Teachers' Perception of Virtual Field Trips: Exploring the Factors Teachers Consider When Deciding to Use a Virtual Field Trip

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Abstract

Authentic learning experiences are a type of teaching tool that emphasizes student engagement and encourages students to make meaningful connections between the concept and the real-world (Mims, 2003). This approach has experienced some success in improving student achievement and enjoyment (Chen & Huang, 2012). Programs such as virtual field trips have the potential to facilitate the delivery of authentic learning experience. However, in order for teachers to implement virtual field trips, certain factors must be in place. This research explores the factors teachers consider when deciding whether or not to use a virtual field trip program. Using purposeful sampling of teachers in the Vancouver and Coquitlam district who have used an authentic learning experience before, specifically the Mobile Dairy Classroom Experience outreach program, two teachers were interviewed. Teachers mentioned that they did not think all the technologies required to use virtual field trips were available to them, and that there may not be sufficient funding to purchase additional technology. Teachers also considered the cost to purchasing the program, if the program relates to the curriculum and is on a desirable topic, teaches student soft skills such as problem solving, and if they have the necessary classroom time to use the program.

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Introduction

Background

I owe my career in communications to a few communications professionals who took a chance and hired a political science student with zero prior experience in the field. While I had considered majoring in communications when I was first admitted, when I found out the university I completed my bachelors degree at did not offer it, I did not lose sleep and decided to pick another major. After gaining five years of experience working in communications and making progress professionally, I wanted to find a Masters program that would allow me to develop a strong foundation in communications and help me tackle real issues. This led me to the Master of Arts in Communications Technology (MACT) program at the University of Alberta.

My studies in the MACT program has helped me understand the diverse application of communications and how incredibly nuanced communications can be. I especially appreciated the blend of course-work and research as well as the three-week Spring Institute, which brought together students from the same cohort to complete two in-person classes on campus. The blend of in-person and online course delivery also enabled me to work full-time while completing the program. Through the coursework, I realized I became interested in socio-cultural theory and how communications may adapt to different contexts to effectively communicate with that audience. This led me to think more about the possible issues in communications I could research as part of my MACT Capstone project, a requirement for graduation.

Selecting the Research Topic

When brainstorming topics I could research for my MACT Capstone project, I realized that much of my work professionally related to the field of education communication. At the time of selecting a topic, I was managing an educational outreach program intended for elementary aged students for a not-for-profit. Specifically, the program I managed aimed to bring the farm to schools. The organization recognized that it may not be possible for schools to bring their students to the farm as they are usually away from city center. Furthermore, bringing students to tour a functioning farm may be disruptive for the farmers and pose a biosecurity issue. At the same time, the organization wanted to increase student's understanding of local agriculture. As a result, they created a program with the intent of bringing the farm experience to the school. This involved transporting a cow in a trailer which also had milking equipment installed. Through that experience, I have first-hand experience that educational experiences can quickly become outdated because information is evolving, how difficult it is make some topic interesting and engaging for the students, and how expensive it is to run a physical program that travelled from school to school. Faced with these challenges, I became interested in using technology to deliver educational content in an engaging way that provides students with a hands-on experience, as a way to keep the outreach program I managed current, make it a more hands-on and meaningful experience for students, and minimize cost.

While I suspected a virtual field trip may be a good next step for the outreach program, I recognized that it must also be a good fit for the teachers who will decide to use it and then implement it. One way to gauge the success of a program is whether teachers actually use it,

therefore, it is important to first understand what teachers want. This led to my research on the factors teachers consider when deciding whether or not to use a virtual field trip.

Beyond my previous role managing an educational outreach program, virtual field trips and its potential application in classrooms deserves to be examined. Technology can be a powerful tool when used in education. It can transport individuals anywhere virtually and provide them almost unlimited access to knowledge - all with a few strokes on the keyboard. For example, Google Maps allows anyone to walk around their neighbourhood, or any neighbourhood of their choosing, and even clicking through to enter certain buildings. Now imagine if that kind of technology can be combined with video, sound, and information to create a hands-on educational experience. Instead of physically going to the museum, people can have a virtual tour of the museum. When applied to classrooms, virtual field trips can provide unique, hands-on education experiences for students. For example, virtual field trips can help classes visit sites that they would not otherwise be able to because it is geographically inaccessible due to safety, costs, or proximity.

Other Applications

I am also interested in the uses of virtual field trips outside of schools. There are many potential applications of virtual field trips. From a public relations perspective, virtual field trips may help organizations be more transparent by providing them with another tool to share information with the public, which may improve their brand reputation. For example, a nuclear power company can use a virtual field trip to provide tours and inform the public about their

work and answer frequently asked questions about safety, without risks such as radiation and other potential hazards.

Understanding where Virtual Field Trips Fit in Education

While virtual field trips appear to be a good way to provide students with an authentic learning experience, they have to be used by teachers and integrated into the classroom. Since teachers are key decision makers in the classroom, it is important to better understand the factors teachers consider in making these decisions. For example, one factor teachers may consider is whether virtual field trips improve student's learning experience. Rather than learning a topic based on information in the textbook, a virtual experience may provide a more engaging experience.

Literature Review

Student engagement is an important consideration in the field of education because it is one way to enhance learning. According to Martin and Bolliger (2018), activities that require student engagement, specifically discussions and assignments requiring collaboration, is positively linked to student's sense of satisfaction and motivation, reduces feelings of isolation, and improves student performance.

Authentic learning is an approach that emphasizes student engagement as a way to encourage students to make meaningful connections between the concept and the real-world (Mims, 2003). In a study conducted by Chen and Huang (2012), children were split into two groups, those who used an authentic learning experience, when learning English as a foreign language, and those who did not. The group who used the authentic learning experience learnt English through a program called the Digital Learning Playground, which was projected onto screens and provides the backdrop for a physical educational robot. Students who learnt English through the authentic learning experience reported higher enjoyment and performed significantly better in a post-test than students who learnt English through more traditional means, despite having similar pre-test scores.

According to Herrington et al., (2014), the most important element of authentic learning is having students complete a task that cumulates their learning on a certain topic such as reflective journal entries. This task should involve self-reflection, which is defined as intellectual activities whereby individuals explore how their experiences lead to new understandings.

There are many ways teachers can incorporate authentic learning experiences into the curriculum. Traditional field trips are an example of authentic learning experience because they

typically provide students with the opportunity to explore the topic through hands-on activities in the real-world. Visits to the planetarium, farm or aquarium are a few examples of traditional field trips. In-school outreach programs and and virtual field trips can also be considered tools of authentic learning experiences because they bring the real-world experience to students. This literature review provides an overview of research on these methods for authentic learning experiences.

Definitions

Here are a few key definitions. According to Shaffer and Resnick (1999), authentic learning is where learning is meaningful to the student, is relevant to the world outside of the academic institution, and can provide new modes of thinking. It can also open students up to new ways of conceptualizing ideas and issues.

As mentioned, traditional field trips, virtual field trips and in-school outreach programs are different types of authentic instructional methods. According to Behrendt and Franklin (2014) experiential activities involving hand-on experiences are important authentic learning experiences. Traditional field trips would be an example of this. Behrendt and Franklin (2014) define traditional or physical field trips as a trip to a place where students can interact with the setting or exhibits to help them connect what they are learning in the classroom or school with real-life experience.

Virtual or electronic field trips have been referred to as a journey without having to physically make a visit to the site (Tuthill and Klemm, 2002). Building on Tuthill and Klemm's (2002) definition, this paper defines virtual field trips as learning experiences usually held in the

classroom that allow students to see, hear, and engage with different sites through technology. Tuthill and Klemm (2002) includes images or anything providing students with similar visual stimuli they would see if they were at the actual site such as video tapes and televisions. In addition, they include web-based technologies that can help encourage students to develop research skills and have discussion with other classmates through the use of search engines, online discussion groups and email. Tuthill and Klemm (2002) provide examples of how virtual field trips can be used. This includes: travel brochures where students take a web tour of a site, multi-school partnerships where classes from different schools present information on a specific site to each other, collaboration between universities that create a database of virtual site visits, professional productions that create hands-on activities for students, and online collections organized in threads that allow students to seamlessly navigate from site to site. Most noteworthy in their definition is that anything that can be used to provide students with an experience similar to if they had actually been transported to the site, counts as technology (Tuthill and Klemm, 2002). Tuthill and Kemm's (2002) definition sets virtual field trips apart from a simple slideshow of photos of a remote site because it incorporates other senses to simulate an actual site visit. For example, a virtual field trip of the pyramids may include multimedia features explaining the design and significance of the pyramids, checkpoints where teachers and students can engage with the program by deciding where to navigate to next, and tasks for students to complete before moving onto the next section.

A third example of authentic learning experiences are in-school outreach programs. Laursen et al. (2017), based their definition of an in-school outreach program on the scientist in the classroom program, which is a common outreach model where scientists are brought into the

classroom to lead a science-based activity or experiment. The goal is to increase science literacy and improve attitudes towards science amongst students. According to Laursen et al. (2017), in-school outreach programs bring content experts to the school with the purpose of increasing student understanding and interest in a topic. Typically this involves a short-duration visit where there is a presentation, discussion or hands-on activity. An example of an outreach program is the Mobile Dairy Classroom Experience which brings real cows to schools and conducts live milking demonstrations, stimulating a visit to the farm.

Process

This paper analyzes some current research on these three types of authentic learning: traditional field trips, virtual field trips and outreach programs. Below, in Table 1 are the keywords used to examine these.

Table 1

Key Word:	Related Key Words:
Virtual field trip	Electronic field trip Electronic field work Video field trip Virtual education experience Virtual museum Electronic museum Online museum Online field trip
Outreach program	Museum in classroom Science in classroom Classroom workshop Guest speaker in classroom Workshop in classroom Lab stations in classroom

Traditional Field Trip	Field trip Physical field trip Museum visit Site visit

Theoretical Frameworks

Communications theories may be helpful in providing insights on how the use of technology has changed classrooms, the way teachers instruct students and how students learn. Furthermore, it may help provide understanding about why authentic learning experiences such as field trips, outreach programs and virtual field trips can be beneficial in the classroom.

Sociocultural Theory

Sociocultural theory in education. An important aspect of education is the communication between teachers and students. Sociocultural theory provides a useful theoretical lens to understanding the relationship between teachers and students and the communication between the two. Sociocultural theory posits that communications is a process whereby people produce, share, and reproduce sociocultural patterns (Craig, 1999). According to this theory, through communications, people replicate their beliefs, behaviours and social structures, which in turn influences how we communicate. It also argues that communication problems occur because there is a gap in the shared understanding which communications relies on (Craig, 1999). According to Craig (1999), sociocultural theory might be particularly useful when thinking about how technology impacts the way individuals communicate because it recognizes that technology effects our social interactions.

According to Bonk and Cunningham (n.d.), the increasing access to new technologies may change the cultural context in which students learn. They argue that technology has changed the nature of institutional settings and given new possibilities to learning (Bonk and Cunningham). By looking at how technology has changed the way teachers and students communicate with each other and amongst themselves from a sociocultural lens, one might gain a better understanding of how technology can change the learning environment. For example, technology may be used as a tool to deliver authentic learning experiences in the classroom.

Education as interactions with cultural artifacts. Whipp et al. (2005) posit a sociocultural theory view of education and learning is that it is a result of interactions between people and cultural artifacts. In other words, individuals form knowledge and values through interacting with other people and things.

Sutherland et al. (2009) argued that these artifacts can be separated into primary, secondary, and tertiary levels. Sutherland et al. (2009) using Wartofsky's (1979) typology of artifacts notes humans create artifacts with the purpose of perpetuating their conditions of existence or survival. Primary artifacts are things that are directly involved in creating a tool or skill (Wartofsky, 1979). Secondary artifacts are representations of primary artifacts and exist with the purpose of preservation or transmission. Tertiary artifacts are abstract representations of tools and skills . From this perspective, authentic learning experiences such as traditional field trips, outreach programs and virtual field trips are important to learning because they provide students with opportunities to interact with artifacts and are themselves primary or secondary sources.

Following Wartofsky's classification, traditional field trips can be considered a primary sources because students are often exposed to the original artifacts. Outreach programs can be considered a primary source or secondary source under this classification because they may involve bringing subject-matter experts to the school who may be deeply involved in a subject and therefore a primary source themselves, or had only learnt it for the purpose of teaching it making them a secondary source. Moreover, an outreach program may bring actual artifacts into the classroom or only representations of artifacts. Virtual field trips on the other hand can be considered a secondary artifact as they often rely on digital simulations and representations of cultural artifacts as opposed to bringing actual artifacts into the classroom.

Use of technology in education. Technology is used here broadly to refer to any practical tool or equipment. This can include simple inventions such as the white board to more complex things like computers and the internet. In 2002, Levin and Arafeh found that middle school and high-school students associate the internet with their daily tasks and activities at school. Students used the internet as their textbook, tutor, tool to form study groups, guidance counsellor, and to store their study materials. Despite students reporting that the internet plays an important role in their day to day school-life, the study also found teachers and school administrators have not recognized its importance.

According to Levin and Arafehs student's perceive technology as being integral to their education, but based on teachers' in-class technology use policies, students do not think teachers recognize how students use technology for education. This is important because it suggests that student's perception of the use of technology for education may differ from teachers' views. Relating it back to authentic methods of instruction, sociocultural theory may explain the

potential disconnect between students' use of technology and teachers' understanding of students' use of technology as a result of different cultural context. However, teachers may also have other factors to consider such as whether the technology is available at the school, past experiences using the technology in a classroom setting, or that teachers and students may have a different understanding of what technology is. One way to fill the gap between how students perceive their use of technology for education and how they perceive teachers' understanding of technology use for education, is to increase understanding of teachers' rationale behind their in-class technology use policy. This study points to the need to study both teachers' perspectives as well as student's perspective surrounding technology use for education as they may differ.

Bennett et al., (2008) and Thompson (2013) both suggests that there is lack of empirical evidence that technology transformed the learning style and expectation of students. One possible explanation is that technology has the potential to transform student's learning style and expectations but only if they are implemented in the classroom and in a way that is conducive to change. Teachers may certainly take into account student's use, enjoyment, and preferences relating to technology use in the classroom, however, there may be other factors at play as well including access to the needed technology. Therefore, further research into how teachers choose and implement technology is needed.

