Redesigning Online Museum Experiences for Gen Z

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I. Background Literature Review Research

1.1 Literature Review

The Challenge

The Digital Department of Ingenium, the governing body of Canada’s museums of science and innovation, has challenged Algonquin College’s Human-Centred Design to design a demographic-specific approach to sharing engaging online content. The older portion of Generation Z, specifically 18 to 24-year-olds, is the group least likely to engage with museums according to our Ingenium contacts, a finding which is corroborated by a 2020 report by the Canadian Heritage Information Network (Survey Results, 2020, Table 7). To address this issue, we have researched Gen Z characteristics, such as their behaviours, needs, and preferences in order to understand how to share the museum collections through online content in a way that would effectively engage this group. In providing solutions, strategies will need to address issues of accessibility and inclusivity, accounting for gender and ability differences and regional and ethnic cultural diversity, presenting the diverse perspectives of Canadian science and innovation itself. Finally, discovering ways to make a revenue-generating solution will be important.

The literature review examines the evolution of museums from primarily showcases for history, culture and wealth to places of trustworthy knowledge, helping the public understand how the past has shaped the present, which in turn will promote future developments. How museums engage with the public to fulfil this mission is constantly being redesigned. In recent decades, part of that evolution is the development and use of technology in people’s everyday lives. Through these technologies, museums are challenged to find ways to incorporate virtual content in a way that supports the value of the preserved artefacts.
The word museum comes from the Greek word muse meaning inspiration (Burcu, 2012, p. 1252). Ingenium’s mission is to be “a catalyst for unlocking the curious and creative minds of a nation of innovators” (Strategic Plan, 2022, p.6). The newest innovators, Gen Z, individuals who were born between the years 1995-2012 (Pichler et al., 2021, p.1), is the first generation to have been born into life with the internet. Therefore, to reach this demographic and to inspire them, museums must recognize that digital content is key. Another of Ingenium’s mandates is to share their collections, knowledge and research with all Canadians, giving them access where they live and in ways that are meaningful to the diverse cultures in Canada (Strategic Plan, 2022). The internet becomes a key tool. Although museums had already begun to realize the importance of using online content, the Covid-19 pandemic accelerated the impetus to prioritize the digitization of their collections. The literature review will examine the evolution of the museum's purpose, how it can be open to all in Canada and uncover the characteristics of online content that capture the attention and interest of Gen Z to be incorporated into engaging virtual strategies.

Why do museums need a virtual face?

Museums initially viewed technology as expensive and overhyped but after more than three decades since the birth of the web, museums increasingly view their online audiences as important as their physical audiences (Parry, 2010, p.16). One point that stimulated debate was whether visits to the physical museum diminish with access to the virtual (Schweibenz, 2019, p. 17). Studies have shown that with more digital content comes more promotion and the physical and foot traffic increases (Schweibenz, 2019, p. 19). With the virtual world becoming a prominent part of the lives of newer generations, museums will need to reflect this by moving in the direction of immersing artefacts in meaning, context and experience (Schweibenz, 2019, p. 20). Digitization has made it easy to produce, use and reuse digital
images. There is a low production cost of information (Bertacchini & Morando, 2013, p.7). Virtual content can expand the boundaries of the physical walls of museums which lack space and resources to display all the artefacts they have. More people are able to see objects in detail, being able to zoom into and change the angles of a 3D view of an artefact. It would degrade the artefacts to have visitors physically interact with an artefact to be able to see all parts closely. (Walczak et al., 2008, p.3).

In multicultural cultures, virtual museums can play an important role in the integration of various populations (Burcu, 2012, p. 1257). With the existence of ever-improving technologies that aid with global networking, Dal Falco & Bonomi (2021, pp. 204 & 205) suggest that a virtual museum is an ideal forum to co-create intercultural exhibits, receiving from and offering to new and more diverse audiences. Multiple studies have shown that blended learning (both online and face-to-face) is more effective than one or the other (Castaño-Muñoz et al., 2014, p, 149) and online learning gives better results when it is interactive with other people rather than involving only a single user. (Castaño-Muñoz et al., 2014, p. 157)

When the inevitable move to virtual was suddenly forced with Covid-19, museums were neither logistically nor technically prepared to operate during the challenging period of the pandemic (Górajec & Pasternak-Zabielska, 2021, p.268). With closures and capacity restrictions of the culture sector to the public, over half of the museums saw a drop in day-to-day revenue. Due to the worsening mood in financial markets, they also saw a drop in their donors' willingness to support their work (Górajec & Pasternak-Zabielska, 2021, p. 267). The number of visitors to museums decreased by 44% in comparison to the previous year, (Górajec & Pasternak-Zabielska, 2021, p. 268) With this wane, to add to the problems, museum staff lost work. Creating new sources of revenue online became a priority.
With education, research and entertainment all needing to be digitised, social media, museum websites and streaming became necessary portals (Górajec & Pasternak-Zabielska, 2021, p.269). Prepared educational content for primary and secondary school became a priority with the pandemic. Digital educational offerings nearly quadrupled, as initial content was expedited. The content was created by the museum using popular services such as YouTube, Facebook, and Instagram, while the least popular was museum websites and email, today considered traditional means (Górajec & Pasternak-Zabielska, 2021, p.269).

The strongest argument for museums going virtual is the needs and expectations of new adults, the technology generation, the new decision-makers and spenders.

Need for a plan

To maintain their relationships with their audiences during Covid-19 closures, 50% of museums have increased their online content by a minimum of 30%. Studies show, though, that the content is not successfully being interacted with by visitors (Orlandi, 2020, p. 58). One of the reasons virtual displays have been less-than-effective is the lack of knowledge of how to make this happen. Museums need to thoughtfully assess the usefulness of their current offerings to visitors to create longevity for their online exhibits (Orlandi, 2020, p. 59). The Web Strategy Scheme (WSS) is a tool that outlines a strategy for museums to go through this analysis and offers information on how to make these changes happen. The vision is for museums to become a well-strategized, online cultural hub (Orlandi, 2020, p. 59).

At a 2008 conference on computer applications in archaeology, ARCO (Augmented Representation of Cultural Objects) was presented. This technology system empowers museum staff or subject matter experts to be able to be part of the IT design process of curating and developing a virtual exhibit with virtual and augmented reality (VR and AR) (Walczak et al., 2008, p. 3 & 6). This technology provides a low-cost and efficient means of
planning, organising and presenting the artefacts of the museum in AR or VR, changing an inactive viewing of an artefact into limitless options for an engaging interactive experience (Walczak et al., 2008, p.13).

**Characteristics of an engaging digital experience**

Games and gamification have been primary sources of engaging online activities in services, entertainment and marketing since the early 2000s. The enjoyment and longevity of a game or gamified process are dependent on a user’s perception. In the marketing world, “service-dominant” thinking began to overtake the former view of sales value simply being in a product. This led to the consumer being considered part of the design process of the product or service. For museums incorporating digital experiences, Gen Z’s needs must be combined with the characteristics of an engaging experience (Huotari & Hamari, 2012, p. 18).

Loyalty is a feature of an engaging digital experience that can benefit museums. Some characteristics that produce gamer loyalty are buying incentives, feeling of belonging, choice of how smoothly the gameplay works, fun-factors, personalised avatars and being socially involved (Liao et al., 2020, p. 2). When these characteristics are repeatedly, positively included in the games played, they become habits (Liao et al., 2020, p. 3). Some examples of loyalty-producing features are: characters have the chance to reincarnate after death so the game is never really over; a smooth experience; avatar personalization for social identity; competitive scoreboard for goals; communication with other players, challenges for social community building (Liao et al., 2020, p. 10).

A process or service that is gamified has elements of an obstacle to overcome or beat, the anticipation of the unknown and enjoyment to make it volitional (Huotari & Hamari, 2012, p. 19). Museum use by Gen Zs is tied to their perceptions and expectations of museums as free-choice learning environments (Hughes & Moscardo, 2019, p.5).
What has been done? What is out there?

The original virtual exhibitions in the 1990s were put onto CD-ROMs, including 3D views, a low-cost way to remember a short-term exhibit. One exhibit showed many details of two Spanish Islands. This exhibit continues to be used online by travel agents to this day – a lasting exhibit (Carreras & Mancini, 2014, p. 88). In 2003, the Smithsonian presented Mexican history through songs on audio files. It was also put into an educational format as well as giving users the opportunity to write their own songs as an offshoot (Carreras & Mancini, 2014, p. 90). As mapping and satellite software became more prevalent in the mid-2000s, geotagging began to be used to share digital displays of artefacts in their own environments around a country or the world (Carreras & Mancini, 2014, p. 93).

The #iziTRAVELSiicilia project was launched in 2016 as a platform for Sicilian people to showcase their cities and cultural resources through participatory digital storytelling, facilitating the production of city audio tours and museum audio guides. (Bonacini, et al., 2019, p. 3). The 3D-MURALE project involved creating and deploying multimedia technologies to measure, rebuild, and visualise archaeological ruins in virtual reality, with the ancient city of Sagalassos in Turkey serving as a test case (Patel et al., 2003, p.3). The British Library Simulator, for example, is another meta experience that mimics the appearance of an early Nintendo game, employing the game's NPC interaction to show the virtual tour as a smaller and narrower view of the British Library (Burke et al., 2020, p.2). The online "Stormy Weather" exhibit made by Google Arts and Culture takes visitors on a trip from early weather lore through modern scientific means of knowing and predicting weather conditions (Burke et al., 2020, p.4).
The success of the exhibits and activities mentioned shows that multi-media, emerging technology and co-creation can be effective tools for inspiring engagement in content across the three Ingenium museums.

An underrepresented audience – Gen Z and their behaviours

Having access to more diversity than other generations, Gen Zs are open to embracing different cultures and beliefs. Because of this, they tend to show their support for organisations that prioritise diversity (Pichler et al., 2021, p.3). As inclusivity is one of Ingenium's core values, this is an opportunity to highlight when designing for Gen Z.

Members of this demographic are more individualistic in learning, interpersonal contact and communication than prior generations due to access to technology (Pichler et al., 2021, p.4). Most areas of Gen Z lives, including communication, sociability, and leisure activities, are dominated by technology. In 2018, 95% of teenagers had access to a smartphone. In 2016, 82% of 12th graders frequented social media sites every day (Pichler et al., 2021, p.2). The on-demand economy, including everything from video-on-demand services like Netflix to dating applications like Tinder, is making Gen Z the most demanding generation yet (Weinswig, 2016, p. 2) and if they don’t find something that fits their needs and wants in one place, they will move on to something that does.

Gen Z and consumption of knowledge

Gen Z prefers to read any text in small chunks. Chunking is breaking down large information into smaller segments so it can be easily assimilated and understood. It also helps to manage cognitive load, preventing overload (Hammill et al., 2021, p.2). While amateur enthusiasts of the content of museums are inclined to read all of the information on a content page, the "general public" group favoured pictures and illustrations (Walsh et al., 2018, p. 84). This is the group that most Gen Z relate to. Walsh et al. (2018, p. 85) suggest that people
from both groups who come to the museum to pass time could benefit from better access to
the museum's online assets via engaging interfaces that don't require extensive subject
knowledge. This generation of self-learners is also more at ease digesting information online
than they are in traditional educational institutions (Francis & Hoefel, 2018, p.6). Active
learning methods like gamification, including rewards, encourage students’ participation.
With high-quality online content, museums can engage their younger audiences in discourse.
This viewpoint would provide museums with insight on how to engage with the younger
generation, particularly during unforeseeable moments (such as Covid-19) when digital
engagement is the only option (Glaser, 2021, p.32).

