted by Dr. Zoe Meletis and Yihang Zhang, in collaboration with The Tumbler Ridge Museum and The Tumbler Ridge UNESCO Geopark. The study aims to address the following questions, and you will be involved in collecting data that will be used to answer questions 2 and 3. The first question will be answered by Zhang based on a literature review and environmental scan:

1. **What are current existing and potential virtual tourism experiences (VTEs)?**

2. **Who are visitors to Tumbler Ridge in terms of demographics, motivations, preferences, and activities on site?**

3. **Which potential virtual tourism experiences (VTEs) might be appropriate for Tumbler Ridge?**

Data from this study will be used to:

- inform Meletis' BC-based research and future studies,
- to compose a key component of Zhang's Masters thesis project, and
- to contribute to resulting analyses and to future discussions of tourism by project partners The Tumbler Ridge Museum and the Tumbler Ridge UNESCO Geopark. It will also be returned to project partners and participants and shared via public meetings, academic presentations and papers, possible popular media articles, and via teaching.

I, (_____) (the "Recipient"), agree as follows:

1. To keep all the research information shared with me confidential by not discussing or sharing the research information in any form or format (e.g. disks, tapes, transcripts) with anyone other than the Principal Investigator(s);

2. To keep all research information in any form or format secure while it is in my possession;

3. I will not use the research information for any purpose other than assisting with this study and discussing final outputs;

4. To return all research information in any form or format to the Principal Investigator(s) when I have completed the research tasks;

5. After consulting with the Principal Investigator(s), erase or destroy all research information in any form or format regarding this research project that is not returnable to the Principal Investigator(s) (e.g. information stored on computer hard drive).

Recipient

_____   _____   _____

(Print name)   (Signature)   (Date)

Signed in the presence of one of the Principal Investigators (Zoë Meletis or Yihang Zhang) or partner organization representatives Zena Conlin (The Tumbler Ridge Museum) or Manda Mags (Tumbler Ridge UNESCO Geopark)

_____   _____   _____

(Print name)   (Signature)   (Date)

Please email your proof of TCPS2 CORE training to <u>zoe.meletis@unbc.ca</u>. And email Zoe at that address if you have any questions about the project or your involvement in it. You can also reach me at 250-640-1260. Link to the course: https://tcps2core.ca/welcome

If you would like copies of resulting project data summaries, etc., please provide your contact information to Yihang Zhang and we will add you to the list.

THANK YOU FOR BEING A PART OF OUR

BRINGING DINOSAURS INTO THE 2020s PROJECT!

Appendix G Copyright Clearance Center License Agreement

CCC Marketplace

This is a License Agreement between Yihang Zhang ("User") and Copyright Clearance Center, Inc. ("CCC") on behalf of the Rightsholder identified in the order details below. The license consists of the order details, the Marketplace Permissions General Terms and Conditions below, and any Rightsholder Terms and Conditions which are included below.

All payments must be made in full to CCC in accordance with the Marketplace Permissions General Terms and Conditions below.

Order Date	08-Oct-2024	Type of Use	Republish in a thesis/dissertation
Order License ID	1533995-1		
ISSN	2212-571X	Publisher	Elsevier Ltd
		Portion	Chart/graph/table/figure

LICENSED CONTENT

Publication Title	JOURNAL OF DESTINATION MARKETING & MANAGEMENT	Publication Type	Journal
		Start Page	36
Article Title	Conceptualising technology enhanced destination experiences	End Page	46
		Issue	1-2
		Volume	1
Date	01/01/2012		
Language	English		
Country	United Kingdom of Great Britain and Northern Ireland		
Rightsholder	Elsevier Science & Technology Journals		

REQUEST DETAILS

Portion Type	Chart/graph/table/figure	Distribution	Worldwide
Number of Charts / Graphs / Tables / Figures Requested	1	Translation	Original language of publication
Format (select all that apply)	Print, Electronic	Copies for the Disabled?	Yes
Who Will Republish the Content?	Academic institution	Minor Editing Privileges?	Yes
		Incidental Promotional Use?	Yes
Duration of Use	Life of current edition	Currency	CAD
Lifetime Unit Quantity	More than 2,000,000		
Rights Requested	Main product, any product related to main product, and other compilations/derivative products		