Authentic Learning Experiences and Sociocultural Theory. From a sociocultural perspective, authentic learning is particularly useful because it puts students at the center of the learning process and holds their perception as central (Andersson & Andersson, 2005). According to Andersson and Andersson, features of authentic learning can be recognized from socio-cultural point of view. In their view, there are three ways to understand authenticity from a

sociocultural lens. First, is that the learner should perceive the experience as being meaningful and authentic. Second, the authentic learning experience should relate to the topic that is being taught. Third, the authentic learning experience should be based on participation in activities that relate to real-life situations. Traditional field trips, virtual field trips and outreach programs generally fit into Andersson and Andersson's understanding of authenticity because they focus on the individual learner, is relevant to the curriculum, and encourages student engagement.

Criticism of Sociocultural Theory. One criticism of sociocultural theory is that it may lead to technological determinism (Selwyn, 2012). Technological determinism supposes that technology drives social and cultural progress, and therefore assumes that the incorporation of technology into the classroom will enhance education. The concern is that technological determinism will lead to mindless and unchecked incorporation of technology without considerations to potential consequences such as cost and effectiveness (Pederson, 2001).

While technology may be important to students' learning experience due to their cultural context, sociocultural theory does not necessitate a deterministic view of technology. Selwyn (2012) argues that to prevent technological determinism, the impact of technology must be considered before it is incorporated into the classroom.

On the one hand, one consequence of incorporating technology into the classroom is that it can democratizes education (Velestianos and Moe, n.d.). By democratizing education, Valestianos and Moe (n.d.) mean that technology can make education more accessible and the management of education can be more decentralized. In other words, due to technology, education is more widely accessible, and teachers and students have access to more diverse viewpoints. This is important because teachers and students have access to more resources and

can choose ones that fit in with their socio-cultural context. While there may be barriers to actually implementing new technologies, such as not having enough devices, the main point is that technology opens a whole new realm of possibilities. For example, instead of relying on textbooks to teach about photosynthesis, teachers can look up videos on the internet and choose from the thousands of available educational material to use for their class. These may include a video from a plant scientist or an animation of how plant cells work. The possibilities are endless and teachers can show multiple videos from different sources to create a customizable and authentic learning experience for students that also make sense for their socio-cultural context, compared to the more restricted, single, printed explanation from a standardized textbook. Given the vast possibilities technology provides teachers with, further research into the factors teachers consider when deciding to use a technology is necessary to better understand why some technologies are implemented into the classroom while others are not.

On the other hand, a possible consequence of incorporating technology into the classroom is because it can be costly and may take away from the quality of education students might receive if the money could have been spent elsewhere (Pederson, 2001). Pederson's (2001) argument is that the purchasing of technology has to be thoughtful or it may have a negative consequence on schools. For example, tablets and desktop computers over-lap greatly in their functions. With the popularity of tablets, some schools that already have desktop computers, and may not need tablets specifically, may still feel the need to integrate them into classrooms. Instead of spending money on other aspects of education, resources are directed to purchase technology that may not be needed since the function is repeated in desktop computers. Of course, tablets may actually save some schools money since they are generally cheaper than

computers. However, the point is that technology that is incorporated because it is trendy or for the sake of having the latest version can have a negative effect on students, especially if it sits idle and is not incorporated into the classroom by teachers. These competing positive and negative consequences ultimately point to the incorporation of technology as something that needs to be done thoughtfully while balancing other priorities. Moreover, how teachers balance the consequences of incorporating technology into the classroom needs to be examined further.

Connectivism

Connectivism theory in education. According to Goldie (2016), a connectivism view of learning and knowledge is that it is fluid and occurs in a network. When an individual learns, they connect the new knowledge to other similar information, experiences, and subject matter experts (Goldie, 2016). Both learning and knowledge is therefore distributed across a network of connections, which the learner makes through interacting with other people, organizations, and technology.

. According to Downes (2009), knowledge is held at multiple nodes distributed across a network rather than being held in one spot. The idea is that knowledge is not the sum of singular isolated facts but an intricate system. For example, in education, connectivism would encourage teachers to focus on helping students develop skills such as on conducting research which will help them make connections as opposed to having students memorize facts. From the connectivist perspective, having students memorize facts is not effective because it doesn't provide for a more general and holistic understanding of a topic. In contrast, encouraging

students to develop soft skills such as research and problem solving will continue to serve the student in the long-term.

When applying connectivism to the classroom and educational technology, the focus is on the students' ability to find and judge the relevance of information (Klop & Hill, 2008). Connectivism diverges from an emphasis on facts as knowledge to allow for a prioritization of currency (Downes, 2009). From a connectivist perspective, learning occurs when the individual interacts with a node or community, which are clusters comprised of similar interests, through dialogue or sharing (Kop & Hill, 2008). These nodes then make up a network where knowledge is distributed across. Connectivism recognizes that facts may alone be limiting in that they are narrow and specific and do not provide higher order understanding. Since some information changes all the time, according to connectivism, the most important skills are one's ability to seek out information and to judge the relevance of the information. Therefore for connectivism, knowledge is a cumulation of the relationships and connections the learner has with the node or community who feeds information back to the individual (Siemens, 2005).

Connectivism and technology. According to Siemens (2017), technology has altered the way we think and in his view, many cognitive processes that were once important can now be supported by technology. However, many learning theories do not recognize that the way people learn is evolving. From a connectivism perspective, people once understood learning as something that happens in a linear fashion, when in actuality, learning is constant and always evolving. The adoption of the internet for education from a connectivist perspective is a positive because it is a potential tool for students to access diverse viewpoints and collaborate, which are pivotal to creating a network (Duke et al., 2013). For example, students can participate in online

forums to discuss their ideas and opinions about different topics or use cloud-based technology to collaborate on a document together in real-time.

Moreover, the internet allows students to develop relationships with institutional resources, which connectivism argues is important to the process of learning. For example, students in Vancouver can easily access resources developed at institutions across the world and therefore expand their network. These relationships may be formed unconsciously as students seek to find specific information. However, the idea is that students connect with a community or node, and depending on their interests and academic or professional pursuits, can further use their relationships with these communities to gain a better understanding of importance concepts.

Connectivism and Authentic learning experiences. Connectivism is well suited to examining authentic learning experiences. There are many parallels between connectivism and authentic learning. According to Duke et al. (2013), connectivism supports the idea that learning can be authentic and relevant to real-life. Compared to other learning styles, authentic learning gives learners more control of their learning and encourages them to decide for themselves what is meaningful for them. Similarly, a foundational concept in connectivism is that the learner is central to the process (Siemens, 2017).

Traditional field trips, virtual field trips, and outreach programs are examples of authentic learning experiences that are particularly compatible with connectivism because they help students develop relationships with institution resources and often put more emphasis on teaching skills than facts. Connectivism argues that education should be focused on helping students develop research skills and connect them to communities of experts. In traditional field trips, virtual field trips and outreach programs, students interact with the hosting institution,

thereby developing a relationship with them. Moreover, connectivism prioritizes teaching skills over facts because information may change over time while skills can help students long-term. Similarly, traditional field trips, virtual field trips, and outreach programs are ways teachers may incorporate hands-on activities. According to Gredler (2004), hands-on activities such as simulations and games are particularly effective because they encourage participants to take on a specific role and address problems, therefore teaching students important skills.

Authentic Learning Experiences

Three types of authentic learning experiences will be examined here: traditional field trips, outreach programs, and virtual field trips.

Traditional Field Trips

The role traditional field trips play in the learning experience of students have been a highly studied area. Sturm and Bogner (2010) researched the effectiveness of field trips on students' knowledge retention. In their quasi-experiment, a control group was exposed to the material in the classroom while the treatment group learnt the same material in a museum field trip setting. The results of a pre-, post- and retention-test showed that those who participated in the field trip had better post- and retention-test scores (Sturm & Bogner, 2010). Furthermore, Behrendt and Franklin (2014) found that field trips were especially important to low academic performance students as it helped foster understanding and enjoyment of learning.

According to Falk (2004), field trips are more effective than classroom settings because they promote free-choice learning. He defines free-choice learning as situations in which

students have control of how and what they learn. An example of free-choice learning is when a student goes on a field trip of a planetarium, they may be free to roam around and explore, spending more time on certain exhibits that pique their interest.

Gilland-Swetland et al. (1999) established that free-choice learning usually occurs in informal learning environments, usually outside of the classroom compared to formal, classroom learning environments.

Conversely, Collinson's (2000) survey of elementary students in the third, fourth and fifth grade, showed that students from lower academic achievement groups preferred formal learning environments, or classroom learning, rather than informal learning environments which are typically in traditional field trips. In addition, they prefer individual learning, for example studying alone, rather than group activity which are commonly found in traditional field trips. It is important to note that Collinson's (2000) study focuses on student preference rather than actual effectiveness. It is possible that even if students do not prefer informal learning environments and group activities that are common characteristics of traditional field trips, it may still be just as or more effective than learning in a classroom setting alone.

One way of thinking about the difference between physical field trips and traditional classroom learning is that physical field trips tend to be informal learning environments while traditional classrooms are usually formal learning environments. Physical field trips are informal learning environments because they often allow for free-choice learning (informal learning experiences) with less structure whereas traditional classroom learning typically tend to be formal learning environments because students are expected to follow the structure set forth by the teacher (formal learning experiences), While informal and formal learning environments is a

good way to conceive the difference between field trips and classroom education settings, Salmi (2014) warns that it is an overly simplistic way of thinking of it. According to Salmi (2014), a hybrid definition should be adopted in which informal learning experiences can take place in formal learning environments and vice versa. For example, students may learn in a formal learning environment, such as a classroom, but the teacher may provide students with free time to research topics that are of particular interest to them - thus allowing the students more freedom and ownership of their learning. Salmi (2014) suggests that the hybrid definition emphasizes that formal learning experiences can occur in formal or informal learning environments and informal learning experiences can occur in formal or informal learning environments as well. In other words, a traditional classroom style lecture can occur in a museum environment and student self-paced work stations can occur in a formal classroom setting.

Salmi's (2014) hybrid approach shifts the focus from the learning environment to the learning experience. In fact, informal learning experience may not always be beneficial because students may actually benefit from the structure of a learning plan. For example, an informal learning experience may be in the form of a trip to the planetarium where students are free to explore at their own pace. However, this may not be as effective because there may be too many stimuli for some students to focus. Instead, a hybrid approach would be to take a trip to the planetarium but provide students with structure such as the requirement to complete a certain number of activities during the field trip.

Falk et al. (1978), observed the novel field-trip phenomenon where students that are unfamiliar with their field trip environment need to take time to adjust to their new surroundings before they can focus on learning. They found that in an activity in which students were

collecting data in the woods, children who were familiar with wooded settings performed better than children who were only familiar with urban settings.

Research has shown that field trips are an effective learning mechanism and can help low-performing students (Behrendt & Franklin, 2014). Promotion of free-choice learning has been credited as an advantage of traditional field trips (Falk, 2004). However, the use of traditional field trips appears to be on the decline for reasons other than their effectiveness. Although traditional field trips can be an effective educational tool that can be used to provide authentic learning experiences, traditional field trips are declining in use due to logistical hurdles such as transportation, cost, scheduling conflicts, and liability (Cassady et al., 2008). Therefore, it has been suggested that further research into alternatives to traditional field trips is increasingly important (Garner et al., 2005).

Outreach Programs

Outreach programs are another authentic teaching tool. An example of an outreach program is Scientist in Schools (https://www.scientistsinschool.ca), which brings professional scientists into the classrooms of elementary and secondary schools. The scientists lead students in lab activities in an effort to increase their interests in the sciences. Laursen et al. (2007) studied the effectiveness of Scientist in the Classroom and found in surveys that 44% of students reported new views of science. In addition, 88% of teachers also reported improved student interest and engagement.

A study that showed a different outcome was conducted by Melber (2006). Melber measured students' attitudes towards the sciences after participating in an outreach program, no

statistically significant improvement in students' attitudes towards the sciences were found. This study involved a multi-session outreach program and studied academically high achieving students.

A third study by Lott (2003) focusing on student and teacher attitudes as well as acquired skills after participating in the Alabama science in Motion program suggests no statistically significant difference in science processing skills between students who participated and those who did not.

The results of Laursen et al. (2007), Lott (2003), and Melber (2006) differ and points to the complexities that exist in this topic, further research is needed.

In terms of logistics, outreach programs may have some disadvantages. Outreach programs may have varying degrees of availabilities, sometimes are costly (organizations may charge schools a fee as it requires resources to develop a curriculum, acquire the necessary materials and hire professionals to conduct them), and have some risks and liability (such as allowing a stranger onto school property). These logistical disadvantages may influence use.

Virtual Field Trips

Virtual field trips are another example of authentic learning experiences. A virtual field trip is a learning experience which provides students the opportunity to interact with a site or artifact without leaving the classroom, through the use of multi-media. Using the definition by Shaffer and Resnick (1999), virtual field trips fit the profile of authentic learning experiences as they provide students with meaningful learning that is relevant to the world outside of school and exposes them to new modes of thinking.

According to Sanchez (2006), students who participated in a virtual field trip, used more new vocabulary in a writing sample compared to students who learnt through the traditional field trip. The study was conducted on second grade students and its findings may be limited specifically to this group of students and the characteristics of this study.

Srirunrasmee et al. (2015), Cantwell (2004) and Cassady et al. (2008) examined the effectiveness of virtual field trips as opposed to traditional classroom instruction. Sriarunrasmee et al. (2015) found that eighth-grade students who participated in a virtual field trip had significantly higher post-test scores than pre-test scores. However, Sriarunrasmee et al. did not compare the results with other student groups. Therefore, while the study may suggest that students can effectively learn through virtual field trips, further research is required to understand if virtual field trips are equally or more effective than traditional classroom learning.

Cantwell, 2004, suggests that virtual field trips may be more effective than physical field trips because it shows great potential in helping students overcome the novel environment phenomenon. According to Falk et al. (1978), the novel environment phenomenon occurs when students are exposed to environments they are not familiar with, and requires time to adjust to their new surroundings before learning can occur.

Cassady et al. (2008) is credited for the first large-scale study on the effectiveness of electronic field trips in comparison to the classroom setting. The 1,568 participating students were divided into two groups - students who had access to the electronic field trip in addition to the online lesson materials and those who did not. Students who did not have access to the electronic field trip only had access to the material through a website. Results showed students who participated in the virtual field trip had higher post-experience test scores. It is noteworthy

that students who had access to both the electronic field trip and the online lesson materials appeared to have more time to review the material than the other group. They were also exposed to the material more as the content was repeated in two forms for them. The extra time and repetition may also account for why their test scores were significantly better than those who did not have access to the electronic field trip. However, this study still provides valuable evidence that electronic field trips may be an effective tool for education deserving of further research.