What young people want (from a museum)

Jacob and Johnson (2021) suggest that consumers will use a brand to gratify their
own particular needs. They want content that is a worthwhile return on investment,
appropriate to their situation, dependable, engages participants in action and provides
amusement. Onsite, younger visitors are inclined to touch the exhibits, use the touch screens,
and also have higher expectations in terms of museum interactivity than older visitors
(Zbuechea 2013, p.6). Curiosity is one of the most powerful motivators in museums for
visitors to learn something new. Interactivity is highly valued by participants as feelings and
experiences are remembered more vividly than knowledge gained (Zbuechea, 2013, p.9).

Gen Z is now the world's largest population cohort, with 2.5 billion people, according
to the United Nations, but they are still the most underrepresented group of people when it
comes to museums, especially in the West. This is the opposite in Asia where evidence has
shown that Gen Z is the core group in most museum visitor populations (Hughes &
Moscardo, 2019, p.2). Of those Gen Z who do attend museums, according to Mokhtar &
Kasim (2012, p.5), 20.6% go for assignments or projects, 18.8% go to broaden their
knowledge, 14.9% for school trips, 9.2% go to satisfy their curiosity and 7.2% go to fill their spare time. Young adults in western countries associate museums with negative memories of boring, rigid and structured museum field trips and may be why western Gen Z hardly visits museums. To Asian Gen Zs, museums represent the history of their culture, their identity and give them a sense of belonging, suggesting that experiences that align with their self-identity and cultural background may influence museum visitation (Hughes & Moscardo, 2019, p.2). This knowledge may present an opportunity for Western museums. Being the first generation to "grow up in public" by documenting their lives on social media, Gen Z highly values personal appearance and belonging. This knowledge, combined with understanding the value museums hold for the identity of Asian young adults, may present an opportunity for Western museums to change their image and tap into becoming a place of belonging.

How This Guides Next steps

Though museums are known for their collections based in the past, it is evident that they have become trusted sources of information and as inspiring muses for igniting ingenuity and progressing innovation (Strategic Plan, 2022). In order to reach the diversity of Gen Z, the next research into the challenge given by the Ingenium digital team will be guided by the insights that we gain from our initial research.
1.2 Insights from Literature Review

Quick Insights

● The purpose of museums has evolved from showing history and technology progression in the collections to include museums as places of research and innovation.

● Technology gives the opportunity to create content that is more in-depth than what can be seen in a museum. These bonus offerings can become a source of revenue.

● Curiosity is a powerful motivator. Interactivity is highly valued by participants as feelings and experiences are remembered more vividly than knowledge gained. People want content that is a worthwhile return on investment, appropriate to their situation, dependable, not self-contradictory, engages participants in action and provides amusement. The authenticity and credibility of the real artifacts are very important to some people. We will need to research to see how much Gen Z value this.

● Virtual is necessary to reach more people, not just Gen Z but across Canada as well.

● Museums have been evolving and will continue to evolve so as Ingenium recognizes the needs of Gen Z, more people will buy into virtual creation.

● Virtual exhibits can support and promote the physical museum.

● Museums are trusted sources of information that we can highlight as a difference from other sources.

● It will be key to bring the consumer into the design process to discover and address the needs of Gen Z with the characteristics of an engaging experience. This could be through content creation and/or testing and feedback by Gen Z users.
● Gen Z is curious and wants interactive inspiration. Information sharing to reach Gen Z should be short and picture dominant. Designs including these traits have great potential to attract Gen Z to museum content and inspire innovation.

● Museums could have an opportunity to engage Gen Z with strategies that encourage belonging, cultural or otherwise.

● Gen Zs absorb information in small chunks. They prioritize diversity and want to learn about and celebrate differences. Gen Z’s lives revolve around technology, therefore they often expect technology to make the experience more engaging. The on-demand economy, which includes everything from video-on-demand services like Netflix and dating applications like Tinder, is making Gen Z the most demanding generation yet so they will go where they are engaged.

● Service-dominant thinking will consider young people part of the design process of product or service, their needs, wants and potentially their co-creation. Characteristics that produce gamer loyalty are buying incentives, feeling of belonging, choice of how smoothly the gameplay works, fun factors, personalised avatars and being socially involved with others in regards to the game.

● In multicultural cultures, museums play an important role in the integration of various populations. With the existence of ever-improving technologies that aid with global networking, a virtual museum is an ideal forum to co-create intercultural exhibits, receiving from and offering to new and more diverse audiences.
II. Research Question and Research Methods

2.1 Research Summary

Our aim is to design an approach to sharing engaging online content that can be used across the 3 Ingenium museums to attract and hold this demographic's attention and, thus, encourage innovation. We chose the group that least attends museums, Gen Z that are 18-24 years old because they are the new generation of innovators.

From our literature review, we learned about the evolution of museums from primarily a show of wealth, history and culture, to becoming a trusted source of knowledge, exhibiting to the public how the past shaped our present which promotes the shaping of the future. For our project, we have focused on Ingenium’s mission of being “a catalyst for unlocking the curious and creative minds of a nation of innovators.” Knowing that Gen Z averages 8 hours per day online we needed to investigate what are the attractive features of the activities they are already engaged with so that we could bring versions of those features into our solution for Ingenium.

Research Question:

What attracts or repels Generation Z to specific types of online content or platforms for enjoyment?

To carry out our research, we initially put out a questionnaire to understand what attracts or repels Gen Z to specific types of online content or platforms for enjoyment. We received more than 40 responses to our survey, with a bulk of the participants coming from Ontario. We then conducted semi-structured interviews with 8 users as well 8 subject matter experts to understand the pain points, challenges, needs and goals with the current online
museum experiences. Later we invited a few of these participants to test out our concepts and proposed solutions.

2.2 Methods of Gaining Data

This study used a mixed-method approach, starting with a ten-minute online survey where participants were asked twenty-seven questions on the themes of their online behaviours and preferences, social media and gaming activity, and museum interactions. The final question of the survey functioned as optional recruitment for participants in semi-structured interviews following the submission of their survey.

Method 1 - Online Questionnaire

Following approval by the Research Ethics Board, an online questionnaire containing 28 questions was created using the software, “Google Forms”, to understand what attracts or repels Gen Z (18-24 year-olds) to specific types of online content or platforms for enjoyment (see Appendix B).

We sent a link for this survey by posting on social media platforms like Facebook, Instagram, LinkedIn, among others, and asking organizations who have connections with Generation Z, to send an email and attached recruitment graphic on behalf of the researchers to their contact lists as well as posting on their social media. As well, emails were sent to organizations across Canada that would have contacts that include our demographic to ask if they would pass our survey via email or social media. Email lists were not shared with researchers. The online survey was able to be accessed through a shortened secure link mentioned in the recruitment graphic, social media posts as well as emails. Participants accessed the anonymous survey by using the same link. Once logged into the secure platform, a link to the informed consent was available to the participants in the introduction of the
survey. The participants were informed that by participating in the survey, they are indicating that they have understood and have agreed to the information as described in the detailed consent form and that they are freely and voluntarily participating in the study. Afterwards, they completed the survey in under 10 minutes.

Survey data was collected over the course of one month. For the purposes of this study, only answers from participants who can be categorized as members of “Generation Z”, specifically between 18 to 24 years of age who use the internet and reside or have at some point resided in Canada were analyzed. We received a total of 49 responses to our survey, out of which 4 were screened out from the survey as they did not meet the inclusion criteria. Out of the 45 that did actually participate in the survey, 18 respondents also said they would also like to participate in a follow-up semi-structured interview.

Method 2 - Semi-Structured Interviews

Towards the end of the survey, participants were asked if they would like to participate in a follow-up, semi-structured interview (see Appendix B) following the submission of their questionnaire. These semi-structured interviews were conducted to further the findings of the survey and collect qualitative data about motivations and barriers to interacting with museums’ online content and consuming digital content on the internet. Out of the 18 respondents who opted-in for the semi-structured interview, we were able to schedule interviews with 8 participants. The people who agreed to do the interviews were from across Canada, but more were concentrated around the Ontario region.

These semi-structured interviews were conducted virtually using the video conference software, “Zoom”. Participants were first asked for informed consent. The interviewees gave their informed consent to being interviewed in 3 ways:

1. By checking “yes” to agreeing to be interviewed in the questionnaire
2. By booking an interview session through Calendly (desktop scheduling app)
3. By verbally agreeing to the interview details (including to be recorded) at the beginning of the interview. (All participants agreed and were recorded on Zoom.)

We asked users roughly 20 questions, with the goal to examine motivations and barriers to interacting with museums’ online content and consuming digital content on the internet. We started with some warm-up questions about their experiences living in Canada, what country they called home, whether they have been to any of the Ingenium museums and what their hobbies were and how they expressed their creativity. We then asked questions about past museum experiences and perceptions and online preferences and behaviours, especially in regards to social media, video streaming and games. The final section, Try it Out Virtually, had the participant going through the Ingenium digital catalogue, a Google Arts and Culture activity (Play a Kandinsky, n.d.) and a game from another museum, verbalizing their thoughts throughout. Interviewers observed actions and thoughts. We adjusted interview questions based on participants’ responses to the survey conducted earlier. The interviewees’ answers were recorded, and their responses were analyzed and interpreted. Each interview took approximately 60 minutes in total.

We also conducted unstructured interviews with subject matter experts (SMEs). As we were looking for different perspectives and guidance from different professions, each interview was planned around what the individual interviewee could advise on in regards to our design.

Gaps, Limits & Constraints

Internet and bandwidth issues during our Try it out Virtually section occurred occasionally requiring a change of device during the interview. One participant could not
access the links because of low bandwidth so we could not completely get their thoughts concerning those activities. Difficulties in reaching participants and SMEs across Canada were another constraint we experienced.

2.3 Methods of Analysis

Only aggregated, anonymized data was analyzed. Quantitative data collected via Google Forms was exported as a Google Sheet in Google Drive. Google Sheets were used for descriptive statistics. Qualitative data was collected through field notes taken during the semi-structured interviews conducted via Zoom. The interviews were also recorded and transcribed in Google Docs and used to identify recurring themes in conjunction with the field notes.

Thematic analysis was conducted via Miro including but not limited to key quotes, events, perceptions, insights and other commonalities and differences across various regions and cultures in Canada. We collected data from all of the interviews under common themes and, cross-correlating the questionnaire data with the data from interviews to gain more understanding of the context in both directions, we used those with the most data attached to develop our key findings, Empathy Map, Iceberg Model, Persona (example of Gen Z user) and their experience through the Journey Map as well as the Experience Principles for the project. (see Appendix E).

Building Personas

As we gathered information from the participants, we discovered some common characteristics and behaviour traits amongst them. Putting quantitative data from the questionnaire into tables and graphs, we could see patterns and trends that informed the value
of the themes that were emerging. We classified similar traits and personalities into groups into an empathy map (see Appendix E), which gave us direction to envision our Persona, an example Gen Z, that we could use to picture how they would respond at any point in our designed museum experience.

Creating Journey Maps

Informed by our substantiated vision of the persona, and by the survey and interviews, we created two journey maps. The first showed how a person in our demographic has experienced, perceived and interacted with museums in the past, their online preferences and what we learned while they “played” through the *Try It Out Virtually* section of our interview. The second fork of the journey map road shows how we envision them experiencing the virtual museum experience that we are creating (see Appendix E).