NEW WORK DETAILS

Title	Bringing dinosaurs into the 2020s: considering current visitation and future virtual tourism possibilities for the Tumbler Ridge Museum and the Tumbler Ridge UNESCO Global Geopark (BC)	Institution Name	University of Northern British Columbia
		Expected Presentation Date	2024-11-20
Instructor Name	Dr. Zoe Meletis		

ADDITIONAL DETAILS

Order Reference Number	N/A	The Requesting Person / Organization to Appear on the License	Yihang Zhang

REQUESTED CONTENT DETAILS

Title, Description or Numeric Reference of the Portion(s)	Fig. 2. Conceptual model technology enhanced destination experiences	Title of the Article / Chapter the Portion Is From	Conceptualising technology enhanced destination experiences
Editor of Portion(s)	Neuhofer, Barbara; Buhalis, Dimitrios; Ladkin, Adele	Author of Portion(s)	Neuhofer, Barbara; Buhalis, Dimitrios; Ladkin, Adele
Volume / Edition	1	Issue, If Republishing an Article From a Serial	1-2
Page or Page Range of Portion	36-46	Publication Date of Portion	2012-10-31

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Marketplace Permissions General Terms and Conditions

The following terms and conditions ("General Terms"), together with any applicable Publisher Terms and Conditions, govern User's use of Works pursuant to the Licenses granted by Copyright Clearance Center, Inc. ("CCC") on behalf of the applicable Rightsholders of such Works through CCC's applicable Marketplace transactional licensing services (each, a "Service").

1) **Definitions.** For purposes of these General Terms, the following definitions apply:

"License" is the licensed use the User obtains via the Marketplace platform in a particular licensing transaction, as set forth in the Order Confirmation.

"Order Confirmation" is the confirmation CCC provides to the User at the conclusion of each Marketplace transaction. "Order Confirmation Terms" are additional terms set forth on specific Order Confirmations not set forth in the General

Terms that can include terms applicable to a particular CCC transactional licensing service and/or any Rightsholder-specific terms.

"Rightsholder(s)" are the holders of copyright rights in the Works for which a User obtains licenses via the Marketplace platform, which are displayed on specific Order Confirmations.

"Terms" means the terms and conditions set forth in these General Terms and any additional Order Confirmation Terms collectively.

"User" or "you" is the person or entity making the use granted under the relevant License. Where the person accepting the Terms on behalf of a User is a freelancer or other third party who the User authorized to accept the General Terms on the User's behalf, such person shall be deemed jointly a User for purposes of such Terms.

"Work(s)" are the copyright protected works described in relevant Order Confirmations.

2) **Description of Service.** CCC's Marketplace enables Users to obtain Licenses to use one or more Works in accordance with all relevant Terms. CCC grants Licenses as an agent on behalf of the copyright rightsholder identified in the relevant Order Confirmation.

3) **Applicability of Terms.** The Terms govern User's use of Works in connection with the relevant License. In the event of any conflict between General Terms and Order Confirmation Terms, the latter shall govern. User acknowledges that Rightsholders have complete discretion whether to grant any permission, and whether to place any limitations on any grant, and that CCC has no right to supersede or to modify any such discretionary act by a Rightsholder.

4) **Representations; Acceptance.** By using the Service, User represents and warrants that User has been duly authorized by the User to accept, and hereby does accept, all Terms.

5) **Scope of License; Limitations and Obligations.** All Works and all rights therein, including copyright rights, remain the sole and exclusive property of the Rightsholder. The License provides only those rights expressly set forth in the terms and conveys no other rights in any Works

6) **General Payment Terms.** User may pay at time of checkout by credit card or choose to be invoiced. If the User chooses to be invoiced, the User shall: (i) remit payments in the manner identified on specific invoices, (ii) unless otherwise specifically stated in an Order Confirmation or separate written agreement, Users shall remit payments upon receipt of the relevant invoice from CCC, either by delivery or notification of availability of the invoice via the Marketplace platform, and (iii) if the User does not pay the invoice within 30 days of receipt, the User may incur a service charge of 1.5% per month or the maximum rate allowed by applicable law, whichever is less. While User may exercise the rights in the License immediately upon receiving the Order Confirmation, the License is automatically revoked and is null and void, as if it had never been issued, if CCC does not receive complete payment on a timely basis.