While research has shown that in some cases, virtual field trips can be an effective method for instruction, a critique of virtual field trips is that it may not be as authentic as real-life learning experiences. Analyzing the authenticity of virtual field trips, Stoddard (2009) questions whether virtual field trips can provide students with authentic learning experiences because while it may provide visual authenticity, the virtual field trip is a digital stimulation and cannot be considered equivalent to real-life experiences.

A study on university students' opinions on virtual field trips as a replacement for traditional physical field trips found that while students enjoyed the virtual field trip experience, they did not think it was a replacement for the traditional field trip (Spicer & Stratford, 2001). It is noteworthy that this study was published in 2001 based on technology that was available at the time. Since then, technology, especially in the field of animation and augmentation, have significantly improved. More up to date research is required to understand whether students would have the same perception of virtual field trips based on current, more advance technologies.

However, other research has shown that while virtual fields are digital simulations, it can still provide effective authentic learning experiences. For example, Smith's (2014) study found

that students who participated in virtual field trips had higher levels of engagement, motivation, learning results, and increased skills. Smith reported that virtual curriculums are successful because students feel that the skills learned can be applied to their everyday life. Smith's research illustrates that virtual field trips can be designed to allow for more authentic experiences for students.

According Rahm et al. (2003) authentic learning should focus more on what students, rather than teachers, perceive as being authentic. They called this an emergent notion of authenticity and argued that it necessitates continued involvement and students' ownership of the experience. In other words, students may perceive authenticity differently than teachers therefore, it may be useful to provide students with the opportunity to be involved in their own learning as they can judge for themselves whether a learning experience is authentic. Virtual field trips may be one educational tool that fits into Rahm et al.'s emergent notion of authenticity as they often emphasize student engagement and involvement in the learning process.

According to research, virtual field trips can be an effective method for authentic learning experiences (Cassady et al., 2008; Sanchez, 2006; Sirarunrasmee et al., 2015).

While virtual field trips have the potential of being an effective instructional tool, whether or not they are used depends on a number of factors. These may include: whether school administrators and teachers are familiar with virtual field trips, if the use of virtual field trips are supported by district or province-wide education organizations such as the school board, and whether or not teachers see the potential value of using virtual field trips in their instruction. Of these different factors, the researcher is particularly interested in teachers' perception of virtual field trips.

Research on Teachers' Perception of Virtual Field Trips

According to Kisiel (2005), when planning a physical field trip, teachers tend to prioritize connection to curriculum over fostering student interest and motivation, or student enjoyment. However, in Kisiel's research, when asked how they would determine if a field trip was a success, teachers identified students' reporting a positive experience as a key indicator. Although not directly asked in Kisiel's survey, if teachers consider student enjoyment as an important indicator of a successful field trip, students' perceived enjoyment might be a factor in teachers' decision to use the same field trip experience again for future classes. Connection to curriculum may therefore be a primary factor that influences whether teachers perceive virtual field trips as being valuable, but they may also consider student's enjoyment as a secondary factor.

In Ballone and Czerniak's (2001) survey, teachers indicated that they believed it was important to employ a variety of instructional strategies to meet the different needs of students learning styles. Their research suggests that teachers have a generally positive attitude about using different instructional strategies to accommodate student's varying learning styles, but identified a lack of time and resources to plan instructional activities as a barrier. While Ballone and Czerniak's study did not ask specifically about authentic learning experiences, it shows that one factor teachers consider when planning a curriculum is student's learning styles. The study also suggests teachers are generally willing to adapt to different needs of their students, but see the lack of time to plan as a barrier (Ballone & Czerniak, 2001). Virtual field trips may be beneficial for teachers who are looking to implement different instructional strategies because they encourage student involvement and are flexible in nature. However, further research into the

effectiveness of virtual field trips as a teaching tool for students with different learning styles is needed.

Another factor is how teachers perceive virtual field trips in relation to traditional classroom instruction. A study of Slovenian biology and science teachers by Puhek et al. (2013), suggests that teachers' attraction to virtual field trips differ depending on subject matter. Results of the study were statistically significant and showed that teachers who only taught biology were less attracted to virtual field trips than those who taught multiple non-biology science subjects. Puhek et al. also showed statistically significant differences in willingness to use virtual field trips based on digital competence with teachers with higher levels of digital competence more willing to use virtual field trips.

Norris et al. (2015) studied the uptake of virtual physical activity lessons. Specifically, the program was created to reduce the amount of time students remained sitting. In these virtual field trips, students stand for the duration and may be asked to do various movements as part of the experience as part of a virtual walk or sport. Teachers were asked to implement the virtual physical activity and report back on their experience. Results of the interviews with teachers showed that teachers perceived a lack of time as a major barrier to the use of the virtual physical activity. Teachers noted that virtual field trips have to be ready-to-use and easy to implement. Interviews with teachers also revealed teachers' technological savviness as a potential barrier. They stressed that if teachers viewed the virtual field trip as being effective and easy to use, they will be more willing to use them. Norris et al. notes that future research needs to look at teachers' perception of usability in virtual field trip design, such as easy set-up.

Virtual field trips are one way authentic learning experiences can be implemented in the classroom. However, whether teachers perceive virtual field trips as valuable will ultimately determine if they are implemented. One factor that may influence teachers' perception of virtual field trips is their beliefs about students' preferences. However, as shown by cited research this is balanced by other priorities such as connection to curriculum (Kisiel, 2005), time to plan (Ballone and Czerniak's, 2001; Norris et al. 2015), and teachers' own digital competency (Puhek et al., 2013). While these are some elements, teachers' decisions may be based on a multitude of factors. Further research into the factors influencing teachers' perception of virtual field trips is required in order to better understand their potential as a tool for delivering authentic learning experiences in the classroom. The current study therefore explores the following research question: What factors do teachers consider when deciding whether or not to use virtual field trips in their classroom?

Methodology

Selecting Research Method

The purpose of the current study is to explore teachers' perceptions of virtual field trips in order to gain an understanding of the factor's teachers consider when deciding whether or not to use virtual field trips. Both quantitative and qualitative approaches have been used to study teachers' perceptions (Kisiel, 2005; Ballone and Czzerniak, 2001; Puhek et al., 2013; Norris et al., 2015) previously. Given the research question is to explore the factors teachers consider when deciding whether or not to use a virtual field trip, the data of interest is descriptive and exploratory in nature and requires a method that can allow for discussions and in-depth data analysis. Qualitative methods are well suited to collect this type of descriptive information as it can help explain, explore, or describe a phenomenon (Williams, 2007). The plan for the current study is to use a qualitative approach as it allows a deeper analysis of teachers' descriptive responses.

To determine the factors teachers consider when deciding whether or not to use a virtual field trip, the focus will be on teachers' perceptions of virtual field trips. The type of information the study aims to collect includes how teachers perceive: virtual field trips, around logistical issues (such as time, usefulness, effectiveness, implementation factors and hardware requirements), and potential student enjoyment. Focus groups and interviews are two approaches that were considered for collecting qualitative data as both allow researchers to gain a better understanding about a phenomenon. Since the goal of the research is to look at the perspectives of a few teachers in different jurisdictions, interviews were the more appropriate approach. A

significant rationale to use interviews is the individual and independent characteristics of interviews. Interviews are well suited to this research because they allow the researcher to gain a better understanding of each individual teacher's perspective and their unique context (Fossey et al., 2016). Therefore, collecting data in an individual setting rather than in a group setting made more sense. This allows research to better focus on and understand each teacher's opinion. Furthermore, focus groups require more logistics as participants must all be available to meet at a specific date, time, and location for an in-person discussion. On the other hand, interviews are more flexible in terms of scheduling.

Interview Design

One important factor that may influence each teacher's response is the amount of experience they have with virtual field trips. Therefore, it may be advantageous to understand each participant's context. Since the goal is to understand teachers' perception of virtual field trips, it is important to allow teachers to freely discuss their perspectives. At the same time, there are some key topics the interview should cover. These include teachers' potential concerns about the logistics of using virtual field trips, comfortability with technology, and perception about student's enjoyment. A semi-structured interview is well suited to allow teachers to explain their perceptions of virtual field trips without limitations, while ensuring the key topics are discussed. This method facilitates follow-up questions and for the interviewer to probe for more information where clarification is needed. Moreover, the questions should help establish consistency between interviews in the topics covered, allowing the researcher to better analyze the results.

Study Participants

As the research explores teachers' perception of virtual field trips with the purpose of understanding if virtual field trips can potentially be used as an authentic learning tool, the study is particularly interested in teachers who have used other authentic learning experiences before. Participants were not required to have a certain level of experience with virtual field trips, however, in order to participate, they had to have used an authentic learning experience before.

To participate in the research, participants were to have participated in an authentic learning experience, specifically an outreach program (programs that connect teachers with professionals in a specific topic to teach their class for a limited time) before. The research will focus on teachers who have participated in an authentic learning experience because the researcher had experience working with teachers who participated in outreach programs before and had knowledge of a database of those teachers' contact information.

The study plans to use a purposeful sample of teachers in the Lower Mainland who have previously participated in an outreach program. An example of an outreach program would be the Vancouver Aquarium's AquaVan which brings the aquarium experience, including trained marine educators, to schools

(more examples of outreach programs considered in Appendix A). The research of Laursen et al (2007), Lott (2003), and Melber (2006) was used to develop the criteria. Based on these studies, the criteria for outreach programs is defined here as programs:

- Led by external staff members who are subject matter experts or trained by the organization providing the outreach program to deliver information about a specific topic,

- Uses props, images and other physical artifacts that are not usually found in the school environment,
- Mobile with the ability to visit schools across the Lower Mainland,
- Currently in use (active),
- Do not require students or teachers to travel out of the school,
- And are offered at low or no cost to the school.

In researching the list of outreach programs, the researcher found that there are a number of programs active in the Lower Mainland in British Columbia, with vastly different requirements and learning objectives. The plan for the current research is to focus on one outreach program to allow for a more in-depth analysis of one context. To select an outreach program to gather teacher participants from, the researcher considered several requirements (available in Appendix A). One authentic learning experience programs that satisfy these requirements is the—Mobile Dairy Classroom Experience (MDCE)[1]—(more information at www.dairyclassroom.ca). The MDCE provides students with an authentic learning experience by bringing the farm tour to the school and teaching students about the dairy industry in British Columbia. In each session, one professional milker or farm hand uses the milking machine to milk a cow while a trained staff member presents information about cow biology. A major factor in choosing to study participants of the MDCE is because of its popularity and simplicity. Any elementary school teacher interested in providing an authentic learning experience for students

[1] It is noteworthy that the researcher was previously employed by the BC Dairy Association (BCDA) which owns the Mobile Dairy Classroom Experience (MDCE). During her employment, the researcher managed the MDCE program including training staff, scheduling schools and events and a project to expand the program. However, at the time of executing the research, the researcher was no longer employed by BCDA.

can sign up and bookings are made on a first-come-first-serve basis. In addition, teachers are not required to prepare anything in terms of a lesson plan for their students in advance. The MDCE visits — an average of 110 schools annually[2] — and the teachers who have participated before will be the focus of the current research. At random, specifically teachers who participated in the MDCE program in 2016-2017 academic year (September-June) will be asked to participate.

To allow for a more manageable sample population size and more thorough analysis of participant's context, only teachers from the three largest school districts (by enrolment) will be asked to participate. These are: Surrey, Vancouver and Coquitlam.

The research plans to obtain consent from the BC Dairy Association, which owns the MDCE program, to use their database to contact the teachers that fit the research participant criteria. The research will be conducted outside of the participant's school. Teachers of any level of experience, gender, and from any elementary grade level are invited to participate. However, as the list being used is three years old (from the 2016-2017 academic year), the list would include teachers with at least 3 years of experience. Teachers who agree to participate will receive a copy of the consent form (found in Appendix B), that included further information on how their responses will be stored, the analysis process, and how the research findings may be used in the future. After a thorough explanation, teachers who would still like to participate will be scheduled for an interview at a time and location that is convenient for them. Before the interview, teachers will be provided another copy of the letter of consent which they will review and sign. After this, the researcher will begin the interview.

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[2] Average number of school visits per year was provided by the BC Dairy Association via e-mail correspondence. The organization does not publish the information publicly itself but has granted the study permission to publish this information.

Interview Questions

Interview questions are designed to engage teachers in a conversation. Prompts were to be asked about specific factors that may not be covered in the participant's response organically. Some of the topics of interest include effectiveness (Sturm & Bogner, 2010; Sanchez, 2006; Sriarunrasmee et al., 2015; Cassady et al., 2008), logistical implementation barriers (Cassady et al., 2008), students' enjoyment and attitude towards the topic (Behrendt & Franklin, 2014; Laursen et al., 2007; Melber, 2006), and their own technological efficacy (Puhek et al., 2013; Norris et al., 2015). In addition, a few questions will be asked to gain a better sense of teachers' experience level, attitude towards technology and previous experience implementing technology in the classroom, and overall familiarity with virtual field trips. The questions are attached in Appendix B, the themes that were planned to be discussed are:

Topics:

- Teaching experience
- Attitudes towards authentic learning experiences
- Attitudes towards technology-based delivery of course content
- previous experience implementing them in the classroom.
- Overall familiarity with virtual field trip.
- Factors teachers consider when deciding whether or not to use virtual field trips.
    - What situation might virtual field trips be useful to help students learn?
    - What logistical concerns might teachers have?

- Other factors: effectiveness, logistics, student's enjoyment and attitudes, teacher tech efficacy.

Data Collection, Storing & Analysis

It was planned to conduct six semi-structured, face-to-face interviews, two teachers representing each of the three school districts selected. Burnard's (1991) "A Method of Analyzing Interview Transcripts in Qualitative Research" was used to generally inform the research's data analysis strategy. With the consent of participants, the researcher planned to audio record each interview. The recordings of the interviews were planned to be transcribed verbatim using a transcription service, and then coded based on the themes emerging from participants answers. Similar themes from all interviews were to be grouped together under a broader category. The transcripts were then be colour coded and grouped. The grouped statements were to be put on sheets with the appropriate category headings and the researcher checked again if the statements fit in the category. The researcher planned to then contact the participants and provide them with the researcher's summary of the general ideas and comments that were brought up in their interviews to check if it was an accurate characterization of their response.