Gaps, Limits & Constraints

We have aimed to discover potential guiding principles and characteristics that represent people across Canada. However, our small size sample would not be able to accurately represent the many different views in different provinces, urban versus rural and the multiculturalism of our country.
III. Results

We collected data from all of the interviews under common themes and, cross-correlating the questionnaire data with the data from interviews to gain more understanding of the context in both directions, we used those with the most data attached to develop our key findings (see SME and User Results), Empathy Map, Iceberg Model, Persona (example of Gen Z user) and their experience through the Journey Map as well as the Experience Principles for the project. (see Appendix E).

3.1 Results from Subject Matter Experts (SME) Interviews

In contacting SMEs, we were looking to talk to experts at museums that have content expertise, innovative ideas, been part of online or onsite exhibit creation, know the processes of Ingenium content creation and look to represent the diversity of Canada. Two of our SMEs were highly focused on accessibility in the digital product. Two were focused on representing and reaching a diverse audience. Three were curators. Four were involved in education and interpretation. One worked in museum communications with industry and government.

Each expert offered thoughts, ideas, and advice that could guide us in different aspects of our design. In analyzing the data, we first looked at notes that stood out to us immediately from each SME, individually, taking note of how those different points of view could inform our project. Then we compared the notes with the other SMEs to find common themes that may show us what is most top-of-mind to most.
SME Introductions

**SME 1:** The focus for this interview was the importance of building accessibility into the design of online museum content from the very beginning of the design and revisit at every stage. As we planned our design, they wanted us to consider certain pieces of advice. Will that tool that you use reach the audience in the best possible way? If the outcome is to get to a specific story, crazy digital experiences may work for some, but not others. You don't want to miss the goal for the experience. Always keep in mind the reason to get the audience to where you want them. Keep the accessibility options as universal as possible, using as many senses as possible. The specific examples that he gave as part of an accessibility checklist can be found in the interview notes (see Appendix C).

**SME 2:** Much of the interview centred around Canada’s involvement in aviation and space research. They gave many examples of technology that was designed for space or aviation that is now commonly used in our daily lives, such as mapping systems, satellites and mini-cameras. How Canadian aviation innovations have been used to connect all Canadians, especially for those in the North and the bush, also brought us to discussion on how science and innovation is part of the inclusion aspect of the museums.

**SME 3:** Highlighted in this interview was the importance of searching out and planning stories of the museum artifacts and their histories from the perspective of the different cultures that co-exist in Canada.

**SME 4:** This curator designs and presents exhibits to schools, community centres and corporate environments highlighting multicultural and Canadian inventors from minority backgrounds. They shared methods they use in exhibits for all people in Canada to have more hope in their own potential to innovate and make a difference, especially in the world of technology. They gave examples of co-creating exhibits by having people tell their stories of
“artifacts” they have encountered in their own lives. The SME guides young people in researching scientists and inventors who represent their shared cultural backgrounds.

**SME 5:** - Several people in this interview discussed their experiences from their involvement in the design of many of the educational and interpretive onsite and online exhibits. It was evident that, so far, they have focused on elementary and high school education. Onsite, demonstrations have often been geared toward enrapturing children. Online activities are geared mostly toward teachers and parents of school-age children. This confirmed that our decision to design for Gen Z fills a gap in the museum industry. They also encouraged us, that as we tell intriguing stories, we also aim to tell the hard stories of our history, where the use or types of technology has had damaging effects on or separates some parts of society.

**SME 6:** This interview centred around a passion for the heritage of science and its effect on our current lives. Many examples were touched on (see Appendix C). We discussed stories that tell who we are now, in our current society, not always known by Canadians and how their world has been shaped by science. How the museum is linked to current issues was highlighted with artefacts that are tools that help to do research for or actually make a difference in climate change, for example.

**SME 7:** In this interview we mostly discussed the development of virtual exhibits. Reaching out to university and college programs was suggested, to create mutually beneficial partnerships to build the content and technology in conjunction with the museum experts. They mentioned the standards that need to be met in digitization and for accessibility. We also discussed thinking outside of the walls of the museum and how to create exhibits around the community.
Insights From Individual Experts

In looking at what makes science in Canada and particularly, Ingenium, stand out when it comes to museums, we have guidance on subjects and perspectives on which to focus when telling stories. Looking at how artefacts are related to innovation gives direction on how our solution can inspire ingenuity in Gen Z. As the Ingenium SMEs told stories of exhibits or artifacts that stood out to them, we began to learn about details that pique interest, excitement or the desire to make a difference. As some of the SMEs had experience developing online exhibits, they gave us thoughts on what has worked and not worked in the past, some pitfalls to avoid and some ideas on user testing.

Common Themes Shared By SMEs and Insights

Because each SME had different experience and types of expertise, most of the lines of questions were different. However, we still wanted to see what subject areas or concerns had a shared importance to museum experts, so we then looked at all of the data from the SMEs to find common themes (see Appendix C).

- **Relationship of artifacts to innovation and to our daily lives** (5 SMEs discussed)
- **Artifacts that counter climate change** (4 SMEs discussed)
- **Stories around artefacts** (7 SMEs discussed)
- **User Co-Creation** (4 SMEs discussed)
- **The importance of Accessibility in all exhibits** (5 SMEs discussed)
- **The importance of Diversity in all exhibits** (5 SMEs discussed)
The representatives of Ingenium that we spoke to shared so many examples of the stories of innovation, artifacts and how they relate to our present society, just off the top-of-their-heads. The wealth of knowledge that they have and have access to, including through the trade library and the Ingenium Research Institute, gives almost limitless possibilities for our solution to tell stories of artifacts and innovations and connect them to the audience’s everyday lives (see Appendix C).

Canada has a legacy of being inclusive. However, according to 4 of our SMEs, Canada doesn’t do a good job of attracting diversity to museums. Museums can point people in the direction where they can see what relates to them. This connects diversity to history. One poignant example of this, from 1 SME was from a school where a young Afghan girl discovered 3 Afghan inventors. The girl was brought to tears and called her parents when she saw her culture and skin colour represented. In regards to all she had gone through - the maltreatment of girls, oppression, war, she felt validated in her school in front of her classmates. Armed with this kind of inspiration, co-creation could give them a chance to imagine and innovate even with a simple idea, and take that idea and try something. Even in some circumstances, the curators, historians and museum staff may not understand all about the objects in the collection. Our solution could include a means to take those objects to people who do relate to it and let them explain from their perspective. As it is part of Ingenium’s mandate to represent and reach all Canadians, our solution will intentionally aim to collect and tell the stories of different cultures and the many differences that the people of Canada experience, meeting the needs of Canadians, who for many reasons - older adults, low economic, disability, distance, lack of cultural knowledge - often are excluded from Ingenium content.
3.2 Results from User Questionnaire

Charts and Insights

Since our research estimates Gen Zs average 8 hours online per day we wanted to find out what they spend their time doing. Not surprisingly, over ¾ of the participants browse the internet and ⅔ engage on social media several times a day. More surprising is the other quarter engaged on social media only once per day or less. We would then need to confirm through interviews where and how they are spending that social media time and use those places to both promote and give sharing and boasting capabilities through those social media platforms in our intervention.

Figure 1

*How often users browse The Internet*
**Figure 2**

*How often Users engage on social media*

Since Instagram is the most named social media in our survey, our intervention should in some way involve Instagram. The other frequently used platforms could also be a means for promotion.

**Figure 3**

*Most used Social Media according to participants*
Only 37.8% of respondents replied that they play games once per day or more. 42% of the respondents never play games online and 20% only play a few times per month. In order to give more of a chance to keep the intervention (and Ingenium) as a regular part of their lives, we would need to consider if users would bring a, or another, game situation into their online time. However, since our research shows that Gen Z likes interactivity online, in interviews we would need to elicit how much gamification or other types of interaction, rather than outright games, is valued.

**Figure 4**

*How Often Users play video games*

The majority of respondents replied that they engage in social media alone. However, with the attached connotation of “social,” we would need to discover in interviews how social they are and how much they use social media to share ideas or activities that stand out to them.
When asked “How important is it for you to have fun while learning new things?” 80% of respondents value that as important (58% of whom think it is very important.) So interviews will need to elicit what is “fun” to our Gen Z users.
Museums

78% of our GenZ respondents enjoy going to museums, so in interviews we would aim to discover what keeps them from visiting museums and see how our intervention could fill this gap.

Figure 7

Users visit museums

- Yes, and I visit regularly: 15.6%
- No, I don’t enjoy going to museums: 6.7%
- Yes, but I don’t visit as often as I would like: 77.8%
3.3 Results from Participant Interviews

Affinity mapping (themes)

During the analysis of the data we extracted from the seven (7) user interviews, we began to identify common themes and characteristics of Gen Z’s online activity that draw them into the experience or drive them away. One is that Gen Z loves content that stimulates their brains. They want to be able to think while playing games. They want an immersive experience where they do not just see the experience, they also get to feel and hear them. Gen Z also loves visually appealing content, the more colourful it is, the more attractive it is for them. They do not just want long and boring text and content, they want some form of interactivity in it. Aside from interactivity, they want a smooth user experience where pages are loaded faster and they want instructions to be clear and concise.
Table 1

Common themes from participant interviews

<table>
<thead>
<tr>
<th>Themes</th>
<th>Number of Users involved</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain Stimulating/</td>
<td>5 out of 7 users</td>
<td>“I loved that I could read about the painting. I learned something while playing the game.”*</td>
</tr>
<tr>
<td>Curiosity provoking / Learning</td>
<td>discussed</td>
<td>“I need a balance, info/fun/interactive.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I prefer story-based games, like ‘Inside.’ You are an observer and you have to think to figure out what will happen.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Would be cool if they had links to more information, not more text but more links, something like Wikipedia, better photo captions and labelling as well.”</td>
</tr>
<tr>
<td>Multi-sensory</td>
<td>5 out of 7 users</td>
<td>“To engage with them, combine a lot of senses, use of colours, pictures, sounds”</td>
</tr>
<tr>
<td></td>
<td>discussed</td>
<td>“would have liked video - not just a write-up”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“It's like National Geographic Wild - where there are videos - watching, hearing, experiencing”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I like that it has the colour, interpretation, sound altogether - your mind can go (all over the place)”*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Ended up in kids exhibits (in Sweden where she did not understand the language) no language barrier in the kid's exhibits.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“has to be relatable, great graphics, cinematography, sounds” “Gen Z: make something a game”</td>
</tr>
<tr>
<td>Visuals</td>
<td>5 out of 7 users</td>
<td>“I’m more visually inclined, I capture pics faster than reading.”</td>
</tr>
<tr>
<td></td>
<td>discussed directly</td>
<td>“The concept &amp; colours are cool. Very fascinating.”*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“the image attracted him first”</td>
</tr>
<tr>
<td>Creativity</td>
<td>6 out of 7 described</td>
<td>fashion, interior decoration, art &amp; beauty appreciation, nail art, arts and crafts, embroidery, knitting, painting miniatures, sketching, dance</td>
</tr>
<tr>
<td>their expression</td>
<td>expression</td>
<td></td>
</tr>
<tr>
<td>Interactivity</td>
<td></td>
<td>“Putting artifacts in action, seeing what they can do”</td>
</tr>
</tbody>
</table>
“Kandinsky: I really like this one, feels intriguing, seems really interactive to me”*  
simple & interactive, exploration, pick & listen to what you want or put everything all together”*

| Navigation/ Functions | 5 out of 7 users discussed | “inconsistent functions/navigation,” “long time for a page to load”  
He liked the show map feature. “noticed it right away.”  
"Games [should] have a map next to you, like lower right hand side, so there is an indication of where you are on the map.”  
“Feels uncertain, clicking randomly at this point, confused what the icons mean, what’s the order?” |
|---|---|---|
| Instructions | 5 out of 7 users discussed | Observation: Every interviewee missed some portion of the Rijksmuseum game instructions; some of them missed most of the instructions.  
“Things need to be simplified. making things difficult makes people feel dumb, big turn off.” |

*One of our “Try-It-Out Virtually” activities was an activity from Google Arts and Culture called Sounds Like Kandinsky. Based on the theory of synesthesia, matching colour to sound and emotions to colour, this experience is a relatively simple concept, including being colourful, narrated with text, interactive, and choice where users explore and move through the activity at their own pace. They can choose to hear different sounds separately or together. The navigation is simple with few intuitive instructions. 6 out of 7 of our users responded with expressions of enjoyment and captivation. This became an example of the types of features we wanted to put into our solution (Play a Kandinsky, n.d.).