7) **General Limits on Use.** Unless otherwise provided in the Order Confirmation, any grant of rights to User (i) involves only the rights set forth in the Terms and does not include subsequent or additional uses, (ii) is non-exclusive and non-transferable, and (iii) is subject to any and all limitations and restrictions (such as, but not limited to, limitations on duration of use or circulation) included in the Terms. Upon completion of the licensed use as set forth in the Order Confirmation, User shall either secure a new permission for further use of the Work(s) or immediately cease any new use of the Work(s) and shall render inaccessible (such as by deleting or by removing or severing links or other locators) any further copies of the Work. User may only make alterations to the Work if and as expressly set forth in the Order Confirmation. No Work may be used in any way that is unlawful, including without limitation if such use would violate applicable sanctions laws or regulations, would be defamatory, violate the rights of third parties (including such third parties' rights of copyright, privacy, publicity, or other tangible or intangible property), or is otherwise illegal, sexually explicit, or obscene. In addition, User may not conjoin a Work with any other material that may result in damage to the reputation of the Rightsholder. Any unlawful use will render any licenses hereunder null and void. User agrees to inform CCC if it becomes aware of any infringement of any rights in a Work and to cooperate with any reasonable request of CCC or the Rightsholder in connection therewith.

8) **Third Party Materials.** In the event that the material for which a License is sought includes third party materials (such as photographs, illustrations, graphs, inserts and similar materials) that are identified in such material as having been used by permission (or a similar indicator), User is responsible for identifying, and seeking separate licenses (under this Service, if available, or otherwise) for any of such third party materials; without a separate license, User may not use such third party materials via the License.

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9) **Copyright Notice.** Use of proper copyright notice for a Work is required as a condition of any License granted under the Service. Unless otherwise provided in the Order Confirmation, a proper copyright notice will read substantially as follows: "Used with permission of [Rightsholder's name], from [Work's title, author, volume, edition number and year of copyright]; permission conveyed through Copyright Clearance Center, Inc." Such notice must be provided in a reasonably legible font size and must be placed either on a cover page or in another location that any person, upon gaining access to the material which is the subject of a permission, shall see, or in the case of republication Licenses, immediately adjacent to the Work as used (for example, as part of a by-line or footnote) or in the place where substantially all other credits or notices for the new work containing the republished Work are located. Failure to include the required notice results in loss to the Rightsholder and CCC, and the User shall be liable to pay liquidated damages for each such failure equal to twice the use fee specified in the Order Confirmation, in addition to the use fee itself and any other fees and charges specified.

10) **Indemnity.** User hereby indemnifies and agrees to defend the Rightsholder and CCC, and their respective employees and directors, against all claims, liability, damages, costs, and expenses, including legal fees and expenses, arising out of any use of a Work beyond the scope of the rights granted herein and in the Order Confirmation, or any use of a Work which has been altered in any unauthorized way by User, including claims of defamation or infringement of rights of copyright, publicity, privacy, or other tangible or intangible property.

11) **Limitation of Liability.** UNDER NO CIRCUMSTANCES WILL CCC OR THE RIGHTSHOLDER BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, OR INCIDENTAL DAMAGES (INCLUDING WITHOUT LIMITATION DAMAGES FOR LOSS OF BUSINESS PROFITS OR INFORMATION, OR FOR BUSINESS INTERRUPTION) ARISING OUT OF THE USE OR INABILITY TO USE A WORK, EVEN IF ONE OR BOTH OF THEM HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In any event, the total liability of the Rightsholder and CCC (including their respective employees and directors) shall not exceed the total amount actually paid by User for the relevant License. User assumes full liability for the actions and omissions of its principals, employees, agents, affiliates, successors, and assigns.

12) **Limited Warranties.** THE WORK(S) AND RIGHT(S) ARE PROVIDED "AS IS." CCC HAS THE RIGHT TO GRANT TO USER THE RIGHTS GRANTED IN THE ORDER CONFIRMATION DOCUMENT. CCC AND THE RIGHTSHOLDER DISCLAIM ALL OTHER WARRANTIES RELATING TO THE WORK(S) AND RIGHT(S), EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ADDITIONAL RIGHTS MAY BE REQUIRED TO USE ILLUSTRATIONS, GRAPHS, PHOTOGRAPHS, ABSTRACTS, INSERTS, OR OTHER PORTIONS OF THE WORK (AS OPPOSED TO THE ENTIRE WORK) IN A MANNER CONTEMPLATED BY USER; USER UNDERSTANDS AND AGREES THAT NEITHER CCC NOR THE RIGHTSHOLDER MAY HAVE SUCH ADDITIONAL RIGHTS TO GRANT.