Findings

The following section summarizes the common themes brought forth in the interviews. While the research planned to have six participants with at least two from each of the three selected school districts in the Lower Mainland (Surrey, Coquitlam, and Vancouver) in British Columbia, only two teachers that fit the criteria volunteered. Initially, two additional teachers had volunteered and provided their e-mail address and phone number for further correspondence but ultimately changed their minds. While there were not as many participants as originally planned, the two teachers were from different school districts and taught at different grade levels, providing some diversity in terms of contexts. Both interviews were conducted through the phone as it was preferred over an in-person interview by the teachers. The participants received the information and consent letter ahead of time but did not receive any questions prior to the interview.

Of the two teachers who volunteered, one currently teaches kindergarten in the Coquitlam School District while the second is currently a special education teacher in the Vancouver School District. Both school districts are in the public school system, each teacher had taught at multiple schools and had over 10 and 20 years of experience.

Several key themes emerged in interviews with the teachers. Participants discussed: their perception of authentic learning experiences and virtual field trips, technologies they have available to them at their school, lack of available funding to purchase technologies required to implement authentic learning experiences, the role of external funding methods to purchase technology, how they currently use technology in the classroom.

Views on Authentic Learning Experiences

When asked about authentic learning experiences each participant thought that authentic learning experiences are an approach to teaching that can be useful. A participant said "for the younger learners, I feel that, having an authentic learning experience, it's like, experience learning, having the opportunity to experience something in an environment where they're captivated, they're motivated and they want to learn is really like truly the key to their growth and development." It was also noted that authentic learning experience can teach practical skills by challenging students to solve real-life problems.

As a special education teacher, one participant indicated that it was difficult to implement authentic learning experiences because they only have 20-30 minutes to spend with each student. However, the participant saw authentic learning experiences happening in their school and said, "I have, at times supported teachers by being an extra set of hands in the room when they're doing project work."

Participants noted that they would like to use authentic learning experiences with their students more frequently, however it may require resources that they do not have. Specifically, participants mentioned wanting to plan more field trips as it would provide an opportunity to use authentic learning experiences for their classes but feel there is not enough funding to do so.

Views on Virtual Field Trips

Regarding virtual field trips, one participant understood virtual field trips as experiences which allow students to Apple FaceTime into, and experience and learn through watching. The other participant mentioned virtual field trips may include virtual tours and webcasts that classes

can sign-up for and participate in. Each participant included a video-conferencing component which allows students to take part in an educational experience. Interestingly, one participant's definition noted students' participation specifically while the former's definition focused more on learning through watching.

Each participant indicated that where possible, physical field trips are preferred over virtual field trips. One participant indicated that they perceive virtual field trips as something that may help with budgetary constraints. The participant noted physical field trips allow students to see and experience things they would not have the opportunity to otherwise. Participants also mentioned that virtual field trips may be a good supplement to physical field trips and can provide students with an opportunity for continued learning.

A participant indicated that virtual field trips may be particularly useful in teaching topics in the sciences and First Nations studies. The participant mentioned that they had signed their class up for a physical field trip on the topic of indigenous plants and traditional ecological knowledge. However, the participant indicated that the field-trip experience is extremely popular with limited availabilities and was unsure if their class would be able to attend. The participant noted that virtual field trips may be a good supplemental component for field-trip programs that are popular or may have limited availability.

On what barriers teachers may face when trying to use a virtual field trip, each participant said access to the required technology was a barrier. One participant suggested a lack of supplemental hardware, for example working headphones, as a roadblock. The other participant mentioned wifi connections at schools are unreliable and that teachers do not have the ability to update or download the software needed to run certain multi-media applications such as Adobe

Flash. This also means that even if teachers are able to obtain the software they need, there are other factors that may influence whether or not they can be used. For example, school owned devices may have firewalls that prevent the use of certain software or administrative controls on devices may not allow teachers to download the necessary software updates. There is likely a process in which teachers can bypass the firewall or administrative controls. However, these security-related restraints are typically controlled at the school district level and may take a lot of time for teachers to get the necessary access. This is compounded by the fact that any success to bypass the firewall or have a software updated is one-off and teachers may have to request the same access again.

Each participant interviewed indicated that whether or not a virtual field trip clearly relates to the curriculum may influence their decision to incorporate it into their lesson plan or not. One participant said, "There has to be curriculum goals or you know, something connected to the competencies or something that I'm trying to achieve."

A participant also suggested that while student enjoyment was important, virtual field trips should help students solidify their learning and enhance the educational experience.

One participant noted that whether or not a virtual field trip is age appropriate as another factor of consideration. The teacher indicated that some experiences may include vocabulary that is too difficult for certain students in certain grades to understand. However, the participant mentioned having used an authentic learning experience that would normally be too difficult for their class' grade level by making it an activity younger students did with their reading buddies from an older grade.

Technology Available to Teachers

When asked about the technologies available to the participants and their school, each participant indicated that based on their own experience of moving between schools, technology available across different schools is limited and varies because schools typically rely on non-government funding to pay for any additional technology that is not already available. One participant said, "When it comes to tech in the classroom, you can imagine there's a lot of factors that determine how much tech can be in a classroom, you know, fundraising and, and how involved, students and teachers and parents can be in that."

Another participant noted that the different technologies at each school is particularly challenging because teachers do not know what to expect when they have to change schools.

It is noteworthy that in order to run a virtual field trip, schools need to have the necessary hardware and software. While both are required, hardware can be used for other educational purposes and is essential for running the actual virtual field trip software - making it typically the first to be purchased over software. Additionally, schools often slowly collect hardware technologies and purchase additional units depending on the funding, either through government or fundraising efforts, they received. Since schools rely on alternative sources of funding to purchase technologies such as computer, tablets, accessories and software programs, teachers either have to accept what is provided or dedicate time to look for and pursue alternative sources of funding for needed technologies. One participant mentioned that due to cyber-security risks, teachers are unable to update software themselves and rely on their school board to schedule the updates.

Each participant mentioned that they currently have adequate access to the technology they need to teach their students but not necessarily for using virtual field trips. Participants also said they have access to computers (laptop or desktops) in classrooms or in a shared computer lab and iPads that are available to be signed out or assigned to each classroom. Other technologies mentioned by one participant but not both were projectors, Spheros kits (https://sphero.com) which are programmable robots that teach coding to kids, and Apple TVs. One participant also discussed a school district mobile application where teachers can post videos and photos of their class for parents to view.

Each participant also noted that access to technology varied depending on the grade level they were teaching. In both interviews, participants indicated that primary grade teachers generally have less technology in their classroom and tend to use computer labs or laptop carts which are shared amongst the entire school and require them to schedule the use of the laptops. Meanwhile, intermediate grade teachers at each of the participant's schools typically have more technology assigned to their classrooms and do not have to share as much. One participant suggested that projects assigned to intermediate grade students generally requires them to use the internet to conduct research.

Need for External Funding

In discussions about authentic learning experiences, funding was mentioned as a concern for the participants. Each teacher indicated that since school budgets were limited, they relied on the technology that they already have, or resources provided by non-governmental organizations, to obtain the necessary technology for their classroom. Participants indicated that it is often up to

the teachers to find authentic learning experiences that fit the curriculum and can be implemented using the resources already available to them. One participant also mentioned that the lack of government funding has increased the reliance on teachers to find alternative ways to afford field trips and the educational experiences associated with these school excursions.

Participants noted that the Parent Advisory Council (PAC), committees at each school that is mandated by the BC School Act through which all parents can provide their feedback to the school administration (more information on the BC School Act available here: http://www.bclaws.ca/civix/document/id/complete/statreg/96412_02#section8), play an important role in fundraising for the needed technology. One teacher said, "Tech as you probably heard gets funded by fundraising by the parents. So some schools don't have much and some schools have lots. It just depends on access and fundraising and all of that."

One participant mentioned that they previously applied to an organization that provides teachers with grants towards purchasing the material they need, My Class Needs (https://myclassneeds.ca), and received money to purchase five iPad Minis. The My Class Needs program, which is no longer available, was funded by private donors and corporations. To be eligible, applicants had to teach at the K-12 level at a Canadian public school. Grants can be used to purchase items such as art supplies, tablets, and gardening tools that wouldn't be available otherwise.

The participant has since moved schools and was unable to take the iPad Minis to the new school since they were gifted to the school and not the individual instructors. This was problematic for the participant because the lack of available funding for technology meant that the technology available at each school was inconsistent. To obtain the missing equipment would

require additional school-organized fundraising. This may lead to further inconsistencies in available technology because schools may direct funding that could have been used towards purchasing technology for other more pressing priorities. Alternatively, teachers can appeal to non-governmental organizations. However, not all applications for resources may be approved, the approval for funding may not time-up with the need for the resources, or the funding program may no longer be available when the new technology is needed.

As mentioned before, a participant found it difficult to afford field trips. One teacher said they receive a specific amount of funding to be used towards any classroom needs, including education materials and fees associated with field trips. This was calculated at $10 per student per year at the participant's school. This meant that planning an authentic learning experiences that cost money, such as a field trip, can be difficult because a school bus alone costs around $350. The teacher said, "My kids this year, we're getting funding $10 a child for field trip. But the thing is I only have 16 children, so I can't, I can't afford the $350 bus or even half of it." One participant suggested that they were only able to take their class on a traditional field trip this year because of the Ocean Wise Bursary program, which is offered through the Vancouver Aquarium and provides free admission and bus transportation to high-need schools, covered the cost of the field trip (https://www.vanaqua.org/education/bursary-program-application).

Use of Technology in the Classroom

When asked about the kinds of technology the participants use in their classroom, each teacher indicated that they were comfortable using technology in the classroom and use it in their lessons.

One participant mentioned that they thought that the extent technology is used in classrooms depends on how comfortable individual teachers are in using technology. The participant said, "They (teachers who are not tech savvy) are hesitant to use it (technology) because they're busy enough already and it's something they just don't have time to spend on." The participant elaborated that teachers who may not be comfortable using or are only comfortable using a specific version of technology often do not want to spend the time learning how to use new, updated or different versions of technology and would rather use the time to plan their lessons.

A participant noted that their class is participating in the Little Inventor program (https://www.littleinventors.org), which encourages students to come up with inventions to solve real-life problems that are also relevant to the curriculum. The participant's class specifically had access to Sphero kits (a programable robot intended to help teach young students about coding), and therefore used them as part of their invention. The Little Inventor program's theme this year is marine life and marine conservation. The goal is for the students come up with a solution to a problem in marine life and marine conservation using the Sphero kits. The program provides teachers with PDFs and PowerPoint slides to help teachers plan lessons. From there, the participant researched videos and photos to show the class what marine environments look like, how they are affected by pollution, and encouraged them to create a robot that can solve the problem of marine pollution. The class spends multiple weeks on the project and builds their knowledge each week.

The participant's use of the Little Inventor program can be considered a type of virtual field trip because the participant used various different multi-media formats, including video,

pictures and text, with the goal of transporting students to the new environment as a way to teach the students about a specific topic. While the participant's implementation of the Little Inventor program can be considered a virtual field trip, it is noteworthy that the program allows for many different ways of delivery. Teachers may choose to implement the program in different ways, including using multi-media. Teachers using the Little Inventors program are likely providing students with an authentic learning experience. The program fits into the definition of an authentic learning experience well as it encourages students to get involved with their learning by coming up with a solution to a real-world problem.

A participant discussed their positive experience using SMART Boards (https://www.smarttech.com). "The kids could go up there…we could do art, my attendance, and the class calendar, and it was amazing." However, the participant noted that the SMART Boards were no longer in use because it was expensive for schools to maintain. In addition, the participant indicated that some Smart Boards get moved between classrooms. In those cases, teachers had to spend a lot of time setting it up because it needed to be recalibrated each time.

A participant also mentioned using a platform called Teachers Pay Teachers (https://www.teacherspayteachers.com/About-Us) to find free course materials and lesson plans for authentic learning experiences. Teachers Pay Teachers is a website where teachers can upload course materials they designed and offer it to other teachers either for free or for a cost.

A participant noted that teachers are mindful of whether technology used in the classroom is contributing to the learning environment or more distracting, and whether the technology is appropriate for the age level. From the participant's experience, students enjoy using technology

in the classroom, however it is up to teachers to ensure technology in the classroom is used to teach practical skills and not for entertainment.

Discussion

According to Wepner and Sertokin (2014), to successfully implement new technology in the classroom, instructors need to have access to the required technology, be trained and willing to use the technology, have the time necessary to plan and execute the program, and see benefits to using the new technology for teaching. In discussing the factors teachers consider when deciding whether or not to use a virtual field trip with study participants, five major themes emerged, these were:

- Use of authentic learning experiences
- Relevancy to the curriculum
- Access to the required technologies
- Funding to purchase the required technologies
- Logistical concerns such as time, curriculum, and authenticity

Teachers' Perception of Virtual Field Trips

Sociocultural theorists Bonk and Cunningham (n.d.), asserted that technology has transformed learning by providing more ways for information to be delivered and discovered. However, before a technology such as the internet, television, computers or even calculators are able to transform a classroom or education, teachers or school administrators must deem it valuable and logistically possible to implement. Similarly, in order to understand why teachers may choose to implement virtual field trips in their classroom, first it is necessary to understand teachers' perception of virtual field trips. Second is to consider teachers' perception of the availability of technology at their school and if they think they have the access to the required material and structures to support the implementation of virtual field trips. This may include time to plan and implement virtual field trips and the hardwares and softwares necessary. Following that process, the following section will discuss whether participants perceive virtual field trips as valuable.

Connection to Curriculum

Previous research conducted by Kisiel (2005) show that when planning field trips, teachers prioritize connection to curriculum over student enjoyment or fostering student interest and motivation. It is therefore not surprising that each participant indicated connection to the curriculum is an important factor when deciding whether or not to use a virtual field trip.

In discussing authentic learning experience such as virtual field trips, each participant went on to indicate that in addition to relevancy to curriculum, they also perceive authentic learning experiences as an opportunity to help students develop higher-order skills such as critical thinking. Participants explained that they want authentic learning experiences to not only teach facts but also provide students with opportunities to think about solutions to real-life problems and to solidify their learning.