Once these themes were unearthed, we used tools to develop our Experience Principles that will guide our planning and reasoning for all stages of design and production of the solution. The insights we gained from the thematic analysis are discussed with the principles below.
Research Tools

From these themes we created tools that helped us envision our users, what they tend to think and do, their frustrations and needs, the existing mentalities held by this demographic around museums, the strengths of museums and the opportunities they have to reach Gen Zs. Gathering this information into tools illustrating different perspectives of the user, museums and the online world helped us to put our feet in the users’ shoes and begin to see this situation through their minds and eyes. These were to be the signposts guiding us to our Experience Principles and Design Guidelines on which we based our intervention.

Empathy map

We created an empathy map to unearth common needs and frustrations, attitudes and behaviours of a Gen Z user in relation to both general online content and museum engagement by grouping user data that referred to what users think, feel, say and do in these contexts (see Appendix E). Once grouped, the most prevalent attitudes, behaviours and needs informed the creation of a persona of an example user.

Iceberg Model

We used an Iceberg Model to illuminate some of the issues, from both our secondary and primary research, that keep Gen Z from attending museums. We began with the symptoms, the tip of the iceberg, by describing a potential scenario of a Gen Z in relation to her ideas around museums. Then we listed the more submerged common Patterns and Trends, Underlying Structures and Mental Models that exist relating to museums and Gen Z needs (see Appendix E).

Table 2
### Iceberg Model

| Event                                                                 | User: A 21yr old, female graffiti artist who loves playing video games because of their interactivity and social aspect  
<table>
<thead>
<tr>
<th></th>
<th>Although she loves going to museums, the cost is too high for her and museums seem to be designed for kids and grandparents.</th>
</tr>
</thead>
</table>
| **Patterns and Trends**                                                | 18-24 year-olds attend museums less than any other generation  
|                                                                      | Museums find it hard to attract the Gen Z demographic  
|                                                                      | Gen Zs love online  
|                                                                      | Gen Z likes to dabble |
| **Underlying Structures**                                             | Cost high for short visits  
|                                                                      | Gen Z is a newer generation  
|                                                                      | Museums have not yet studied them enough  
|                                                                      | Many museums prioritize onsite to online  
|                                                                      | Traditional displays are text-heavy and less interactive  
|                                                                      | Curators are trained in traditional ways |
| **Mental Models**                                                      | Museums are geared towards kids and grandparents  
|                                                                      | Museums are rigid and old school in their choice of display  
|                                                                      | There is no interactivity, just flat displays and long boring text  
|                                                                      | Museums are places to go for a lengthy period of time  
|                                                                      | Some museum people think online will deter people from going onsite  
|                                                                      | Museums are all about the past |
Persona

Using the Empathy Map and Iceberg Model insights, we created a sample persona, to be able to envision and refer to as an example user throughout the design of the intervention (our challenge - the approach design requested by Ingenium) (see Appendix E). This included her demographics, life interests and education, issues she cares about, and frustrations and needs. Her quote, “I’d rather be bold or italic, never regular” sums up a general sentiment and attitude among Gen Zs (see Appendix E).

Journey Map

Before we had a concrete solution concept, we made a short road map of the ‘As Is’ and the ‘To Be’ user experiences (see Appendix E). This depicts, based on our user research, Jasmine’s current museum experience while looking for inspiration for a mural proposal, versus what the experience could be with our potential solution, based on our research and Experience Principles.

The Feelings are depicted by the emojis, and the path of the user’s Actions moves in the direction of how they are feeling at each point of the experience. With each action, a thought or thoughts representative of our data is attached.

- Touchpoints are both the physical touchpoints and the other people that the user interacts with at each stage.
- The opportunities came from gaps in how Gen Z perceives museums and what their actions and behaviours are when they are online doing what they choose to do.
- We included a legend at the bottom to clarify the sections, symbols and representations.
Creating all of these tools took us through a journey of our user and their perspectives on the world, what is important to them, holds their interests or drives them away and what they need for fulfilment and purpose. This process illuminated the most important principles that should be adhered to throughout our project, the Experience Principles and the Design Guidelines, to attract Gen Z and avoid deterrents to our solution and, in turn to Ingenium’s goals to inspire innovation. The implications of implementation are discussed with each principle.

### 3.4 Experience Principles

1. **Tell me a story about the facts.**

   6 out of 7 of our Gen Z users that were interviewed make mention that many museum exhibits or catalogues just tell facts about the art or artifact and do not give more context for the facts. They want to know stories of how the art or artifact came about, e.g. what an artist was thinking when painting or how an inventor came up with their idea. Just stating facts is not something they find interesting. One participant likes “games with interesting stories. I like getting my worldview challenged…games where I learn the historical backing.”

   **Implementation**

   In our solution, when presenting facts in an exhibit, we can envision the context around those facts and a reason to care, e.g. circumstances around the artifact, the surrounding environment and prominent trends and philosophies of the era. We can tell stories about what makes the artifact stand out from former technology, how it has affected everyday life and bring in related elements that are familiar to Gen Zs.

2. **Make it brain-stimulating and curiosity provoking so I want to investigate more.**
The majority of our interviewees mentioned they are drawn to activities where their brain was stimulated or where they were given an activity that showed a little, really interesting information. One participant, while exploring the Kandinsky painting with sound and emotion integrated, commented, “This is more my thing. I’m engaged with this. More mind-stimulating for me. This is a burst of energy. [I feel] I would have to do more research on his work. Another interviewee, referring to what he liked about his favourite game, “You have to think to figure out what will happen.”

**Implementation**

Our solution will aim to give just enough intriguing information at first contact to pique interest and then provide options for users to explore further and learn more if and when they choose. This information should be presented in such a way as to leave them having learned something and wanting more.

3. **Provide me with an interactive & immersive experience.**

Our Gen Z users do not want text-heavy content. They want content that is interactive and gives them something to do. A participant mentioned that he likes when exhibits are “putting artifacts in action, seeing what they can do. They want their senses to be heightened and piqued while experiencing this content. They do not just want to read, they want to hear, see and feel too.

Every one of the interviewed participants commented several times that they are most interested when they experience games and activities with their different senses. When trying the Kandinsky activity in the interview, one participant commented “I really like this one! It feels intriguing [and] seems really interactive to me.”

**Implementation**
Interaction, where the user is involved in doing something, will be a pillar of the design. Being sure to have a multi-sensory approach will not only engage users but also create a more universally usable experience by people of varied abilities and learning styles.

4. I want the freedom to make my choices.

Gen Z wants the freedom to consume at their own pace. They want to be able to control their narrative and make decisions for themselves. They want the freedom to choose what aspects to look at. A participant exploring Kandinsky liked that “I’m in control,” described in depth by another as “simple and interactive exploration, pick & listen to what you want or put everything all together. This is supported by literature, “Museum use by Gen Zs is tied to their perceptions and expectations of museums as free-choice learning environments (Hughes & Moscardo, 2019, p.5).”

Implementation

Choices can be incorporated by allowing different paths to information, including order, pace and what information they want to follow up on or exclude.

5. Spark my creativity.

Gen Z is involved in creative activities. They want content that allows them to use their imagination. Some creative outlets of our participants were arts & crafts, embroidery, painting miniatures from the game Warcraft, drawing and sketching and one is a mechanical engineer who uses social media for inspiration. Even though one felt she was not an artist she said, “I express myself creatively through my sneakers, my fashion and interior design.”

Implementation
The prototype will involve exploration, being part of creating content or the display of content, using imagination, changing or manipulating a model of the artifact and/or discovering emerging innovations for one’s own inspiration.

6. **I don't want any of my friends, or myself, left out of the experience.**

Gen Z is big on diversity and inclusivity. They want their culture, race and gender to be represented and they want the content to be accessible to everyone. One participant’s most memorable museum experience was, “back at home [Nigeria]. [It was so meaningful] to see my culture, a visual representation of my backstory. One participant who is hard of hearing says that she values the online option because you can “take your own time, you pick [what you look at]. For someone who's hard of hearing, anything in a museum that has audio can be challenging [with the ambient noise]. When they experience the content they like that is meaningful, they want to be able to share it with their friends of all abilities.

**Implementation**

Intentionally involving diverse people and perspectives in the designing of the solution or exhibit and allowing people to tell their stories will create more opportunities to give hope and inspiration to all Gen Z in Canada.

7. **Make instructions clear and concise**

Gen Zs get frustrated when instructions are not clear and concise. It makes content difficult to follow and understand and they lose interest quickly. From our observations of interview participants exploring in the Try-it-virtually section, most skulled the longer instructions quickly and ended up not understanding and asking the interviewer what to do. For example, in the Rijksmuseum virtual tour game, some people did not realize the final goal of the game was to collect letters as they went along to spell a word or phrase. Another participant
stated, “Things need to be simplified. Making things difficult makes people feel dumb - a big turn off.”

**Implementation**

We will present only instructions in small chunks at the time when they are needed. Testing with a diverse audience of users to ensure that instructions or the situation presented are well understood in a minimalist way.

The combination of our research data into the different perspectives of the research tools gave us direction for creating the principles on which we based our solution experience details and decisions. It also informed our decisions on the “look and feel” of the project that we define in the Visual Design Guidelines.

### 3.5 Visual Design Guidelines

Our research shows that, in general, Gen Z prefers bright, bold and contrasting colours. The older end of Gen Z, in some instances, tends to closely follow millennial trends and prefer pastel or muted colours.

In the “Try It Virtually” section of our user interviews, the Kandinsky Google Arts & Culture experiment was the preferred online activity of the three we had them go through. In addition to a smooth, interactive and immersive experience, the Kandinsky experiment used a lot of colours, about which the users expressed great enjoyment.

Therefore, we’ve used a mix of bright and pastel colours in our visual language to cater to this audience but we’ve also tried to balance the colour out with neutrals like white and black so that the information in the persona and journey map is easily understandable by our clients at Ingenium.
IV. Intervention Design & Implementation

4.1 Introduction to Intervention

Intervention Options

**Intervention 1: Role-Playing Games**

Based on the opportunities we discovered in the Journey map and insights from our primary research, we came up with the idea of Role-Playing Games. The idea came about based on our Problem Question “How might we retell the stories of artifacts online in such a way that will captivate Gen Z & spark their ingenuity?” and on our Experience Principles.

Users wanted more context and not just facts. They wanted to see “artifacts being put in action, seeing what they can do”. They wanted “links to articles or something more about the artifact”. Users wanted an interactive and immersive experience, something that would stimulate their brain but also something they could gain knowledge from. User 20 said, “he likes games with interesting STORIES. He likes getting his worldview challenged. Games where he learns historical backing.” Another important aspect that inspired this concept was the fact that Users wanted the freedom to choose, they wanted control over how they interact with something. The statement “I’m in control” was made when a user tried out one of the virtual experiences we have lined up for our participants in the Try it Out Virtually Section of our Semi-Structured Interview (see Appendix B).