13) **Effect of Breach.** Any failure by User to pay any amount when due, or any use by User of a Work beyond the scope of the License set forth in the Order Confirmation and/or the Terms, shall be a material breach of such License. Any breach not cured within 10 days of written notice thereof shall result in immediate termination of such License without further notice. Any unauthorized (but licensable) use of a Work that is terminated immediately upon notice thereof may be liquidated by payment of the Rightsholder's ordinary license price therefor; any unauthorized (and unlicensable) use that is not terminated immediately for any reason (including, for example, because materials containing the Work cannot reasonably be recalled) will be subject to all remedies available at law or in equity, but in no event to a payment of less than three times the Rightsholder's ordinary license price for the most closely analogous licensable use plus Rightsholder's and/or CCC's costs and expenses incurred in collecting such payment.

14) **Additional Terms for Specific Products and Services.** If a User is making one of the uses described in this Section 14, the additional terms and conditions apply:

a) *Print Uses of Academic Course Content and Materials (photocopies for academic coursepacks or classroom handouts).* For photocopies for academic coursepacks or classroom handouts the following additional terms apply:

i) The copies and anthologies created under this License may be made and assembled by faculty members individually or at their request by on-campus bookstores or copy centers, or by off-campus copy shops and other similar entities.

ii) No License granted shall in any way: (i) include any right by User to create a substantively non-identical copy of the Work or to edit or in any other way modify the Work (except by means of deleting material immediately preceding or following the entire portion of the Work copied) (ii) permit "publishing ventures" where any particular anthology would be systematically marketed at multiple institutions.

iii) Subject to any Publisher Terms (and notwithstanding any apparent contradiction in the Order Confirmation arising from data provided by User), any use authorized under the academic pay-per-use service is limited as

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follows:

A) any License granted shall apply to only one class (bearing a unique identifier as assigned by the institution, and thereby including all sections or other subparts of the class) at one institution;

B) use is limited to not more than 25% of the text of a book or of the items in a published collection of essays, poems or articles;

C) use is limited to no more than the greater of (a) 25% of the text of an issue of a journal or other periodical or (b) two articles from such an issue;

D) no User may sell or distribute any particular anthology, whether photocopied or electronic, at more than one institution of learning;

E) in the case of a photocopy permission, no materials may be entered into electronic memory by User except in order to produce an identical copy of a Work before or during the academic term (or analogous period) as to which any particular permission is granted. In the event that User shall choose to retain materials that are the subject of a photocopy permission in electronic memory for purposes of producing identical copies more than one day after such retention (but still within the scope of any permission granted), User must notify CCC of such fact in the applicable permission request and such retention shall constitute one copy actually sold for purposes of calculating permission fees due; and

F) any permission granted shall expire at the end of the class. No permission granted shall in any way include any right by User to create a substantively non-identical copy of the Work or to edit or in any other way modify the Work (except by means of deleting material immediately preceding or following the entire portion of the Work copied).

iv) Books and Records; Right to Audit. As to each permission granted under the academic pay-per-use Service, User shall maintain for at least four full calendar years books and records sufficient for CCC to determine the numbers of copies made by User under such permission. CCC and any representatives it may designate shall have the right to audit such books and records at any time during User's ordinary business hours, upon two days' prior notice. If any such audit shall determine that User shall have underpaid for, or underreported, any photocopies sold or by three percent (3%) or more, then User shall bear all the costs of any such audit; otherwise, CCC shall bear the costs of any such audit. Any amount determined by such audit to have been underpaid by User shall immediately be paid to CCC by User, together with interest thereon at the rate of 10% per annum from the date such amount was originally due. The provisions of this paragraph shall survive the termination of this License for any reason.

b) *Digital Pay-Per-Uses of Academic Course Content and Materials (e-coursepacks, electronic reserves, learning management systems, academic institution intranets).* For uses in e-coursepacks, posts in electronic reserves, posts in learning management systems, or posts on academic institution intranets, the following additional terms apply:

i) The pay-per-uses subject to this Section 14(b) include:

A) Posting e-reserves, course management systems, e-coursepacks for text-based content, which grants authorizations to import requested material in electronic format, and allows electronic access to this material to members of a designated college or university class, under the direction of an instructor designated by the college or university, accessible only under appropriate electronic controls (e.g., password);

B) Posting e-reserves, course management systems, e-coursepacks for material consisting of photographs or other still images not embedded in text, which grants not only the authorizations described in Section 14(b)(i)(A) above, but also the following authorization: to include the requested material in course materials for use consistent with Section 14(b)(i)(A) above, including any necessary resizing, reformatting or modification of the resolution of such requested material (provided that such modification does not alter the underlying editorial content or meaning of the requested material, and provided that the resulting modified content is used solely within the scope of, and in a manner consistent with, the particular authorization described in the Order Confirmation and the Terms), but not including any other form of manipulation, alteration or editing of the requested material;

C) Posting e-reserves, course management systems, e-coursepacks or other academic distribution for audiovisual content, which grants not only the authorizations described in Section 14(b)(i)(A) above, but also

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the following authorizations: (i) to include the requested material in course materials for use consistent with Section 14(b)(i)(A) above; (ii) to display and perform the requested material to such members of such class in the physical classroom or remotely by means of streaming media or other video formats; and (iii) to "clip" or reformat the requested material for purposes of time or content management or ease of delivery, provided that such "clipping" or reformatting does not alter the underlying editorial content or meaning of the requested material and that the resulting material is used solely within the scope of, and in a manner consistent with, the particular authorization described in the Order Confirmation and the Terms. Unless expressly set forth in the relevant Order Conformation, the License does not authorize any other form of manipulation, alteration or editing of the requested material.

ii) Unless expressly set forth in the relevant Order Confirmation, no License granted shall in any way: (i) include any right by User to create a substantively non-identical copy of the Work or to edit or in any other way modify the Work (except by means of deleting material immediately preceding or following the entire portion of the Work copied or, in the case of Works subject to Sections 14(b)(1)(B) or (C) above, as described in such Sections) (ii) permit "publishing ventures" where any particular course materials would be systematically marketed at multiple institutions.

III) Subject to any further limitations determined in the Rightsholder Terms (and notwithstanding any apparent contradiction in the Order Confirmation arising from data provided by User), any use authorized under the electronic course content pay-per-use service is limited as follows:

A) any License granted shall apply to only one class (bearing a unique identifier as assigned by the institution, and thereby including all sections or other subparts of the class) at one institution;

B) use is limited to not more than 25% of the text of a book or of the items in a published collection of essays, poems or articles;

C) use is limited to not more than the greater of (a) 25% of the text of an issue of a journal or other periodical or (b) two articles from such an issue;

D) no User may sell or distribute any particular materials, whether photocopied or electronic, at more than one institution of learning;

E) electronic access to material which is the subject of an electronic-use permission must be limited by means of electronic password, student identification or other control permitting access solely to students and instructors in the class;

F) User must ensure (through use of an electronic cover page or other appropriate means) that any person, upon gaining electronic access to the material, which is the subject of a permission, shall see:

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- a statement to the effect that such copy was made pursuant to permission,

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- a statement to the effect that the material may not be further distributed to any person outside the class, whether by copying or by transmission and whether electronically or in paper form, and User must also ensure that such cover page or other means will print out in the event that the person accessing the material chooses to print out the material or any part thereof.

G) any permission granted shall expire at the end of the class and, absent some other form of authorization, User is thereupon required to delete the applicable material from any electronic storage or to block electronic access to the applicable material.

IV) Uses of separate portions of a Work, even if they are to be included in the same course material or the same university or college class, require separate permissions under the electronic course content pay-per-use Service. Unless otherwise provided in the Order Confirmation, any grant of rights to User is limited to use completed no later than the end of the academic term (or analogous period) as to which any particular permission is granted.

v) Books and Records; Right to Audit. As to each permission granted under the electronic course content Service, User shall maintain for at least four full calendar years books and records sufficient for CCC to determine the numbers of copies made by User under such permission. CCC and any representatives it may designate shall have the right to audit such books and records at any time during User's ordinary business hours, upon two days' prior notice. If any such audit shall determine that User shall have underpaid for, or underreported, any electronic copies used by three percent (3%) or more, then User shall bear all the costs of any such audit; otherwise, CCC shall bear the costs of any such audit. Any amount determined by such audit to have been underpaid by User shall immediately be paid to CCC by User, together with interest thereon at the rate of 10% per annum from the date such amount was originally due. The provisions of this paragraph shall survive the termination of this license for any reason.