Participants' views about learning are therefore also compatible with Klop and Hill's (2008) view of connectivism in education, which asserts that education technology should help students develop analytical skills, and Gredler's (2004) theory that authentic learning experiences are useful because they encourage students to think in different perspectives and come up with solutions. The implication for virtual field trip design is that it should primarily focus on teaching students skills and concepts and rather than facts. While the delivery of information on subjects that relate to the curriculum is certainly important, virtual field trips should also focus on building up students' practical and critical thinking skills.

Furthermore, one participant mentioned that similar topics are often covered at different difficulty levels through a student's k-7 experience. For example, primary grade students in B.C. are often introduced to the concept of life-cycles and come across it again in intermediate grades

at a more complex and technical level. Teachers may therefore consider whether a virtual field trip program may be used by different grade levels with different levels of ability. It may be also important for teachers that virtual field trip programs are flexible with activities that vary in difficulty so that it can be used by different grade levels.

Where Virtual Field Trips Fit In

Previous studies have found that virtual field trips can be effective (Cassady et al., 2008; Sanchez, 2006; Sriarunrasmee et al., 2015; Smith, 2014), and according to Stoddard (2019), be as authentic as real-life experiences. In discussing the use of virtual field trips, participants indicated that they preferred physical field trips over virtual ones. One participant even said that they did not believe that virtual field trips could replace real-life experiences.

While participants preferred physical field trips, they agreed that virtual field trips can be valuable. One teacher noted that where physical field trips are not possible because of scheduling issues or is not accessible due to geography, institutions can consider creating a virtual experience as an option. A participant was particularly interested in using virtual field trip experiences for topics in the sciences and First Nations studies as they noted finding a physical field trip on that topic was particularly difficult.

One possible explanation for why teachers prefer physical field trips over virtual field trips is that they are more familiar with physical field trips. During the interview, both participants came up with their own definition of a virtual field trip that generally aligns with the definition used in the study, however neither seemed very certain of their definition and noted that they had never used a virtual field trip before. Teachers' unfamiliarity with virtual field trips

work in several ways. First, teachers may not be compelled to look for a virtual field trip on the subject they are teaching simply because they are not familiar with their existence in certain topics. Second, teachers who are unfamiliar with using virtual field trips in the classroom may prefer to stick to other methods of teacher they are experienced in, such as leading students through a worksheet activity instead. Third, a teacher may feel more comfortable using a program that is recommended to them by other teachers. If other teachers are also unfamiliar with the use of virtual field trips in the classroom, the teacher may feel unsupported in using it.

Teachers' perception of virtual field trips are an important point of consideration. Teachers may be interested in using a virtual field trip where a physical field trip is not possible, such as a virtual field trip to examine something microscopic, not practical due to geography, or does not allow enough time to fully explore a topic. Martin (2005) and Bednarz (1999) points to the potential of virtual field trips as a teaching tool in the geosciences. While field work has been a long tradition for students in the geosciences, some sites are much too dangerous and inaccessible to visit (Tuthill et al., 2002). In addition, it allows students to learn how to use the tools and technologies available in the field to remedy difficult to access sites.

Virtual field trips can also be used in schools to accompany a curriculum and provide extra value even if a physical field trip on the topic is available. For example, a class studying plants may be able to visit a greenhouse to learn about how plants grow and then complete a virtual field trip that explores plant cells when they are back in class.

Another option is to create experiences that provide students with a different perspective that may be better suited to be taught through a virtual field trip rather than a physical one. For example, teachers might appreciate a virtual field trip experience that is comparable to a physical

field trip to the aquarium. The virtual field trip program may replicate all the basic experiences students get from going to the aquarium and also include an experience that allows students to dissect marine animals virtually. Teachers may find value in such a virtual field trip because it would add value beyond what is possible at a physical field trip and even possibly cover more of the curriculum.

A virtual field trip that is similar to an existing traditional field trip counterpart may help make virtual field trips appear more familiar to teachers, especially if it is recommended or offered through an institution that is well known and regarded. Drawing on the example of the aquarium again, many teachers in Vancouver have led their class on a traditional field trip to the Vancouver Aquarium. A virtual field trip to the aquarium can therefore feel more familiar for teachers who have likely led a traditional field to the aquarium before. Since they are already familiar with the physical version of the field trip teachers may therefore feel more confident in leading the virtual version and gauging the success of the experience. This can help introduce teachers to virtual field trips and see the value they provide even if a comparable physical field trips are available.

Resources

In order for virtual field trips to be used in the classroom, teachers must not only perceive them as being valuable but also have the resources needed to implement them. For example, in order to run a virtual field trip, teachers may require access to: technology such as computers, headphones, and supporting software; time to plan and execute the program, and funding to purchase virtual field trip programs. Interviews with participants revealed that implementing

virtual field trips at schools can be a challenge because schools may not have the required technology nor the funding to purchase the needed technology.

Access to Technology

In order to implement an educational program or software such as a virtual field trip, teachers may require access to different types of technologies, such as computers, tablets, mice, headphones, appropriate operating systems, additional software, working CD drives or a stable wifi connection. During the interview, one participant noted that they may not have enough working devices and headphones for their class nor a reliable wifi connection to use a virtual field trip. In addition, a participant noted that their software applications are often out-dated as teachers do not have the ability to update these themselves. Since teachers likely consider the technology they already have at the school before deciding to purchase programs such as virtual field trips, access to the required technology or funding to purchase what is missing are important factors teachers consider when deciding whether or not to use virtual field trips.

Based on the response of participants, it appears that in order to implement virtual field trips, several things need to be in place from a technology perspective. First, teachers need to have access to enough computers or tablets to run the program with their students. Second, teachers need to have the necessary accessories such as headphones and wifi required by the programs. Third, the equipment needs to be up-to-date enough to be compatible with the virtual field trip program.

Schools may already have some technology but not enough or the needed type for the class to use the programs, and purchasing additional technology may not be economically

feasible for schools. For example, a school may have a few working tablets but many pairs of working headphones. Since virtual field trips require many pieces of technology working together, teachers may not have enough working sets of tablets and headphones to run the virtual field trip with their entire class simultaneously. Teachers may try to find ways to fill the gap by borrowing from other classes, having students share or by requesting the school purchase additional technology. Alternatively teachers may also choose to make scheduling adjustments so they can run a virtual field trip with only a portion of their class at a time. While these are all possible work-arounds, it requires schools to have at least a certain number of working sets of technology, otherwise the circulation of the technologies and scheduling of students taking turns eventually becomes impractical.

To help alleviate teachers' concerns about having the needed technology to run virtual field trips, programs need to be flexible and allow for different configurations that can be used in various environments. For example, some classes may have access to a computer lab where students can each have a computer to run through the virtual field trip at their own pace. Others may only have one computer in the classroom that can be connected to a projector. This set up would allow for a teacher to lead the class through programs using the one computer. Having multiple layout options for virtual field trips documented for teachers can be useful in helping teachers better understand what the required technologies are and provide them with some ideas on how they can work with the technologies they already have. Another consideration is that given the potential mix of different computers and tablets available at schools, teachers may prefer to have a virtual field trip program that can be used with different operating systems, for example, being compatible with both Macs and PCs.

Lack of Available Funding Driving the Disparity of Technology

Related to the concerns about having the technologies teachers need, participants noted that some schools do not have the technology teachers need to instruct their class the way they would like. Based on the response of participants, it appears that lack of available funding for technology, in general, has resulted in schools relying on fundraising efforts to obtain the needed technologies. When the needed technology is not available in the school and additional funds for purchasing the required technology is not provided for by government, schools must find alternative ways to pay for the required technology.

According to participants, hardware devices such as computers in school are primarily funded by their own fundraising efforts. However, since not all schools are able to raise the same amount of money, some schools end up being able to purchase more technologies while others may not. Schools that have historically been able to raise lots of money for technology are more likely to already have the required technology and may be able to use fundraising dollars towards other purposes or to further upgrade existing technology. For example, they can divert the funds towards purchasing more advance technologies, pro-actively replace technologies nearing their end-of-life or bank the excess funds for the follow year's technology. On the other hand, schools that historically have not been able to raise a lot of money are likely already lacking much of the technology required, and may possibly have other competing priorities and therefore unable to provide funding for technology. Fundraising for these schools is more difficult because they need to raise substantially more funds to meet their basic technology needs. In addition, since technology is continually improving, require maintenance and can become outdated, fundraising efforts are continuous.

This can be particularly challenging for teachers who change schools because as participants noted, there is a significant difference in the technologies available between schools. One participant specifically expressed frustrations with the inconsistent technologies available at each school as they do not know what to expect when they switch schools. Specifically, the participant explained that they were unable to take the iPad Minis, which the teacher had independently applied and received a grant for. Since it is up to individual teachers to search and apply for grants, the technologies available at each school is inconsistent. As such, when teachers change schools, they most likely have to adjust to a new set of tools on top of adjusting to a new environment.

Due to the variance in available technology at each school, teachers have to note what capacities exist in terms of technology and find ways to work with the capacity. If teachers find that their new school does not have the technologies they need, within reason, to teach their class effectively, one option is to seek out external funding to purchase what is needed. However, as one participant noted, if the needed technology does not exist and is not planned to be purchased by the school, it is up to individual teachers to decide if they want to spend the time and effort to apply for external funding. Not all teachers may have the time or the know-how to apply for external funding - furthering the inconsistency of technology available. Moreover, if teachers feel their placement is changing constantly and that the technology they successfully applied for may not be available to them in the future if they move, they may not be inclined to put in the effort to apply for external funding. This may be especially true if teachers feel the technology they apply for may not be used after they leave. For example, one participant mentioned using the Sphere programmable robots. However, not every teacher may want to make use of this

technology. Furthermore, depending on when the teacher is planning to implement the virtual field trip and when the funding cycle for grants are, teachers may not be able to obtain the needed technology at the appropriate time for the current school year.

The disparity in technology available at each school may mean that teachers prefer programs that are flexible, compatible with dated versions of software, and take into account the different configurations of technology teachers may have available to them.

Funding Options

Based on the two participants, the perception is that the available resources needed to run virtual field trips is insufficient. To fill the funding gap, participants indicated that teachers may need to rely on other funding options. However, external funding options were also thought to be limited.

Each participant noted that the Parent Advisory Committee (PAC), which represents the interest of parents to each school's administration and are made up of parent volunteers, plays an important role in fundraising, including for the needed technology at their schools. Based on participants' response, it appears that the lack of school resources to purchase required technologies in schools has led to an increased dependency on fundraising. This may limit or enable teachers' options to use new technologies like virtual field trips. On the one hand, PACs may be more focused on purchasing technology that the school can use for multiple purposes in the long term. For example, PACs may prioritize replacing existing technology that has become outdated over purchasing new and more experimental technology. Furthermore, PACs may be more focused on the needs of the school rather than individual requests from teachers. On the other hand,

appealing to the school PACs may be very effective, especially when priorities align, at providing schools with additional funds and potentially increase parents' understanding and connection to the schools.

It is noteworthy that the socio-economic status of parents at a school is likely to have an impact on the amount of technology already available and the money PACs are able to raise, therefore creating greater inequality in the amount and types of technologies available at each school, especially over time. These schools, are likely in areas with more affluent parents who can afford to support their school's fundraisers economically. Schools with less affluent parents are less likely to be able to raise large amounts of funds as parents may have less disposable income. These schools are likely to have other needs to address with their limited funds, making it less likely that the specific needs for a virtual field trip will be a high priority.

One participant mentioned that they researched and applied for grants through non-government organizations such as the My Class Needs Foundation (https://myclassneeds.ca). As part of the application process, teachers have to explain what the funding is for and how it may contribute to their students' learning. The involvement of external grants can also have a positive or negative influence on teachers' ability to use new technologies such as a virtual field trip. On the positive side, funding through external grant programs augment some of the budgetary limitations of schools. Unlike grant programs such as the My Class Needs Foundation acquires most of its funding through corporate donations and therefore may help enable teachers who want to use virtual field trips by helping provide additional sources for funding. On the negative side, external grant programs may not be available every year or even when available, proposals may not be successful. Applying for grants also take considerable time and effort for teachers,

there is no guarantee that they will be successful, and the success rate may be dependent on the number of applications received.

If teachers decide they want to implement a virtual field trip, they may first look to implement virtual field trips that are flexible and can be held using technology they already have available. If that is not possible, teachers may consider their options for obtaining the needed resources to purchase the additional technology infrastructure needed to run most virtual field trips and to purchase the desired virtual field trip program. This can include an appeal to the PAC for fundraising or apply for external grant programs. Given that virtual field trips may not be a priority for PACs and that external grants may not be available or teachers may not be successful obtaining them when the funding is needed, teachers may choose to use virtual field trips that do not require them to source additional technology. This further demonstrated the need for virtual field trips to accommodate technologies that vary at each school and should therefore keep technology requirements simple. Moreover, it also supports the earlier recommendation that it be possible to implement a virtual field trip program using different variations and combinations of technologies.

Cost of Admission

One participant indicated that the benefit of virtual field trips is that it can potentially alleviate budgetary constraints compared to physical field trips. Although the participant did not mention how much they may be willing to spend on a virtual or physical field trip, they discussed that they have $10 per student per year allotted to them to use for their class. This fund can be used to purchase needed materials or to send the class on physical field trip.

It is true virtual field trips often do not have some of the one-time costs associated with physical field trips, such as the cost of admission and transportation. However, there are other costs virtual field trips may require such as the cost to rent or access the program. Since virtual programs may allow multiple or one-time access, the cost of purchasing or renting the program may or may not be a one-time purchase. While earlier sections examined the logistical factors associated with obtaining the needed technology, this sub-section focuses on budgetary components of virtual field trips.

Based on a participant's response, there seems to be an assumption that virtual field trips should be more affordable than physical ones. This preconception is likely based on the assumption that the needed technology infrastructure already exists at the school. It is possible that participants assumed virtual field trips are more affordable than physical ones because they are not familiar with the technologies needed to run a virtual field trip. Another possibility is that participants are confident that their schools already have the required technology. This illustrates the complexity of calculating the true cost of running a virtual field trip. For example, a school may decide to purchase additional laptops to support student learning. These laptops may also be used to run virtual field trips but are unlikely to be just purchased with the purpose of implementing one virtual field trip. However, if the virtual field trip program can be used across different classes and years, schools may be convinced to purchase additional laptops for the purpose of running virtual field trips. Teachers who want to use virtual field trips may also identify the need for more laptops to school administrators who ultimately agree to purchase additional devices because it can be used for other purposes. Therefore, whether or not virtual field trips are more affordable than physical ones depend on each school's context, specifically if

they already have the required technology infrastructure, if they are purchasing any additional technology and whether or not they plan to use the technology for other purposes.