The role-playing game was to be in the table-top RPG style where players “meet” to play through an adventure on an online forum like Discord on or off-camera. Ingenium would design adventure stories around artifacts in their museums. They could be written by Ingenium historians/curators in collaboration with RPG authors. Genium Masters could be either museum curators, contracted professional Game Master, or experienced players. Users create
their own characters with a character creation guide, and they would have the freedom to be whoever they want to be, so long as it fit the story. Posters/ads/videos would be uploaded on Ingenium’s social media accounts where links and info would be provided for each RPG Adventure. Users would click on story highlights and swipe up to read more on Ingenium’s website to sign up.

**Figure 8**

*Storyboards for Role-Playing Game Intervention*
Intervention 2: Digital Trading Card Game

This idea stemmed from our visit to the museum. Ingenium had collections in their museum and we decided to take advantage of that. Users wanted more than just facts and they wanted an interactive experience. They also didn’t want to leave their friends out of the experience. A user said, “We had fun among friends making fun of our thoughts of what we thought the artist was communicating so that made it interactive.” They want to be able to share and play these experiences with friends.

The idea would be based on collections. It would be a mobile app where users would have to log in every week to open new packs. The cards would come in different forms from common artifacts in the collection to rare ones and the value of each card would be based on the story or inventor or history of each artifact. To get more context from the card, users could flip their cards to learn more about the story behind each artifact. These stories would be in the form of videos, short but interesting stories, or QR codes they could scan to read more about the artifacts. You could build your collections by opening more packs and trading with friends. A new pack would be available each week but if you wanted access to more packs, you could complete tasks like watching ads, visiting the Ingenium website, or buying a new pack. You could play games with friends and earn rewards and also trade cards with friends.
Intervention 3: Myseum: Build Your Own Museum (BYOM)

After validating our first two solutions concepts, we recognized some dilemmas with each. We re-worked the idea into a new prototype taking into account characteristics that testers said they were looking for and keeping in mind Ingenium’s core value of Inspiring Ingenuity. The validations reaffirmed our experience principles so it was just a matter of fusing the initial concepts. We took the storytelling and promotion-focused aspect of the Roleplaying game concept and the collections aspect of the second intervention to create the Myseum Mobile App - Build Your Own Museum (BYOM).
Users would scan an object around them and then the app would find a similar artifact in Ingenium’s museum and present it to users with images and the history behind each artifact in the form of interactive stories and videos (See Appendix E).

4.2 Validation Methodology

For our 1st round of validation we presented two initial solutions:

1. A role-playing game, with the adventures based on Ingenium artefacts and stories
2. Trading Cards - series based on the many collections in Ingenium museums

Using storyboards for each, we took the testers through how each would work from a user’s perspective, from promotion, to onboarding, to activity engagement to the hooks to keep them coming back. We gave a run-down of what the development might entail (on Ingenium’s end.) And finally we presented several “look and feel” design options for their opinions.

For our 2nd round of validation we presented a new solution:

Having recognized some dilemmas with each, we re-worked the idea into a new solution, taking into account the characteristics that testers said they were looking for and keeping in mind Ingenium’s core value of Inspiring Ingenuity. We used the storyboard to take users through the new iteration for testing.

Validation Analysis

Transcription notes were collected for each on Miro (shareable whiteboard software). Common themes and poignant insights were pulled from both the user and the SME feedback and gathered on Miro to inform the design of the prototype.
4.3 Results from validation and iterations

Validation participants

Users for testing came from former interview participants as well as some students from Algonquin College. Subject matter experts (SMEs) for testing came from the initial SMEs.

Validation SMEs (see Appendix E)

SME # 4: In response to the Role-Playing Game (RPG) option, this SME could see the opportunity for showing diversity with the possibilities of creating one’s own character, with the visual and description, as oneself or as another person. It would give the opportunity for someone to either show others who they are or step into the shoes of another person and experience the adventures through their eyes. “At the end of the day, we want an empowered Canadian.”

SME #5: From the storyboard of our Trading Cards the AR on the cards piqued their interest. Questions were mostly around how to get people hearing about the cards/collections and interested to get into it. For both the RPG and cards, they suggested the (researched)trending aesthetics of ‘dark academia’ - “goes with the trains” - ‘cottage core’ and ‘cyber punk’ for Gen Z. There was discussion about creating videos to present the instructions and game introductions to be able to take the place of a live Games Master, to reduce the amount of human resources needed.

SME #8: Discussion began around why businesses, industry and government partner with museums for information presentation to the public. They explained that those entities might be experts in science or policies but not at reaching the general public. Museums are the storytellers and it is their job to discover the ‘tipping points,’ the points that touch people’s
hearts to affect change. As well, people have more trust in museums than government and industry. They are seen as more objective, unbiased facilitators.

Validation discussion was around promotion potentially done with specific interest groups such as cyclists in regards to the bike collection on the trading cards. They talked about digestibility and bingeability - making the content easy to take in in one sitting but creating the desire to return to it, giving the simple example of Wordle. They also gave insight into the monetization of the RPG games. They were an RPG player themself so they had a great interest in the possibilities of that solution.

**Validation Users** (see Appendix E)

1. Participant #48 - Student from Algonquin College
   He liked the visual of the card from the card game. Preferred the card game over the RPG. (Didn’t remember the description of the RPG when we returned to get feedback after discussing the cards.) Would definitely try the card game. The nostalgia of trump cards. He recommends using rewards for sign-ups, referrals etc. Maybe the rewards could have some real-life value too (compare Scene points from Scotiabank). Liked the contrast of red and black in one of the RPG promotional posters

2. Participant #49 - Student from Algonquin College
   She used to trade cards when young because they went with games she played. She is not as enthusiastic about it now. She wondered how to make it a game with suggestions involving legends and heroes. Suggested explaining the game in a short amount of time. “I like colours.”

3. Participant #50 - Student from Algonquin College
He liked the visual of the trading card sample and would definitely try the card “game”, the nostalgia of trump cards. He recommended using rewards for sign-ups, referrals, etc. Maybe the rewards could have some real-life value too (compares Scene points from Scotiabank.)

4. Participant #16 - From interviews

Hard of hearing, she first asked for closed captions to be used. She liked the idea of finding out the background of things in her everyday world. She wants to see a timeline of the progression of the technology/artefacts that goes along with her scanned object. She "would definitely try it."

5. Participant #44 - From interviews

A museum enthusiast, this user-focused on technical feedback. Be aware of server size to store all of the collected information. Image matching software that will match images to the museum's artefact. She questioned whether it would last beyond the initial novelty. Likes the idea, will try it and believes will improve with iterations

Validation Findings

Characteristics that our Gen Z validators either liked about our 1st and 2nd iterations or wanted to see in the solution ended up including confirmation of what we had seen in our primary and secondary research, with some additions (see Appendix E).

Table 3

Validation Findings

<table>
<thead>
<tr>
<th>Quotes</th>
<th>Issues</th>
<th>Opportunities</th>
</tr>
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</table>
## Have minimal instructions

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<tr>
<th>&quot;I don't buy the manual [for the game]- too much work.&quot; We also observed that users didn’t retain many parts of the instructions if multiple instructions were given at once.</th>
<th>We want users to clearly understand why and how the app works.</th>
<th>Make reasons obvious for buttons or swiping Make UI that they would be familiar with Short video of why and how to get started at the beginning Keep any necessary instructions short, picture driven and on a need-to-know basis</th>
</tr>
</thead>
</table>

## The users confirmed that Instagram is the most used social media (which we saw originally in our Questionnaire)

<table>
<thead>
<tr>
<th>One reason, they can view Tik Tok, Twitter and short YouTube videos on IG.</th>
<th>We don’t want to be trying to compete with Instagram.</th>
<th>The related artefacts, quick interest stories and presentation of innovations have a different purpose than IG in a familiar design context and UI - to be intuitive. Some promotions could also originate on the other platforms listed above since they can also be used and shared on Instagram.</th>
</tr>
</thead>
</table>

## Tell a story around the facts

| [I want] "short content with a hook. It's about the narrative." 
"How is this artifact related to me? 1940 – post a pic of someone that everyone is familiar with from that time."
“Make sure the content is somehow related to me and something I have familiarity with.”
“with stories and histories of the eras, artifacts, etc. within the story” | Potentially more clicks Apps don’t have much space More research may be needed to find stories within the facts Curators would need to understand what Gen Z would relate to | Tell stories with visuals as much as possible Keep stories short Get Gen Z writers (from Journalism and English programs) to work with the material that curators provide |
In order to keep them engaged, users want their brains challenged with just enough of a problem to keep them interested without being frustrated.

<table>
<thead>
<tr>
<th>I would engage</th>
<th>The challenge is subtle.</th>
<th>Our opportunity is to show them the potential, the purpose. They will be learning in an interesting way while being inspired to innovate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;if you puzzle my brain&quot; [with a gradually progressive challenge.]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**What Gen Z will and won't pay for**

<table>
<thead>
<tr>
<th>One person says she would pay for &quot;new costumes for my avatar when a new episode comes out&quot;</th>
<th>Monetization</th>
<th>The app starts off free and add-ons can be built into the scalability (described in the paper). It also acts as an advertisement for the museum.</th>
</tr>
</thead>
<tbody>
<tr>
<td>One SME gave his view as a paying parent: &quot;I would pay for game acquisition upfront with costs included. My Gen Z kids play the games for free but will spend money on the upgrades.&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Shareability**

<table>
<thead>
<tr>
<th>&quot;If there is some sort of game [insinuating activity] and feedback or credit, I’ll share it with friends.&quot;</th>
<th>We need to provide challenges to gain rewards. Content needs to be that interesting to want to share with friends.</th>
<th>The plan is to present vibrant, retro and otherwise “cool” visuals and short, intriguing stories to catch the interest and be something Gen Z would want to tell others about. The curators and science advisors are a wealth of interesting knowledge.</th>
</tr>
</thead>
</table>
What piqued interest

From our second validation, we discovered aspects that they loved about our solution concept as well as questions and recommendations.

- They liked the fact that we used AR technology and that they were able to relate objects they used in their everyday lives to artefacts in the museum.
- They liked that they could compare past technology to current technologies and how they affect future innovations. Technology: Past → Present → Emerging Innovations
- They loved the aspect of storytelling in the app and that each artefact would have an interesting story behind it.

Critical Recommendations

We were also made aware of some concerns and recommendations:

- Create hooks to return - to bring them back to the app and to promote Ingenium’s collections
- How to introduce the more obscure Ingenium artifacts
- How to introduce innovation and creativity

4.4 Implementation

Prototype Description

The plan is to have the application available as a free download for both iOS and Android mobile devices through their respective application stores. Once the users download the
application, the users will be taken through some introductory screens that explain to the users the purpose of the application and what they can do with it (refer to figure 10).

**Figure 10**

*Onboarding Screens*

After going through these introductory screens, users will be asked to either sign-up (for first-time users) or log in (for returning users) to continue using the application. This step is important because their collection needs to be linked to their account so that they can return at any time to the application without the fear of losing any of their previous data or collected images.