c) *Pay-Per-Use Permissions for Certain Reproductions (Academic photocopies for library reserves and interlibrary loan reporting) (Non-academic internal/external business uses and commercial document delivery)*. The License expressly excludes the uses listed in Section (c)(i)-(v) below (which must be subject to separate license from the applicable Rightsholder) for: academic photocopies for library reserves and interlibrary loan reporting; and non-academic internal/external business uses and commercial document delivery.

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iii) reproduction of an entire Work (cover-to-cover copying) except where the Work is a single article;

iv) reproduction for resale to anyone other than a specific customer of User;

v) republication in any different form. Please obtain authorizations for these uses through other CCC services or directly from the rightsholder.

Any license granted is further limited as set forth in any restrictions included in the Order Confirmation and/or in these Terms.

d) *Electronic Reproductions in Online Environments (Non-Academic-email, intranet, Internet and extranet)*. For "electronic reproductions", which generally includes e-mail use (including instant messaging or other electronic transmission to a defined group of recipients) or posting on an intranet, extranet or intranet site (including any display or performance incidental thereto), the following additional terms apply:

i) Unless otherwise set forth in the Order Confirmation, the License is limited to use completed within 30 days for any use on the Internet, 60 days for any use on an intranet or extranet and one year for any other use, all as measured from the "republication date" as identified in the Order Confirmation, if any, and otherwise from the date of the Order Confirmation.

ii) User may not make or permit any alterations to the Work, unless expressly set forth in the Order Confirmation (after request by User and approval by Rightsholder); provided, however, that a Work consisting of photographs or other still images not embedded in text may, if necessary, be resized, reformatted or have its resolution modified without additional express permission, and a Work consisting of audiovisual content may, if necessary, be "clipped" or reformatted for purposes of time or content management or ease of delivery (provided that any such resizing, reformatting, resolution modification or "clipping" does not alter the underlying editorial content or meaning of the Work used, and that the resulting material is used solely within the scope of, and in a manner consistent with, the particular License described in the Order Confirmation and the Terms.

15) **Miscellaneous.**

a) User acknowledges that CCC may, from time to time, make changes or additions to the Service or to the Terms, and that Rightsholder may make changes or additions to the Rightsholder Terms. Such updated Terms will replace the prior terms and conditions in the order workflow and shall be effective as to any subsequent Licenses but shall not apply to Licenses already granted and paid for under a prior set of terms.

b) Use of User-related information collected through the Service is governed by CCC's privacy policy, available online at www.copyright.com/about/privacy-policy/.

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c) The License is personal to User. Therefore, User may not assign or transfer to any other person (whether a natural person or an organization of any kind) the License or any rights granted thereunder; provided, however, that, where applicable, User may assign such License in its entirety on written notice to CCC in the event of a transfer of all or substantially all of User's rights in any new material which includes the Work(s) licensed under this Service.

d) No amendment or waiver of any Terms is binding unless set forth in writing and signed by the appropriate parties, including, where applicable, the Rightsholder. The Rightsholder and CCC hereby object to any terms contained in any writing prepared by or on behalf of the User or its principals, employees, agents or affiliates and purporting to govern or otherwise relate to the License described in the Order Confirmation, which terms are in any way inconsistent with any Terms set forth in the Order Confirmation, and/or in CCC's standard operating procedures, whether such writing is prepared prior to, simultaneously with or subsequent to the Order Confirmation, and whether such writing appears on a copy of the Order Confirmation or in a separate instrument.

e) The License described in the Order Confirmation shall be governed by and construed under the law of the State of New York, USA, without regard to the principles thereof of conflicts of law. Any case, controversy, suit, action, or proceeding arising out of, in connection with, or related to such License shall be brought, at CCC's sole discretion, in any federal or state court located in the County of New York, State of New York, USA, or in any federal or state court whose geographical jurisdiction covers the location of the Rightsholder set forth in the Order Confirmation. The parties expressly submit to the personal jurisdiction and venue of each such federal or state court.

Last updated October 2022