Aligning with the findings of Cassady et al. (2008), participants noted that the cost of admission and transportation, and the time it took to plan and execute physical field trips were major hurdles to planning physical field trips and contributed to their declined use. In general, the cost of physical field trips is more straightforward. Schools have to account for the cost of admission, transportation and sometimes even liability insurance each time they go on a physical field trip. In contrast, the cost of a virtual field trip changes with each use. While the cost of purchasing a virtual field trip and acquiring any additional technology required may be high at first, the cost to run virtual field trips after the initial investment may be minimal.

Since the cost of purchasing the virtual field trip may be an important factor for teachers, it may be beneficial to make the upfront cost of their program more attractive for schools. For example, allowing multiple access so that the virtual field trip can be shared across different classes and re-used over a span of time may help teachers to convince their school administration and make a case that other teachers at the school are also interested in the program.

Given the possible expectation that virtual field trips be a more affordable option to physical field trips, virtual field trip programs that has content for different grade levels in one convenient program may be more attractive for teachers as it can help justify the cost. This may help schools see the value of virtual field trips over physical field trips as the program can be better shared across the school. Institutions and private companies who may see value in virtual field trips as a public outreach and education opportunity may also consider creating a sponsorship opportunity so that schools do not have to bear all the costs.

Amount of Time

Each participant mentioned authentic learning experiences in relation to hands-on learning. According to Shaffer and Resnick's (1999) definition authentic learning is where learning is meaningful to students, expands their worldview and is relevant to the world outside academia. Participants' views of authentic learning experiences were similar, also emphasizing student engagement and involvement in their own learning as underlying principles.

Each teacher discussed the amount of time authentic learning experiences require in different contexts. One participant mentioned that their class participated in the Little Inventors program, which spanned across multiple weeks. The participant periodically presented PowerPoints, went through the PDF handouts, and worked on designing a Sphero spherical robot, a programable robot intended to help teach young students about coding, with their class. The participant reviewed the Little Inventors program positively and expressed that they enjoyed the multi-week structure as students can work on the different steps and build up their learning. Interestingly the other participant who is a special education teacher, discussed the time commitment associated with implementing authentic learning experiences as a barrier to their use. This participant noted that special education teachers have a different kind of schedule and only have about 30 minutes with each student in their case load every day. They indicated that while they see the benefits of authentic learning experiences, they did not feel they had enough time to use it with their special education students.

Based on the participant's response, it appears that having authentic learning programs that fit into the teachers' teaching blocks is important. Some teachers may only teach certain topics and may be allocated a certain amount of time with a class. However, having a program

that spans multiple weeks, and that can build upon the knowledge students acquire each session, was viewed favourably. This may indicate that teachers prefer programs with multiple short sessions that can be adapted for the time constraints they are working with.

In addition, Norris et al. (2015) found that teachers consider the amount of time it takes to run a virtual field trip as a major barrier to use, but are more willing to use virtual field trips if they perceive them as being effective and easy to use. This may mean that teachers view time constraints as a secondary factor. If a program is user-friendly and effective, teachers may be more willing to work around any concerns about time. Norris et al.'s (2015) findings is consistent with the response of the participant who used the Little Inventors program. This participant indicated that other factors, such as effectiveness of the teaching material and students' enjoyment, as a more important factor than time.

In sum, one of the factors teachers consider when deciding whether or not to use a virtual field trip may include the amount of class time it requires and how that time can be structured to fit their class schedule. While most conventional elementary classrooms have one teacher for multiple subjects, some teachers may be able to allot extra time for specific activities, while other teachers may not have the same flexibility and need to follow the prescribed time blocks or simply have too many topics to cover to spend additional time on a program. Therefore, it may be important for teachers that virtual field trips be flexible in terms of how it can be delivered. For example, virtual field trips that are designed fill three 20-minute blocks may allow for more flexibility. Teachers can then choose if they want to run through the program in a single one-hour section or in separate sessions over different days.

Summary of Discussion

The research question for this study is: What are the factors teachers consider when deciding whether or not to use virtual field trips? Interviews revealed several important factors teachers consider when deciding to use virtual field trips. The main factors discussed were: whether teachers perceive virtual field trips as being valuable and if teachers have the required resources to implement a virtual field trip. This led to further discussions about factors such as relevancy to the curriculum, value compared to physical field trips, if the needed technologies in the necessary amount are already available at the school, and if additional funding is available to help purchase any additional required technologies.

It is noteworthy that many of the factors discussed relate to logistics elements. There are many other possible factors that participants did not mention that might come before the factors discussed. In order for virtual field trips to be implemented in the classroom, teachers have to learn about the virtual field trips, have the ability to find a virtual field trip programs that fit in with their needs and be comfortable using the necessary technology or have access to training. These are all factors that teachers may also consider when deciding whether or not to use a virtual field trip.

Available funding for technology at schools is limited and can lead to teachers having to find alternative ways to afford the technologies required to use virtual field trips. This can include appealing to the school's PAC and third-party organizations offering grants. As each school's PAC may not be able to provide supplemental funds and not all teachers may apply or be approved to receive grants offered by non-government organizations, the technology available at each school varies and are older versions. As a result, it may be important to teachers for

virtual field trip programs to be flexible and appropriate for the technologies that are commonly found at schools.

Interestingly, one participant assumed that virtual field trips are more cost-effective than physical field trips. As participants indicated that there is limited access to funding, teachers may value virtual field trip programs that recognizes the financial limitations of different schools. One way to maximize the value of virtual field trips is to allow schools to access the program multiple times. Future research may consider the direct and indirect costs associated with virtual and physical field trips and help provide a better understanding of their true cost.

Another factor participants indicated as important was whether a virtual field trip connected to the curriculum. Teachers also felt that an important strength of virtual field trips was the ability to teach soft skills and critical thinking. For example, one participant chose the Little Inventors program because it connected the curriculum which had a section for marine life, but was motivated to keep using it week after week as it challenged their students to use their critical thinking and problem solving skills to come up with a solutions to the issue of ocean plastics. Here, the authentic learning experience not only connected to themes in the curriculum but also encourage students to think practically about an issue. It may therefore be important for teachers that virtual field trips teaches certain topics while emphasizing higher-order skills such as problem solving and critical thinking. As curriculums tend to change and differ depending on the region, focusing on topics that can be taught well using virtual field trips might be more beneficial than hyper-targeting specific schools or school districts. This is especially useful for topics where statistics and facts may become out-dated quickly. For example, figures on CO2 emission may change annually, but a virtual field trip that teaches students more general themes

about global warming, such as how green house gas works, and then encourages them to think critically as well as to conduct and report on their own research, can continue to be relevant even when the statistics it discusses are not.

Participants noted that they preferred physical field trips over virtual field trips because they were perceived to be more authentic, although the later was seen as a good supplemental resource to authentic field trips. One possibility is that teachers are more familiar with physical field trips and may not be aware of the different types of virtual field trips available. Teachers may also choose physical field trips because the costs are more predictable and easier to plan for. Virtual field trips may be attractive for teachers because they can be used in the classroom setting which is more controlled than if students were brought out of the school. Moreover, teachers may require more communication about the types of virtual field trips available. This may be crucial to helping increasing teachers' familiarity with virtual field trips. Furthermore, it may help teachers better understand the types of virtual field trips available and how they may be used to teach certain topics.

Limitations

This study set out to explore the perspectives of a few teachers in the Vancouver Lower Mainland. Here are some limitations to this study.

First, while the study had originally intended to have more than one participant from three school districts, only two participants representing two school districts signed up. To better understand the factors teachers across different school districts consider, it would have been helpful to have had participants from all three school districts.

Second as there were only two participants, there was not enough data to determine if saturation was reached. More participants might have allowed the researcher to consider if the participant's responses represented teachers in the Vancouver Lower Mainland.

Third, the researcher recruited participants without considering their specific roles within their schools and had assumed the different participants would be in similar roles, but there ended up being participants with different roles that made comparisons more challenging. While it is certainly beneficial to capture the perspective of different kinds of instructors, the vastly different context made it more difficult to compare the responses. The researcher would have preferred to have focused on instructors teaching conventional classes.

Fourth, the researcher recognizes that recruitment could have been conducted using additional methods. Recruitment was conducted by e-mailing teachers who had used an authentic learning experience, specifically the Mobile Dairy Classroom (MDCE), before. Given the opportunity, the researcher would have chosen to recruit through additional methods such as mailing information about the study to schools that have participated in the MDCE program before as some teachers may have missed the e-mail. The researcher could also have used snowball sampling by asking participants to suggest other teachers whom they think may be interested in participating as well. Another possibility is to expand the sample population to include additional elementary school teachers regardless if they had used an authentic learning experience before.

Future Research

The current research explored the factors teachers consider when deciding to use a virtual field trip. In discussing the topic with participants, several themes came up that might deserve further research.

One area for further research is teachers' perceptions of authentic learning experiences. Each participant noted that they did not consider virtual field trips as authentic as physical ones. It is also possible that teachers' understanding of authentic learning experiences is limited and research into this may help determine if there is an opportunity to increase teachers' understanding of authentic learning experiences. Furthermore, research into teachers' perceptions of authentic learning experience could determine whether teachers view them as being important to education. Depending on the findings, this might determine whether programs that deliver authentic learning experiences such as field trips, outreach programs and virtual field trips should be further developed.

Another topic for further research is teachers' perception of authenticity. The current research did not ask participants to explain why they viewed physical field trips as being able to provide a more authentic experience. Teachers' perception of authenticity of virtual field trips is important because it may lead to a better understanding of what is considered an authentic experience in the context of learning. For example, instead of seeing a replica of the pyramids at a museum, virtual field trips may allow students to see the actual pyramids and even interact with the site through augmented features, which a physical field trip could not do. This may also depend on what teachers consider authentic. Further research into teachers' perception of virtual

field trips may therefore help researchers understand the specific aspects of virtual field trips teachers prioritize and how virtual field trips can be used most effectively.

Future researchers may also be interested in studying teachers' familiarity with the types of virtual field trips available to them. While participants shared their own definition of virtual field trips in the current research, they did not discuss their familiarity with the different types of virtual field trips that exist. Understanding teachers' knowledge of the virtual field trip programs that are available is important because it may provide understanding of why existing virtual field trips are or are not used. For example, teachers may not be using existing virtual field trips because they simply do not know about them, or because there are other barriers to use, such as relevancy to curriculum. Further research into this topic may also help identify how teachers prefer to receive communications about virtual field trips. By understanding teachers' communications preferences, researchers may be able to come up with ways teachers can be connected to the virtual field trip that fits their curriculum objectives.

Sources of funding for technology was brought up in interviews with both participants. While the current research broadly discussed access to alternative forms of funding, as a way to understand the possible logistical factors teachers consider when deciding whether or not to use a virtual field trip, further research may be required to understand the types of infrastructure teachers work with. Research into this topic will provide a better understanding of how virtual field trips can be created to utilize resources that are already available to teachers.

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Appendix A: List of Outreach Programs Considered

For the purpose of this research outreach programs have to satisfy the following requirements:

a. Led by external staff members who are subject matter experts or trained by the outreach program.
b. Include props, images and other components that are not usually found in the school environment.
c. Mobile with the ability to visit schools across Vancouver Lower Mainland.
d. Not require students or teachers to travel out of the school.
e. Currently in use (active),
f. At a low or no cost to the school.
g. Functions across Vancouver Lower Mainland.

Outreach programs in the Vancouver Lower Mainland considered were:

- Aqua Van (Vancouver Aquarium: https://www.vanaqua.org/education/outreach)
- Mobile Dairy Classroom Experience (BC Dairy Association: https://bcdairy.ca/dairyfarmers/dairyclassroom)
- Let's Talk Science (UBC: https://outreach.letstalkscience.ca/ubc/local-programs/classroom-community-visits.html)
- Poultry in Motion (B.C. Chicken Marketing Board: http://bcchicken.ca/consumer/poultry-in-motion/)
- Presentation by Port Vancouver (Port Vancouver: https://www.portvancouver.com/community/school-program/)

- Scientists and Innovators in Schools (Telus World of Science: https://www.scienceworld.ca/sis/)
- VRCA Education Committee (https://www.vrca.ca/education/vrca-education-committee/)

Appendix B: Sample Questions and Follow Up Questions

Theme	Question
Teaching experience.	Tell us a bit about yourself Prompt 1: What grades you teach? Prompt 2: How long you have been teaching?
Attitudes towards authentic learning experiences	One definition of authentic learning experience is engaging students in hands-on experiences. Do you see using authentic learning experiences in your classroom? If yes - What role do you want authentic learning experiences to have in your classroom? Prompt 1: What are some factors you might consider when deciding to use an authentic learning experiences/hands-on experience. For example: student enjoyment, logistics, ability to convey important information, etc. Prompt 2: How might authentic learning experiences be useful to teach students? If not, can you expand? If you have used them, how have you included authentic learning experiences in the classroom?
Attitude towards technology and previous experience implementing technology in the classroom.	What types of technology have you used in the classroom in the last academic year? How have you used these technology (videos, gifs, computer games, film strips, projectors, etc.) Have you come across any logistical issues when using technology in the classroom? What factors do you consider when deciding whether or not to incorporate technology into your lessons? What role do you think technology play in providing students with authentic learning experiences?

Overall familiarity specifically with virtual field trips	How familiar with virtual field trips? How would you define virtual field trips? There's been a few different definitions of virtual field trips. For the purpose of this research, virtual field trips have been defined as "a learning experience held in the classroom that allows students to see, hear, and engage with different sites by using technologies available." Do you have any questions or suggestions to help refine this definition? Is there anything missing or should not have included?
Factors teachers consider.	What factors would you consider when deciding whether or not to use a virtual field trip? How might virtual field trips might be useful for your students? Prompt 1: Are there parts of your curriculum where you could see virtual field trips being useful? Prompt 2: If not, can you expand more? What logistical concerns might exist around the use of virtual field trips? Do you think logistical concerns would be a consideration in using virtual field trips? If so, how? Prompt 1: What role do you think logistical concerns have taken or will take in the use of virtual field trips?