For first-time users, the first page that comes up after signing up will be the ‘Camera View’, where the users will be prompted to use their smartphone camera to scan or capture an object around them (refer to figure 11).
The users can tap on the object to focus and the application will then detect the object and create an outline around it. Users can then tap on the ‘Capture’ button to click a photo of the object. Once the user hits the capture button, the system on the back-end will process the image to identify what the object is and search Ingenium’s collection database to find the same/similar/related objects from the past as well as information on future innovations happening around that object. The users will then be presented with a screen (the ‘Present’ tab) where they can see the image that they captured, give it a title and also share their story behind the object they captured. Also on this screen, the users can switch between the ‘Past”, ‘Present’ and ‘Future’ tabs to discover the past stories of the same/similar/related object that they scanned in the ‘Present’ or explore what advancements or innovations are happening in the ‘Future’ around their object. The users can then tap on the ‘Add to Collection’ button to proceed which will take them to the ‘User Collection’ page (refer to figure 12).
The ‘User Collection’ page is like the user’s personal profile page that holds their collected objects. Again, the ‘Present’ tab shows images of objects that the users have clicked, the ‘Past’ tab shows images of the past versions of collected objects, and the ‘Future’ tab shows images of the new innovations happening around the collected objects. The grid and layout of the images are consistent across the 3 tabs so that it is easy for the users to relate their present objects to their past and future versions. This page marks the end of the first-time user’s journey. From this step onwards, the users can use the application freely and switch between the 3 main pages of the application, ‘Explore’, ‘Camera View’ and ‘User Collection’.

Tapping on the camera icon in the centre of the navigation menu will take users to the ‘Camera View’ page where they can capture objects around them. The right-most icon in the navigation menu, the profile icon, will take users to their own ‘User Collection’ page. The leftmost icon, the search icon, will take users to the ‘Explore’ page (refer to figure 13).
The ‘Explore’ page displays users a feed of images of different objects recently collected by other users on the application. The users can swipe on the thumbnail image itself to switch between the ‘Past’, ‘Present’ and ‘Future’ images or they can tap on the image to open a detailed view of the object. The detailed object view for each of the 3 tabs displays important information, stories and fun facts about the particular version of the object. The ‘Explore’ page also recommends other users to the users that they might know based on their contact list. The users can tap on the profile image of these recommended users to view their collection page and browse through the images of the objects they have collected. The ‘Explore’ page also features a search bar that the users can use to search for other users on the application by searching using their usernames.
Promotion - the hooks to get them started

We came up with different ideas for the promotional aspects of the concept. We would promote the app with students for orientation/Frosh week activities. Playing on nostalgia and strategy from games like Pokemon Go, we could organize a scavenger hunt activity where users would use the app to scan items and win rewards. Students would get to know about the app as well as about Ingenium. This would be a way to spread awareness and could even kick-start a whole new “chain” where programs and students would organize games based on the app, one way to keep them coming back to the app.

The second promotional idea would use social media. We would run ads on popular sites and apps where Gen Z are usually found. The ads would depict the idea of the app with short interesting stories and beautiful graphics as hooks to draw them in. An idea could be asking a user to scan an object in their home and an artifact in Ingenium’s museum would pop up with an interactive and interesting story attached to it.

Ingenium could also involve various programs in the college to be a part of the project. They could build on our pilot project with recommendations from us and make it scalable. Beta test subjects could be from another program where the testing is an assignment, and then recruitment could be expanded to other programs, friends, etc., as laid out in Stage 1 - Pilot project (below).

What technology will be needed?

Mobile App

AR

AI/machine learning (Computer Vision)

AI algorithms for connecting related objects, artifacts and information.
General Development Planning

Ingenium curators would work with students from a journalism/English program from a college or university, like *Algonquin College Journalism Program*, to write the stories. They would be well-informed and kept up-to-date with what Gen Z wants and the project’s Experience Principles.

- Include Gen Z humour.
- Keep the stories on the app short and highly intriguing to Gen Z.
- Random stories are fine; that is part of Gen Z's interest and humour.

The digital team of Ingenium would work with students from digital development for the app development and students from computer engineering programs to develop the AI machine learning and AR technologies incorporated in the Myseum app.

4.5 Scalability

**Recommendations for future iterations**

For our solution concept, we have presented a minimal viable product (MVP) because of time constraints, so it does not contain all the features we could add. The scalability section is a breakdown of the extra features and recommendations for the app. To make the app more interactive, immersive and brain stimulating as well as adding relatable stories, we decided to break down these recommendations according to our experience principles.
Table 4

Recommendations for Future Iterations

| Currently Included / Additions to be Made Related to Experience Principles |
|---|---|
| Facts into stories or relatable content | ● When clicking on a fact, stories will pop up (see Interactive below)  
● As well as, pictures of important happenings or recognizable people related to that era |
| Curiosity and brain stimulation | ● The initial premise of the app stems from curiosity about the scanned object and where it fits into history and innovations  
● Learning about related technology, eras, history  
● Innovation section - sparks curiosity and new ideas |
| Interactive and immersive | ● AR/AI/machine learning technology  
● Multi-sensory story-telling (video included)  
● Text also has audio (see accessibility)  
● Add option to see a timeline of the technological progression of the object or artefact. |
| Choice | ● Initially, choose a category.  
● The user chooses the initial object. |
| Accessibility and Inclusivity | - Also has choice to go deeper (will have direction to more information on Ingenium website)
- "Tell us what’s cool about your IRL (in real life) object.” Use co-creation and sharing, giving fuel to spark innovative ideas.
- Gain more ideas and inspiration from the Future (Innovation) section.
- When an artifact is shown, create an avenue for the user to design the artifact any way they want and share with friends.
- As per Ingenium’s mandate, our redesign will be multi-sensory to be more universally accessible, using audio, text, pictures & pictographs with alt text and video with closed captioning. Built into the solution would be aspects to meet and exceed Canadian and Ontario accessibility standards and be as inclusive of all abilities as possible.
- Inclusivity - Ingenium content creators (curators and other researchers) intentionally highlight stories related to diverse cultures |
- In Canada and Canadian history. Stories could include:
  - Inventors from many backgrounds
    (One of the curators from CASM is already focusing on developing some of these stories.)
  - Aspects that are hard stories to tell, which may even put Canada in a bad light but telling true stories

- Partner with the Canadian Multicultural Inventors Museum to create content.

<table>
<thead>
<tr>
<th>Short instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Keep it intuitive with features similar to common apps like Instagram.</td>
</tr>
<tr>
<td>- Directions are currently short, but should be tested more to be sure they are clear.</td>
</tr>
</tbody>
</table>

### Scalability Stages (Short, Medium, and Long Term)

#### Short Term (3-6 months)

Since it will not, initially, be possible to make links to all possible objects that one could scan in their daily life, the pilot prototype would limit the potential scanned objects to certain categories, similar to the categories in the Ingenium catalogue, that could be associated with the collection categories that are highlighted in Ingenium’s current digital catalogue.
A separate screen would be included in the onboarding process to choose a category, just before scanning the object.

Students from one digital development program at a college or university would use the app in beta as an assignment for their program for a couple of months. AI would be in place to be learning what other categories are priorities to add.

Even with the beta version, sharing capabilities would be there so others (snowball effect) who hear about it could join as they wish. Have a distinguishing selection for those using the app as part of their course versus the snowballed users so that metrics can be kept.

Receive feedback from students in the program and the snowballed users.

**Medium Term (6-12 months)**

Expand to more student programs that are not design or development related. Promote the app to the Student Association of that school through Scavenger Hunt (see Promotion). Expand the categories as suggested by AI from the short-term results. Features discussed in the ‘Additions to be Made Related to Experience Principles’ table (see Table 4) above will begin to be implemented in this phase and continue to develop in the long term. It is essential to onboard new users during this phase while also retaining early users. Therefore a lot of the features around the ‘Choice’ & ‘Accessible and Inclusive’ experience principles will be a priority during this phase.

**Long Term (12-24 months)**

Promote the app to Student Associations of as many schools as possible throughout Canada with Scavenger Hunt (see Promotion). If the first two stages have met the required metrics (see below) the snowball effect should have enough users to continue without the student programs. Long term feature implementation relies heavily on the results and feedback from the short and medium term phases. If the results are positive, both user engagement and retention are high, continued innovation in creative and interactive features would be required.
to maintain these positive results. If the results are not so positive, this phase would start by analyzing and identifying issues that led to such results. Implementation of new features will be secondary to fixing the identified issues.

User Retention - what’s the hook to keep them coming back?

Playing on nostalgia and strategy from games like Pokemon Go, we would promote the app with students for orientation/Frosh week activities with a scavenger hunt activity where users would use the app to scan items and win rewards. This way students (often Gen Zs) would get to know about the app and also get to know about Ingenium. This would spread awareness and could even kick-start a whole new “chain” where programs and students would organize games based on the app, one way to keep them coming back.

Metrics

Metrics and metric goals will help Ingenium’s team make informed decisions based on data that substantiates user response to the intervention and helps to steer clear of opinion-based planning. The data should include both quantitative and qualitative data should be part of the measurements so that the “why?” behind the numbers is actually uncovered rather than just assumed. Occasional field testing should be done to observe users and ask specific questions that will elicit explanations of the quantitative data.
### Table 5

**Metrics and their Reasons**

<table>
<thead>
<tr>
<th>Reasons for the Metrics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of clicks on social media and website promotion</td>
<td>How many people are discovering the app in the first place?</td>
</tr>
<tr>
<td>Downloading &amp; Onboarding totals and rates</td>
<td>How many and how often are people trying the app?</td>
</tr>
<tr>
<td>Return visit totals</td>
<td>Are users liking it enough or getting enough reminder prompts to return and try it again?</td>
</tr>
<tr>
<td>Retention Rate</td>
<td>How long are they continuing to use the app?</td>
</tr>
<tr>
<td>Daily, weekly, Monthly Active Users (MAUs)</td>
<td>The totals of people using the app, compared the respective time ranges.</td>
</tr>
<tr>
<td>Numbers of Shares</td>
<td>How many users are inspired to share this app with friends?</td>
</tr>
<tr>
<td>Reward accumulation</td>
<td>How many/what level of rewards are users accumulating?</td>
</tr>
<tr>
<td>Review ratings</td>
<td>How much do users like the app and why, which includes quantitative and qualitative data.</td>
</tr>
<tr>
<td><strong>Occasional field testing</strong> (frequency TBD)</td>
<td>Why do users do what they do? Why do they like or dislike any particular features? Are they clear on instructions and capabilities of the app? What would make the app more attractive or engaging? What would encourage them to come back?</td>
</tr>
</tbody>
</table>
V. Conclusion

Clamouring for a piece of Gen Z’s online time, there are countless modes of entertainment, education and other information to be shared. In order to answer the challenge that the Digital Team of Ingenium set out for us, to design an online intervention to inspire innovation among 18-24 year-olds across Canada, we needed to discover what Gen Z needs and wants, what excites them and frustrates them. We researched museums and existing virtual exhibits and interviewed museum subject matter experts and potential users in order to understand how to share the museum collections through online content in a way that would effectively engage this group. We began the planning of 3 potential solutions and settled on a strategy that, after several iterations, will use many of Gen Z’s preferred traits of activities they tend to be attracted to. Of particular importance, the design will have accessibility and inclusivity built into the process, accounting for gender and ability differences and regional and ethnic cultural diversity, presenting the diverse perspectives of Canadian science and innovation itself. While designing features into the app that look out for the user, the vision that Ingenium ignites ingenuity and their mission of being "a catalyst for unlocking the curious and creative minds of a nation of innovators" can be met (Strategic Plan, 2022).

5.1 Future Considerations

The majority of questionnaire and interview participants live in Ontario. In order to consider the views and interests of the different regions of Canada, the study should be expanded to include potential users from all provinces and territories.

We did not ask about cultural identity or backgrounds, gender, economic or other differences. If we want to take into consideration the perspectives of a more diverse audience,
the study would need to be intentionally taken to different sectors within our originally stipulated demographic.

Our scalability recommendations give opportunities to build in more universal strategies to make the app more accessible to different abilities and preferences for intaking information, However, accessibility would need to be looked at more thoroughly through the standards of the Accessibility for Ontarians with Disabilities Act (AODA) and the Accessible Canada Act (ACA).

5.2 Appreciation

Thank you to all those who gave their knowledge, input and feedback to develop this intervention:

Subject matter experts (SMEs)

Potential Gen Z users who responded to the:

- Survey questionnaire
- Follow-up interview

All the SMEs and Gen Zs who gave feedback for our validation.

To all of our professors who guided and mentored us through this process and shared their real-world experiences.

Thank you to Ryan Dodge and Lauren DiVito, of the Ingenium Digital Team, for partnering with the Algonquin College graduate program of Interdisciplinary Studies in Human-Centred Design to give us this challenge and opportunity to be part of Ingenium’s mission of inspiring ingenuity.
Appendix A

Annotated References


The article examines how the Internet and the move to digitization are affecting access to and use of museums' digital cultural collections, as well as the present problems and opportunities in this new environment. It highlighted some benefits of museums going digital. Digital art are goods that are experienced. You can only know its value when you experience it (Bertacchini & Morando, 2013, p.4). Digitization has helped make these artworks readily accessible for people to consume. You don’t need to worry about value or quality. You just need to experience these goods. Consumption of digital art doesn’t reduce the value or availability of other works. Unlike the constraint of traditional museums, the artwork is non-excludable, readily available to everyone. Technology has provided new digital experiences for museum lovers and visitors by improving their interactions with the museum’s collections via high resolution images and virtual tours (Bertacchini & Morando, 2013, p.6). Digitization has made it easy to produce, use and reuse digital images but museums being the original owner of the artworks claim and maintain control over the copyrights of the artworks even though it is on public domain (Bertacchini & Morando, 2013, p.8). There is a low production cost of information.

A major challenge Museums face is trying to balance increasing access to their collections and financial gain. Because of the inelastic demand curve for their collections, they face the issue of reduction in their visitors if they increase their fees. As with most museums, only a handful of artefacts actually generate money for the museums. They also make little or no money with their digital catalogues online. With the cost of maintaining the museum plus other expenditures, they face the challenge on how to make money from the digital space (Bertacchini & Morando, 2013, p.10). Another challenge would be maintaining control over the access and reuse of their collections. User’s access to these collections online could bring about new perspectives on the artwork which could lead to the increase in the value of the artwork but there is the downside of production of fake artworks or illegal use of artworks which could result in the reduced value of the brand (Bertacchini & Morando, 2013, p.11). So depending on the outcome, maintaining control could cause a positive or negative effect on the museum and the value of the collections.


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The authors analyse the #iziTRAVEL.Sicilia project for its use of the digital storytelling approach and the Hackable City model to involve heritage communities in long-term co-creative and participatory processes that bolster the local cultural heritage (Bonacini, et al., 2019, p. 2). The Hackable City model is a more inclusive approach to city-building, where technology is relied on to stimulate a bottom-up participatory model that serves as an alternative to the Smart City model. The #iziTRAVEL.Sicilia project was launched in 2016 as a platform for Sicilian people to showcase their cities and cultural resources through digital storytelling and has facilitated the production of city audio tours and museum audio guides (Bonacini, et al., 2019, p. 4). The article discusses the case study of the Ursino Castle Civic Museum in Catania, Sicily, where the museum has used the services of hundreds of students in implementing the museum’s audio guides in both English and Italian (Bonacini, et al., 2019, pp. 6 & 7). The results of the #iziTRAVEL.Sicilia project reveal that a participatory and creative involvement in creating cultural digital content could benefit museum management by slashing the costs of implementation and updating, allowing the direct maintenance of contents, ensuring long-term social and economic revenues, and permitting museums to control quantitative statistics about the performance of their audio guides (Bonacini, et al., 2019, p. 10).


This article talks about the history of the museum concept and how museums have evolved into educational centres. The concept of museums was traced back to the ancient Greeks. The word Museum was coined from the Greek word “Museion” which means the temple of the goddesses called “Muses”. The word muse means source of inspiration which was coined from the word “men”.

Museums have advanced from only presenting collections to being venues for observation, learning, and questioning. They are no longer things to be passively viewed, according to a study of their growth from ancient Greece to the twentieth century. All living-nonliving objects and natural-artificial things brought back to western countries from the lands of the other were exhibited in cabinets, which in a sense provided information about the history of nature, geology, ethnography, archaeological findings, historical remains, and religious documents.

Virtual museums, touchable museums, mobile museums, and foundation museums are four major methods in today's museum concepts.

Museums have demonstrated that artefacts are not just for looking at. With the support of the shares they receive from public organisations, they have begun to get involved in additional projects and maintain close relationships with the communities. Many museums today offer diverse programmes to appeal to various audiences by getting to know their audiences better, as it is well recognized that viewers will integrate the message with their own experiences and become engaged with the artefacts and topics of interest. In multicultural cultures, museums play an important role in the integration of various populations.

This study examines attempts to reproduce the museum visit experience, alternate replacements that rely on online platforms, and projects that anticipate radically altered interactions with their audiences.

Museum employees can upload a virtual tour, and digital visitors can take a 360-degree virtual walkthrough of their selected site using Google's Street View technology, thanks to the Google Arts and Culture platform, a non-profit effort that connects with cultural institutions across the world. In all of its manifestations, the virtual museum has allowed visitors to visit regardless of time or location, while social media has given institutions a new voice. Virtual interactions are critical not only for allowing visitors in while the buildings are closed but also for validating the existence of such cultural institutions when in-person visits are not possible and promoting our heritage as worthy of attention.


Since the web became public in the 1990s, some museums across the world have explored the ability to share content digitally (Carreras & Mancini, 2014, p. 88). With technology changing rapidly, innovations are constantly evolving. The authors begin by suggesting, though, that museums have not taken advantage of the benefits of the online museum (Carreras & Mancini, 2014, p. 87). For many, this was due to the desire to avoid creating competition between the physical exhibit and the virtual (Carreras & Mancini, 2014, p. 87). But progress has been made and the authors offer some examples of ideas that have been manifested virtually.

In the 1990s, after short-term exhibitions, information was put onto CD-ROMs, including 3D views, a low-cost way to remember the exhibit. One such exhibit from Spain showed many aspects of the 2 Spanish Islands. This exhibit continues to be used online by travel agents to this day – a lasting exhibit (Carreras & Mancini, 2014, p. 88). Another lasting exhibit in 2000 used multimedia presentations but what gave it longevity was the distribution into the educational system (Carreras & Mancini, 2014, p. 89). In 2003, the Smithsonian presented Mexican history through songs on audio files. It also was put into an educational format as well as giving users the opportunity to write their own songs as an offshoot. This was a participatory virtual exhibit where users could be part of the design by uploading their files of video and audio and network with others within the exhibit (Carreras & Mancini, 2014, p. 90). As mapping and satellite software became more prevalent, geotagging began to be used to share digital displays of artefacts in their natural environments around a country or the world, often shared in geo blogs (Carreras & Mancini, 2014, p. 93). Virtual worlds can depict views of inaccessible places (ex. Inside the human body or in outer space) (Carreras & Mancini, 2014, p. 94).


The study focuses on the reasoning for why blended learning (both online and face-to-face) is more effective than one or the other (as has been shown in multiple studies) (Castaño-Muñoz et al., 2014, p 149). The questionnaire aimed to look at 1) if increased online learning of any sort shows more effective learning and 2) the efficiency for learning of interactive online use versus
single-user online use with a third group using lecture-style technology learning (Castaño-Muñoz et al., 2014, p. 151). With a large study sample, the results show that online learning gives better results only when it is interactive with other people (Castaño-Muñoz et al., 2014, p. 157). Results also point to the importance of addressing the fact that those who don't have access to the internet are excluded from e-learning and therefore this should be taken into account and looked at more closely when studying inequality in learning.


This article examines the relationship between museum communication and information technologies, presenting an overview of the key references that chart the growth of museums from analogue to digital, as well as the rise of immersive experiences. The authors suggest that with the many technologies that help with global networking, a virtual museum is an ideal forum to co-create intercultural exhibits, receiving from and offering to new and more diverse audiences. The evolution of the sensory approach in museum design has opened up the possibility of a parallel world made up of a space that sets up immaterial objects and reinvents geographies, resetting the concept of time in relation to traditional chronological orders, amplifying users' perceptual responses, and transporting them through powerful sensory stimuli in a dimension of sound and moving landscapes (Dal Falco & Bonomi, 2021, p.205).

The COVID-19 pandemic tested museums' resilience with new projects such as virtual tours, movies, and in-depth material produced and shared on social media, thanks in part to a collaboration with Google Art and Culture, which enabled web-based access to digital archives. Events, conferences, webinars, instructional and gamification activities, public awareness on social media, podcasts, installations, and video mapping were all part of the digitization process. Even when the lockdowns ended, the experiences generated inside the various declinations of storytelling increased audience engagement and improved the user experience, and museum digital initiatives have become fundamental (Dal Falco & Bonomi, 2021, p.206). The visitor's level of involvement and appreciation is a crucial aspect in the success of modern museum communication. In an era where technology is increasingly prevalent, the success of the museum experience cannot be measured without the presence of a virtual area that accompanies the visitor during his visit. As a result, the fields of User Experience Design and Artificial Intelligence are becoming increasingly important in the field of museum communication. The goal is to promote customer happiness and loyalty by improving usability, the convenience of use, and pleasure in the visitor-exhibition interaction, as well as providing tailored experiences and support (Dal Falco & Bonomi, 2021, p. 207).

The confluence of analogue and virtual forms, according to Dal Falco & Bonomi (2021, p.208), is an appealing condition that elicits a specific sensation in visitors and a desire to repeat what they have seen, therefore improving their awareness of the knowledge they have gained. If the previous museum was centred on items, the new museum is focused on people, making design a fertile ground for scientific, cultural, and social experimentation.

This study focuses on Gen Z also known as Generation Z, their behaviours and their search for truth and freedom and the implications of their freedom to companies. Gen Zers are at ease with the fact that there is more than one way to be yourself. Their quest for authenticity leads to more freedom of expression and a greater willingness to comprehend people of all backgrounds. The goal for Gen Zers is to experiment with numerous ways of being yourself and to shape their distinctive identities over time, rather than to identify themselves by a single stereotype.

Gen Zers according to the study was born during a period of global economic uncertainty. Because of these obstacles, Gen Zers are less idealistic than the millennials. Many Gen Zers understand the need of saving for the future and value employment stability over a large wage. They already exhibit a strong preference for full-time jobs over freelance or part-time work, which may come as a surprise when compared to millennials' attitudes.

According to the research, Gen Zers now have unprecedented levels of connectivity among themselves and with the rest of the population due to technological advancements. As a result, generational shifts become increasingly crucial, and technological developments accelerate. This shift will attract opportunities as well as challenges for companies.


In this report, the author discusses the findings of a study (survey and interviews) conducted to discover how Gen Z perceives virtual museum visits in light of the COVID-19 pandemic. Glaser (2021, pp. 26-27) found that participants who possessed a lower level of knowledge or a low-functioning internet connection did not differ in terms of enjoyment when experiencing a virtual museum visit from those who possessed a higher level of knowledge or high-functioning internet connection. Object labels, which allow virtual museums, unlike physical museums, to include history and background information on the objects as well as connections to more information stored on the site, were highly praised by the participants (Glaser, 2021, p.29). The main hurdle was unanimously acknowledged as technical challenges and/or difficulty manoeuvring during the virtual museum visit (Glaser, 2021, p.30).