Follow up on factors if not already discussed.	Context: Do you see using virtual field trips in groups? During class? As homework? Effectiveness: How might you grade students on materials covered in the virtual field trip? How would you determine if a virtual field trip was successful? How would you gage if it is successful with the students (student engagement, enjoyment, performance on test or worksheet)? What factors would you consider when deciding whether or not to use it again (ease of program, relevancy to curriculum) Logistics: Do you feel you currently have the appropriate resources and training to implement a virtual field trip? For example, time, access to a computer, money. If not, what resources do you think you would need? Do you think any of these logistical factors would be too difficult? Student Enjoyment & Attitude: What do you think your students' general attitudes towards virtual field trip would be? How do you think using virtual field trips may affect your students' attitude towards school or learning? Teacher Tech Efficacy: If a virtual field trip was available online, requires you to register for an account, log-in, present the video with your class, and lead your class to click through activities and decisions prompted by the program, how comfortable would you be to run a virtual field trip? What factors would influence whether or not you use virtual field trips?

Appendix C: Information and Consent Letter

UNIVERSITY OF ALBERTA
FACULTY OF EXTENSION

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Edmonton, Alberta,
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INFORMATION LETTER and CONSENT FORM

Study Title: Factors Teachers Consider When Deciding Whether or Not to Use Virtual Field Trips

Field Trips Research Investigator:
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Research Supervisor:
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Purpose

The purpose of the research is to explore the factors teachers consider when deciding whether or not to use virtual field trips. Virtual field trips have the potential of providing teachers with an additional tool to help provide authentic learning experiences. The research is primarily interested in teacher's perception about virtual field trips. Previous experience in using virtual field trips is not a requirement to participate in the study. Through the study, I hope to identify major factors teachers consider when deciding whether or not to use virtual field trips, which will hopefully help guide future virtual field trip design.

Background

The purpose of the current research is to explore the factors teachers consider when deciding whether or not to use a virtual field trip. This will provide valuable insight into teachers' decision-making process and may inform future virtual field trip design. You are being asked to participate in this study because you have participated in the Mobile Dairy Classroom Experience program during the 2016/2017 academic school year. The results of this study will be used for the purpose of a capstone project. The completion of a capstone project is the final requirement for the completion of the Masters of Communications and Technology program at the University of Alberta.

Voluntary Participation

You are under no obligation to participate in this study. The participation is completely voluntary.

Study Procedures

You will be asked to take part in a one-on-one interview. The estimated time you should set aside for the interview is one hour. During the interview, you may choose to skip any questions you do not wish to answer. Interviews will be transcribed and categorized into themes. You will be provided with an opportunity to review the transcript summary to ensure it accurately reflects your opinion.

Freedom to Withdraw

You may withdraw from the study up to two weeks after you have reviewed the summary of the interview. In the event you choose to withdraw from the study before the two-week period is up, your interview transcript and any associated notes will be deleted and will not be included in the results. After

the last point of withdrawal, data collected will be used in the study. All data used in the study will be kept anonymous.

Benefits

There may not be any direct benefit to participation, although participation may provide a valuable opportunity for you to reflect on your opinions about virtual field trips and the general use of technology in the classroom. The proposed research will provide the scholastic community with more insight into the factors teachers consider when deciding whether or not to use a virtual field trip. By investigating teacher's perceptions, the research will help provide context for future research and potentially guide virtual field trip design.

Risk

Participants in the study will be asked to answer questions in an interview. Some participants may find answering questions regarding their knowledge, experience and ability to use technology, uncomfortable. Please note that participants may skip any questions that they do not wish to answer. That is the only foreseeable risk the researcher has identified. If there are additional risks that become apparent during the course of the study, I will inform you right away.

Remuneration

As a gesture of gratitude for participating, each participant will be provided two $5 Amazon gift cards for a total value of $10. One $5 Amazon gift card for participating in the interview and one additional $5 Amazon gift card for reviewing the interview summary. Participants who participate in both parts of the study will receive a total of
$10 Amazon gift card. Gift card codes will be sent electronically via email within a week of participation. Participants may skip an unlimited number of questions during the interview. Participants who chooses to skip questions during the interview or withdraw entirely from the study will still receive the $5 gift card for their participation.

Participants will receive the second $5 Amazon gift card once they have reviewed their interview summary. An interview summary review is considered completed when the participants informs the researcher that no changes is required or what changes are needed. A participant may withdraw their data up to 2 weeks after reviewing the interview summary. Participants who completed the review but chooses to withdraw their data from the study will still receive the second $5 Amazon gift card.

Confidentiality & Anonymity

The purpose of the research is for the completion of a capstone project for the Masters in Communications and Technology program. Participant's names will not be included in the paper. Data will be kept securely and will be destroyed five years after the conclusion of the study. I will keep all information discussed with you in the strictest confidence. Your identity will be anonymized in the dissemination of the research. Data will be secured via password protection. You can receive a copy of the study if you send me an email with your request.

Identifying information will be removed from the data after participants have acknowledges the receival of the second $5 gift card, or after the last point of withdrawal (2 weeks after reviewing the interview summary), whichever is the last.

The principal researcher will be the only person with access to the complete data file. If a situation arises where the principal researcher needs to send the data to the research supervisor, the principal researcher will remove all identifying information (name and email address) before doing so.

Further Information

If you have any questions, please contact me at cecilia1@ualberta.ca.

The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615.

Consent

By signing the below, you are acknowledging that the study's procedures and purpose have clearly been explained to you. You understand that participation is voluntary and can be withdrawn anytime. In addition, you are aware of the study's timeline, that you be available for an in-person or phone interview between January 6th, 2020 – April 1st, 2020**.**

Date:_____

Name (printed):_____

Participant's Signature:_____

Investigator's Signature:_____

Appendix D: Interview Transcript Organized by Question

Researcher:

Could you tell me a bit about yourself and kind of your experience in teaching?

Teacher:

- Sure. I have been teaching for over 20 years. I first sign up to make on a teacher on call, which is how you typically start your, you know, teaching profession in the city. I put down that I would be comfortable covering for teachers that were technology teachers. So like a TOC for tech, and then subsequently found myself getting a ton of work because at that time there was a lot less, I guess, comfort and experience in teachers to teach tech. And so I was getting lots of jobs covering for tech teachers. And then, yeah. And then I actually got a part time job my first year of teaching, teaching tech.
- I was full time teaching technology for students in kindergarten to grade seven and then moved into teaching in a classroom grades five, grade six. And I taught over in Hong Kong for a year. When I came back from Hong Kong I was again teaching technology K to seven. And then I took some time off teaching that I came back to teaching. So anyways, after coming back to teaching I went into resource learning resource, which is special education helping kids with reading and writing, case managing files for kids that have special designations like autism or learning disabilities. I do reading intervention. I do a gamut of stuff as a resource teacher. And I also have done in that also some technology where I've been in the computer lab, again, teaching classes for 30 to 40 minute periods of time.

Teacher:

- I've been teaching for over 10 years. I too am surprised yet it's been a long time. And I'm at a new school and I am teaching grade one two this year. The last six years I've been teaching kindergarten.

Researcher:

One definition of authentic learning experience is engaging students in hands-on experiences. Do you see using authentic learning experiences in your classroom?

Teacher:

- Yes. And I feel it's so powerful. For the younger learners, I feel that, having an authentic learning experience, it's like, experience learning, having the opportunity to experience something in an environment where they're captivated, they're motivated and they want to learn is really like truly the key to their growth and development.
- For example, right now, just kind of off the top of my head, we are working on a challenge through the United nations called Little Inventors. I know it sounds like, Ooh. But it's quite practical for them. So it's called a little inventor challenge and um, you can look it up. It's really cool. So a couple of years ago they did one based on NASA and space and they were helping astronauts bigger out what improvements, enhancements, technology that they could create to help them at the space station.
-
- This year they're starting a new one and it's going to go for I think like a year and a half or something like that. And it's about Marine life, but Marine conservation. In the fall we were a high-need school. So like low income neighborhood, high needs and we got granted a field trip to the Vancouver Aquarium. That's why when I applied for that grant, it just kind of started a whole a whole bunch of things where I was like, okay, we have this amazing opportunity, we're going to go there for one of the wet lab experiences workshops where we could touch like organisms and talk about endangered species and the sort of diversity on the West coast in terms of our eco life.
- After that, my kids were totally, you know, entranced by that and what's happening. Then as part of our, you know, the one true curriculum, we were talking about life cycles, we were talking about, that's actually how we connected with the dairy foundation. We were doing life cycle.

- Before we went to the aquarium, we were actually talking about life cycles. We had the cow come, we had chicken, we got with the poultry, the poultry in motion. I was like, After we came back, then we did more focus on animal research and talking about modifications. And then I'm like, wonderful. This opportunity came about. And then, and then we were like, okay, there's a natural interest with the kids talking about this as part of the curriculum.
- We want to talk about, um, how we are like in terms of social responsibility, how are we able to make a difference in improving, you know, the like ecosystem, the earth that, you know, that sort of thing and getting that message across. So, part of the project is they are inventing vessels. I guess it's just kind of their idea of where they wanted to go.
- We're using Spheros so integrating technology as well. And they're building inventions to save Marine animals. So what they came up with. And I can send you videos if you like, that it's actually using just recycled materials they are making or they have made inventions to transport animals. It's so cute. And so through the process of like a couple weeks and like they planned it out, they threw it out and they tried it.
- The Spheros are sort of the vessel, like the transport vehicles. And then anyways, they build contraptions to go on top to maneuver it. So we're going to do this in water. That's the next step is that we haven't done is we're putting the Spheros in the water with their invention on top and then we're going to see how it goes in terms of like whether they're designed was to collect the animals or were they supposed to, um, some of them had designed it where they were collecting garbage. They were cleaning up like shoreline cleanup. Yeah, it's really cute and they did a really good job.
- The next step is for them to plan that and test it. We're going to test it to see how it's going to go in water, does it work? Does it not work? And if it doesn't work and what kind of enhancements or modifications we need to do in order to fix it up and then we're going to send it as part of our challenge. It really gets kids thinking. I mean like essentially creating robots which clean the ocean. In some of my videos, cause I put it on there, um, they have E portfolios in Coquitlam, so everybody uses a FreshGrade app and um, the portfolio follows the child every year.

- I'm posting these videos of them talking about, cause I'm like, Oh yeah. Okay. Well tell me about your learning. Tell me about your invention. And it's so cute to see several of them. They're saying, "It was really hard, I didn't know how to do it, but then I kept trying and I was trying different things and (my teacher) helped me. And seeing them struggle, it's hard. But seeing them realize that, okay, you know, I can work together with others. I can try different things. If this isn't work, maybe I just need to take this apart and then start from scratch.

Researcher:

Okay. So I'm curious about the, the, the challenge that you guys like if they give you a prompt and then do they give you like additional kind of resources and kind of week by week or anything or is it just really a prompt and go about it? However you would like.

Teacher:

- They gave us a PowerPoint and some like resources on a PDF. It was kind of just to start us off. And then from there you kind of have to go like your own way of how you want to teach it.
- For me, I've used, I use that as a starting point. And then, I also did like lessons on the Spheros and how to operate the Sphero and talking about like how to, how to maneuver it and working on controlling the Sphero. And then we looked at some actual, you know, problems.
- I looked on CBC and CBC had a video about this boy diving for plastics right in the Philippines, I think. And it was really powerful for my kids to be able to see that, okay, you know, this is, this is what's happening for a kid, you know, their age, maybe a little bit older, but you know, in another country and what he's doing in terms of, you know, he's trying to make money for his family. He's not going to school and diving in the, you know, dirty rivers for plastic. So I'm trying to bring in the outside from outside sources, whatever I can anyways.
- And as part of that, our school, it has been talking about properly sorting our recycling and you know, car emissions, that sort of thing. So that kind of all tied into it as well. Yeah, I've been able to

be like, okay, well is everything recyclable? If it's not, what happens to things that are, that needs to be recycled and what process do they go through? So the return at depot has been really good about it. I've seen a lot of their videos online, short and snappy, but like good for kids to be able to kind of grasp the concept of what's happening.

Researcher:

So when you are kind of looking at these authentic learning experiences, what kind of factors do you consider using?

Teacher:

- I think that definitely the grade level and what in what my kids are interested in because I mean this class is interested in, you know, like what we're interested in, in terms of marine-life conservation.
- But other classes I've had before have not been as interested in that topic. So with the primary grades, this is about sort of exploring and seeing where they're sort of inquiry, you know, leads to, and if it leads to one of these topics, fabulous. If it doesn't, then it's more of a teacher sort of initiated thing or a school initiated thing.
- At this school they've booked the dairy and the Poultry in Motion like many years, I think every year they've done it. So that's just kind of the routine of what they do in the fall because a lot of the kindergarten classes talk about farms and they go to like the pumpkin patch sort of thing.
- Part of it is sort of scheduling and just where in the calendar year it falls, which is, which is kind of unfortunate because you know, it may not necessarily be as authentic as it could be, but it's kind of, it's kinda where blends, right. Your availability of the programs.
-

- Free is very good. It is super important. I can't emphasize how important it is because our schools have a significant lack of funding, so it's really important for the programs to be available and cost-free, and it's wonderful that they're able to come to us. It saves us the cost of going there to experience a program.
- A bus normally costs about $350. And it only fits, um, depending on the size of the bus, which obviously increases the cost. A bus of like $350 for a bus usually takes two classes Yeah. So it is not like, it is not a lot of kids. So for many of us, our school doesn't get funding. My kids this year, we're getting funding $10 a child for field trip. But the thing is I only have 16 children, so I can't, I can't afford the $350 bus or even half of it. So even if I share with another class, I would still have to charge families for like money to go on the bus. Right. And that doesn't even include wherever we're going and costs and stuff there. So, yeah. So it's really, it's really important that programs and you know, places out there do provide opportunities to come to the school. That be, that'd be really great.

Teacher:

- Well, in my role, I would like to be able to do authentic learning, but I don't really have the opportunity to do a lot of that because I have kids coming in and out of my room every 20 to 30 minutes and they only stay with me for 20 to 30 minutes. So it's tough to do any of that experiential learning when you have only 20 to 30 minutes. I'm either assessing students or I'm doing very targeted intervention for reading and writing.
- But yes, I definitely do see it. I have, at times supported teachers by being an extra set of hands in the room when they're doing project work. But yes, in my, in my current role, it's not something that I can really do.
- You know, we're like as resource teachers, we're supporting the needs of the students and the staff. And if you have a huge caseload and you're basically all over the school all the time with kids in and out every 20 to 30 minutes. So very tough to do anything like, yeah.

Researcher:

What types of technology have you used in the classroom in the last academic year? How have you used these technology?

Teacher:

- Okay. This school has, every school is different in terms of what technology it has. Unfortunately. Like I wish it was more standard so you know what to expect. So I'll talk about both the schools that I've been at recently.
- Cause this school we have, projectors on a cart and we have a teacher laptop. My kids, because we're primary, we don't have regular laptops. We have a laptop cart because all computer labs have been dismantled because we need the space.
- The school district needs to space for classrooms or you know, student services rooms. All of the computers have been kind of taken, I'm not exactly sure where they are, but, um, maybe high school, I'm not sure. So anyways, so they've been replaced with a laptop in carts.
- Most of the laptops are used by the intermediate grades and it's in a cart. Then they just sign it out and they just, you know, use it whenever. And for us just because my kids are little, usually we just use my laptop and then we have a screen.
- Then I kind of use that as my projector. And then I also use an iPad. Not the minis, but we have the full sized ones and I have five. Those I'm using like my class can use them at all times and then if we need more than we need to go borrow from another class. And each class I think has about five in total. And then of course I have my, I have my phone, I have an iPhone. I take videos and the pictures of the kids there.
- In terms of my last school, I had a smart board. Each classroom had a smart board and the district is no longer funding purchases of Smart Boards anymore. They're not paying for the maintenance of the smart boards. The smart boards are expensive to have someone come, like troubleshoot, have people come in and fix it.

- The cost, I know this kind of specific, sorry, but for the for the bulbs and for the projectors are really expensive to replace and they do die after, you know, three to five years, probably around three years. Because of that they're no longer funding the upkeep of them so they're not encouraging schools purchase more.
- I think we also had a school sort of deal through smart board and I was like at one point when they first came out with it, I don't, I know like maybe 10 years ago. I actually got a smoking deal. It was like buy one, get one free. Yeah, they're like $1,500 each. So back then when they were promoting it and it came out and they were trying to pitch it as school districts, like we got smoking deal and so we bought like, school had bought lots, either mounted on a wall or it was on a rolling one.
- I've heard issues about the rolling ones. The rolling one kind of I've heard kind of sucked because it sounded good that you can move it from classroom to classroom, but then every time you get like you kind of move it somewhere else. You had to reset orientation of the screen and it was hard to operate and expensive to keep having it set up and maintained.
- But I, for primary, especially kindergarten, I loved my Smart Board dearly. The kids could go up there like they could, like we had games on there, we could do sorting and we could do like we could do art, my attendance on their calendar and it was amazing.
- I'd like to think of multifaceted sort of use of the Smart Board there. Unfortunately, you know, if they're not using it anymore and that sort of thing. It's too bad. With a smart board they also had a program that it's sort of a collaborative resource, like a, it's like a database called Smart Exchange and it's brilliant. It's sort of like, have you heard of Teachers Pay Teachers?

Researcher:

No, I haven't. So teachers pay teachers.

Teacher:

- It's an online site where it's like teacher created materials and yeah, and a lot of them, like you, people like from all over the world have created these resources, educators at different grade levels.

- It's sort of like an online marketplace a little bit because they can sell the material if they want us. But there were tons of free stuff that is awesome.
- I usually tell my student teachers, just go get free stuff. Don't buy anything because it's too expensive and you don't have money and you're going to spend too much money.
- Smart Exchange is like that only for Smart Boards. Once you have a Smart Board, like when you get a Smart Board, you get the program on your laptop and it's awesome. You go on there and it's a huge database that you don't have to recreate anything. You could just search for it first and somebody somewhere may have already created, a Smart Board like notebook program that you can actually do that for that topic or lesson or whatnot is so cool.
- I use my Smart Board a lot last when I did at my last school, I also use iPad minis cause I found that with kindergarten that the small ones were just better suited for like little kids just cause they're small. I found the finger ones were kind of cumbersome for them to hold and it's heavy and, and yeah. The smaller ones were perfect and we did a lot of our, um, documenting our learning and a lot of, you know, just like either videos, apps, like learning apps and stuff. We did it on that and that was great.

Teacher:

- We're lucky that we've had a very supportive parent community and some donors. So there's quite a bit of tech available for a public elementary school, but it depends on what types of activities we want to do.
- We've got a computer lab with 32 devices that 32 desktops that students and staff can use. And it gets used all the time. So teachers sign up and bring their class to the lab for 30 to 40 minute chunks of times. We have three iPad carts that staff can borrow to use with their students. And those get used quite a bit. Some, some classes in grades, I'd say the

intermediate classes at my school tend to use that a bit more. All teachers I think at this point have a whiteboards that is in their room, most have an Apple TV.

- The Vancouver school board, two years, three, three years ago finally gave all elementary teachers a brand new laptop, either a PC or a Mac, air of their choice. Like they got to choose. For resource teachers, we got our computers last year. Prior to that there were computers in every classroom, but they were getting older.
- There's adequate amounts of tech around the school. I mean, not compared to like a private school or maybe a West side school, but definitely we're not too badly off.
- Tech as you probably heard gets funded by fundraising by the parents. So some schools don't have much and some schools have lots. It just depends on access and fundraising and all of that.

Researcher:

Have you come across any logistical issues when using technology in the classroom?

Teacher:

- When it comes to tech in the classroom, you can imagine there's a lot of, there's a lot of factors that determine how much tech can be in a classroom, you know, fundraising and, and how involved, students and teachers and parents can be in that.
- I think with tech there's constant challenges, right? It's sometimes it just doesn't work properly or for a variety of reasons.The wifi is down or the software's not updating or your computer needs to be restarted several times to, you know, it's just like with tech, there is just sometimes frustrations

and there is a lot of staff that are not tech savvy and are not comfortable with tech. And so they, they are very frustrated. They are hesitant to use it because they're busy enough already and it's something they just don't have time to spend on. But then when they do try to use it, they sometimes are frustrated because it doesn't work properly. And because they're not tech savvy, they think, Oh, must be me and something I'm doing. So I say in general, the limitations to tech are just lots of people not being tech savvy and not, and not, and not having the time to get training and even if they have time, where would they do that and what would the cost be of that?

- So yeah, I mean I say that limitation because for those of us that are tech savvy to whatever degree you can, you can definitely, you know, find a way to get enough to get the tech you want in your, in your classroom, especially these days. And you don't need much to do quite a bit. Right. So yeah, but again, like you know, in like the one area of my school, there's a iPad cart with you know, devices that are good to go with good apps and everything and it doesn't, it wasn't even barely getting used last year, this year a little bit more. And it was just because the teachers of the grades of the teachers in that area of the school who access that cart just don't have the interest, more than the interest, I think that comfort, right.

Teacher:

- A challenge for teachers definitely is if you transfer schools then, I mean, I can't take my technology with me, some of the iPad minis at my last school, I had gotten through a grant that I applied for through the My Class Needs program.
- My Class Needs is a grant program that was in place probably about six years ago. And it was funded through several like corporations like Chevron. And it was a, I don't know if it was like managed through the school because the the school district, they didn't say you should apply for it or you shouldn't. And neither did our union per say, but they did. It was kind of up to teachers sort of like individually basis. And honestly with the underfunding of our schools and our resources, a lot of teachers like me were like, you know, forget that we are going, we're going for it. We're going to find and see what happens and if they give us free money and resources, why the heck not. That's

just my personal opinion on it. So anyway, so I applied and I got, I did get, I think my three iPad Minis were from the grant and they fully funded, it was amazing.

- They delivered like the materials to you. You don't have to take anything, you just have to tell them that what project you're doing and what you're using it. And it was fabulous, I think it's since then it's kind of ended and they don't do that anymore, which is unfortunate. But yeah, unfortunately I can't, because I changed schools. I couldn't take a technology with me, so it stayed at my last school and I'm not sure if they are, I'm not sure if they're using it. I hope so a lot of the other technology that I got for the class have stayed at whichever school as well.

Researcher:

What role do you think technology play in providing students with authentic learning experiences?

Teacher:

- I think that the key part of today's learning for our, like for the young, is to really kind of embrace it. But being able to find technology that's useful and it makes sense. So not having technology that's just like, it's just there for the fun of it, but we're actually using it for something that's purposeful and actually is meaningful.

Teacher:

- Teachers also do not just allow kids on devices just to play around because they do that enough already at home. So they, you know, if they aren't going to use them, they want them to be part of like a, you know, a project or an activity. If they're doing a hands on experiential learning you know, with a primary class, they're not going to be researching stuff the same way that an intermediate class would.

- Teachers are starting to do more experiential learning. But in some classes at my school like I said, I think it's definitely a an evolving process of growth and change. They're showing things. By accessing photos and videos and about science or social studies.

Researcher:

How familiar with virtual field trips? How would you define virtual field trips?

Teacher:

- I have very limited knowledge about virtual field trips. I don't know of many out there. I know that the Aquarium does a, they have like these virtual sort of web webcasts or something so that you could sign up with that you could do, but I haven't, I haven't done that because we, I got in like to actually see the aquarium with the kids, and I prefer doing the actual field trip because the kids can see things for themselves.
- I did hear that the hatchery, I don't know if it's small, some hatchery, but one of the hatcheries, they have this thing called fry F. R Y. Just look it up. And I just, I was just investigating honestly these things. I feel like I just Google and see what shows up because it's hard to see what's out there. I wish there was a comprehensive list or something. And the ones who, the hatchery, it's really cool except it's for grade four, five. So that kind of is out for us. In other, in like other sort of virtual learning sort of things, I've checked out different aquariums and their live webcam. That's kind of been it for us. I wish there were more virtual field trip opportunities because of the like, budgetary kind of constraints. I think it would be, I would think it would be great.

Teacher:

- When you say virtual field trips? Gosh, I mean, I think virtual field trip, I'm, I'm, you know, thinking like, you know, you're kinda like it almost like a face time or you know, that kind of experience where you're online and you're not at the place, but you're experiencing it by watching.

Researcher:

Yeah. There's been a few different definitions of virtual field trips. For the purpose of this research, virtual field trips have been defined as "a learning experience held in the classroom that allows students to see, hear, and engage with different sites by using technologies available.

What factors do you think a teacher might consider when they decide, you know, whether or not they should use something like that?

Teacher:

- I mean, I think it would be around access to be able to get the tech that they needed for that virtual experience. A lot of teachers I work with at this point don't have access to the tech.
- I think it wouldn't replace taking kids on and asked to booking trip. It would just maybe add to it. Yeah. I think, I think it would depend on the grade. There are just a lot of factors.
- I think the access to the tech needed for that experience would be a challenge and for it to work properly, even working headphones. I can see that probably being more accessible and easier but that depends on whether or not, like can they do it from an iPad, or if they need a computer.

Teacher:

- I do, I would see that the challenge yes. Like we would need the technology or more of it because I mean, I have five iPads and not sustain my class, but I could probably survive. So it's not like there's a significant amount, we could do it as a class depending on what it is. I think you would add to the experience if the kids could do it, like and, and really kind of foster their independence to write or try to do it by themselves.
- I think that the virtual field trip might be a little bit of an issue. We don't have that technology at all in, in school districts. So I'm not sure if that would be a difficult thing to kind of, for them to get on board and expensive as well. It really is. It really depends on what is the sort of tech that is required.

- I do think that wifi, I know it's got wifi capabilities is huge cause our wifi in our schools is kind of on and off. And if it's not, if it's a great idea but it's not effective, you know, part of it works or if it's clutchy and I don't have the, you know, app to do it or I don't have the right, you know, browser or whatever, then it's just annoying. That definitely does not motivate me to use it.
- Our teacher laptops as well as our iPad, the apps and everything on it is updated through the district IP. So even if you know, even I, I do online I use the Go Noodle app. It's a fitness break. It's like little videos and breaks. So I use it for brain breaks. But even with that that website, they're meeting, you know, lead to, Oh, you need to update your Chrome, you need to the latest flash. Yeah. And I can't, so then often it's glitchy because of those reasons to be annoying for the kids. The video stops halfway through and then we have to stop and it's not working. So just little stuff like that.
- I think that whatever we decide to take on needs to be definitely adhere to our curriculum. There has to be curriculum goals or you know, something connected to the competencies are something that I'm trying to achieve. I think sometimes the virtual activities and stuff we see online might be just for fun and for fun it's totally fine. But I need to make sure that it connects to what I'm teaching. And then once it does, then yes, then I'm definitely looking for the engagement piece. I'm looking for their enjoyment of course, but also seeing that is what we're experiencing taking them to the next step.

Researcher:

Are there parts of your curriculum where you could see virtual field trips being useful?

Teacher:

- Like definitely for the sciences, definitely for the sciences.
- First nations studies. Yeah. For that aspect. I think that would be amazing. I think and specifically with, I mean, looking at my curriculum in early primary, I would think that talking about indigenous planets and adaptations, Oh my gosh, that would be very cool.

- However, I did, I did see though an actual fields trip opportunity come up for the aboriginal studies. There's an Aboriginal school in Coquitlam. They have a campus in Coquitlam and they have one in Vancouver and they're offering field trips to their school and to their garden where they're going to talk about indigenous plants and just eco ecological, you know, traditions and knowledge in general. So I've signed my kids up for that, but it's very high in demand and it's unlikely we will get in.
- But our district is actually funding a mission in spring. I think it's only the spring as a sort of introductory thing, but usually it's really expensive. I think it's like 300 bucks. They take your kids. Our school couldn't afford that, anyways yeah.
- I know that the Canadian National Geographic, I think that they have some cool resources that if they kind of did more stuff with it and kind of formed it into a virtual field trip, I think that'd be really cool. I have requested that they have a giant map that you can get on loans and it's like, like a gym size map of Canada. It's massive. Anyways, they said that they have they have it, it's like a traveling map that goes from school to school and you just have to kind of sign out and request a for it.
- I think that something along that line where it's virtual, but maybe there's some materials that they can send to you circulate or we can borrow. I think that's a really think, really cool way to get learning to kids.
- I think that a lot of the facilities that offer kind of regular field trips, there could be an added component where it's more virtual. But I see, I can also see that you know, it could affect their actual, like they don't want it to affect people coming in.

Teacher 2:

- I mean, my school, you know, grade five, grade six teachers will put their class up to Cypress to go snowshoeing. And that's the first time children have ever set foot on a mountain. We have a lot of students who don't get taken stuff.

- So at this school the teachers actually want to take the kids out to do stuff in person. I think it would supplement other things they're doing. Like we wouldn't replace field trips. They would just supplement.