According to the author, museums are facing difficult times, as a study conducted by the American Alliance of Museums in October 2020 found that nearly one-third of 850 museum directors surveyed across the United States believed their institution was "at risk of permanent closure by the following Fall". Virtual museums appear to be an easy solution because they provide a museum visitor with much of the same information and access to the same assets as a physical institution (Glaser, 2021, p.31). The study also found that the participants unanimously loved the digital catalogues, with the only criticisms being that they were too short and "boring," which was later explained as being related to the graphic style used in the digital catalogue rather than the catalogue itself. While both the virtual museum and the digital catalogue were lauded for providing access to art and knowledge about the variable "worth," both tools were also described as "liked" for their accessible features in the interviews.
The paper discusses the impact of the pandemic on the operations of museums in Poland after the closure of the culture sector to the public. Over half of the museums saw a drop in day-to-day revenue, and due to the worsening mood in financial markets, they also saw a drop in their donors' willingness to support their work (Górajec & Pasternak-Zabielska, 2021, p. 267). The number of visitors to museums decreased by 44% in comparison to the previous year, according to data from the research titled Cultural Institutions during COVID-19, Museum Strategies for Reaching the Public (Górajec & Pasternak-Zabielska, 2021, p. 268). 75 percent of respondents also stated that museums were neither logistically nor technically prepared to operate during the challenging period of the pandemic. During the first lockdown, the lack of visitors and the effects were a big issue for the museums. Another issue was the scarcity of stationary work for museum educators at the time. In the case of this group, a lack of visitors typically signified job loss, as well as the loss of a sense of relative security, which was replaced with concern about the future. Cultural institutions' financial status had worsened dramatically, and one of the strategies used to improve it was considered to be termination of non-full-time personnel.

However, the digitization of museum collections and their offering, which was greatly accelerated due to the pandemic, provided some relief for that professional group as well as the museum’s educational functions. The author proposes that there should be a distinction made between digitization for the purpose of documenting or academic research and other types of museum digital activities, such as online courses, content distributed on social media, museum websites, or streaming portals. (Górajec & Pasternak-Zabielska, 2021, #)Because of its educational component, the authors are more interested in the latter. During the pandemic, online education, which had previously been ignored in museum activities, flourished as social distancing and the closing of museums to the public resulted in a four-fold increase in the number of museums distributing resources online. Initially, education departments primarily digitized and shared well-known public content from stationary workshops; however, over time, they began to prepare proposals that better matched the public's expectations and the technological potential offered by tools for digital content presentations, and they began to share the contents created on their grounds using popular services such as YouTube, Facebook, and Instagram. While the least popular were museum websites and email, today considered as traditional means. In the museum resources, the sharing of digital educational offerings nearly quadrupled, and demand for this sort of offer was considerably stronger than in prior years. Although the virtual museum world had been around for a long time, it had never before presented so much on such a large scale. Over half of the respondents found online education to be beneficial and believed that programmes for remote education combined with stationary classes would result in a new hybrid form of museum learning. When cultural institutions reopened, however, there was a large-scale return of the public to museums, which was accompanied by a decline in interest in the online offering. The author notes that this could indicate the importance of direct public contact with museums, art collections, and stationary museum learning.

This study looked at how students were motivated and engaged in an active-learning, flipped classroom that included gamification components while also fulfilling students’ psychological requirements for autonomy, relatedness, and connection. Student motivation and engagement were assessed using a mixed-methods approach that included student perception surveys and focus groups. Throughout the course, the data demonstrated that a substantial proportion of students were motivated and engaged in the learning process. The range of gamification tactics utilized to increase engagement received excellent feedback from students. Throughout the course, students stated that their writing, presentation, and comprehension improved. In addition to focusing on non-technical aspects of gamification, Chunking pre- and in-class information may have aided student engagement and comprehension during the learning and teaching process. It has been determined that the applied learning and teaching method helps to motivate and engage our current Gen Z students in the learning and teaching process.


This paper explores the representation of young adults in museums with a focus on Chinese and Australian young adults. Despite the western’s efforts to involve young adults in museum-related content, the young adults are still a small proportion of museum visitors in the West. But this is the opposite in Asia where evidence has shown that young people are mostly the core group in the museum visitor population. This suggests that culture may influence museum visitation. Young adults in western countries associate museums with negative memories of the classroom due to the rigid and structured museum field trips. This may explain why young adults in western countries hardly visit museums after school. Young adults commonly visit Museums in Asia because museums represent the history of their culture to them. It offers a sense of belonging and it represents their identity as Asians. Asians are big on culture and entertainment so it is of no surprise that this generation would visit the museums.

According to the research, young adults' use of museums is influenced by their previous museum experiences, their perceptions and expectations of museums as free-choice learning environments, their opinions on whether museums provide experiences that align with their self-identity, and their cultural background. The general goal of the research is to learn more about how young adults think about museums in order to figure out how to attract and engage them.


This study explores the impact of mobile communication devices on the experience of young adults in museums. Their findings suggest that mobile technologies and social media may be used to further educational and visitor experience goals in museums, particularly for young adults. People can connect with their surroundings and share their experiences in new ways thanks to mobile devices.
Despite the fact that the exhibition in question was not constructed with MCD use in mind, the directed MCD group was able to enhance and broaden their experience by using their mobile devices. Using MCD as a design feature is likely to result in more enjoyable visitor experiences. Designated photo places with major artifacts, exhibits, and vistas clearly visible are some choices, as is the case in theme parks. Interesting statistics, vital message signs, and photo tag lines could all be offered. Components will need to be carefully considered by museums.


This was presented at MindTrek '12: Proceeding of the 16th International Academic MindTrek Conference in the Session: Digital games: gamification and analysis. In 2004 “service-dominant” thinking began to overtake the marketing world, from the former view of the value simply being in a sellable product. This led to the consumer being considered part of the design process of the product or service (Huotari & Hamari, 2012, p. 18).

A process or service that is gamified has elements of an obstacle to overcome or beat, the anticipation of the unknown and enjoyment to make it volitional, but with the breadth of possible games, there is no set of particular features that define a game (Huotari & Hamari, 2012, p. 19). The enjoyment and longevity of a game or gamified process are dependent on the subjectiveness of a user’s perception, and hence why service marketing theory is applicable to designing, producing and advertising games or services that are gamified (Huotari & Hamari, 2012, p. 19).

Gamification can come from within the service or product being offered or be offered in conjunction with an outside party. This could include another service provider (ex. bonuses can be offered by a store when the customer is recorded by Facebook or Google check-ins as having been to that store a given number of times) or other customers (Huotari & Hamari, 2012, p. 20).


In this article, Jacob and Johnson engage in a conceptual analysis of Digital Content Marketing (DCM) by applying the Uses and Gratification Theory (UGT). The authors suggest that consumers will use a brand-generated DCM communication in order to gratify their own particular needs (Jacob & Johnson, 2021, p. 86). Jacob and Johnson argue that consumers are attracted to DCM content that is valuable, relevant, reliable, consistent, interactive, and entertaining (Jacob & Johnson, 2021, p. 90). Furthermore, DCM content will elicit optimal responses from consumers when it is disseminated in various formats through relevant digital channels or platforms (Jacob & Johnson, 2021, p. 91). The authors also indicate that DCM content that is both gratifying and delivered through appropriate means will be capable of stimulating positive engagement in the consumers that it targets. While this article identifies key drivers that marketers could use for developing DCM content, the theoretical nature of the paper implies that further empirical research and testing will be needed to validate the propositions of the authors (Jacob & Johnson, 2021, pp. 93 & 94).
Liao, G.-Y., Tseng, F.-C., Cheng, T. C.E., & Teng, C.-I. (2020). Impact of gaming habits on motivation to attain gaming goals, perceived price fairness, and online gamer loyalty: Perspective of consistency principle. Telematics and Informatics, 49. 10.1016/j.tele.2020.101367

Some characteristics of games that have been shown to produce gamer loyalty are buying incentives, feeling of belonging, the material they choose to be involved in, how smoothly the gameplay works, fun-factors, personalized characters that a player owns and being socially involved (Liao et al., 2020, p. 2). When these characteristics are repeatedly, positively included in the games played, they become instinctive. This study looks at how gaming instincts, or patterns, lead to gamer loyalty. (Liao et al., 2020, p. 3)

The majority of the study participants were male, had been to post-secondary school and their average age was 21.5, traits that aligned with the literature on gaming. (Liao et al., 2020, p.7)

The recommendation for those who produce games is to integrate these features into the games (and the marketing) that promote the development of these habits. (Liao et al., 2020, p. 10)

Some examples of loyalty producing features are: characters may die but have the chance to reincarnate – the game is never really over; smooth experience – ease; avatar personalization - social; competitive scoreboard - goals for engagement; fun, surprise, intrigue, investigation – perception of enjoyment; communication with other players – community building; gamer guilds, tournaments, challenges – social (Liao et al., 2020, p. 10).


This study looks at young people's motivations for visiting museums, the barriers that prevent them from visiting museums, and their opinions on how museums should be promoted to attract Gen Z. According to (Mokhtar & Kasim, 2012, p.4), 20.6% of Gen Z would go to museums for assignments or projects. Only 18.8% would go to museums to broaden their knowledge. 14.9% would go to museums for school trips, 9.2% would go to satisfy their curiosity and 7.2% would go to fill their spare time. The main reason for not visiting museums was lack of time and that was 29.4% of Gen Z who filled the survey. 15.5% stated that they were not interested. 14.8% stated they experienced difficulties getting information about museums and their events.

According to their research, international students are more likely to visit museums to satisfy their curiosity but local students would visit museums to broaden their knowledge. They also suggested that to attract international students, unique exhibitions showcasing their local culture would most likely capture their need to broaden their knowledge. Male students do not go because they think there is a lack of accessibility and female students do not go because they think the admission fee is high.

This article discusses how museums in Europe have coped with the outbreak of the COVID-19 pandemic. The museums have shown resilience by using the web to maintain their relationships with their audiences. Due to Covid-19 closures, 50% of museums have increased their online content by a minimum of 30% (Orlandi, 2020, p. 58). Studies are showing, though, that the content is not successfully being interacted with by visitors (Orlandi, 2020, p. 58).

The author recommends that museums thoughtfully assess the usefulness of their current offerings to visitors and the potential longevity of the online exhibits (Orlandi, 2020, p. 59). The European research group, Digital Cultural Heritage, presents the Web Strategy Scheme WSS as a useful tool they have designed that outlines a strategy for museums to go through this analysis and offers information on how to make these changes happen (Orlandi, 2020, p. 59). The vision is for a museum to become an online cultural hub with their online content. The author concludes that museums must engage in active dialogues and listen to their audiences so that the museums create projects ‘with’ the public rather than ‘for’ the public. Some issues with the web-based digital contents are that the museums have generally failed to show a long-term editorial strategy, and that the digital contents have rarely stimulated a dialogue. Orlandi believes that the WSS monitoring tool can be useful for museums to perform self-assessments for deriving strategies to govern their relations with the public.

The tool, in the form of a book, contains parameters for topics to be addressed so that results can be measured (Orlandi, 2020, p. 61). Some of the topics include the implementation of information architecture, preparing content for many audiences and planning effective user interfaces. Methods for building connections with and among users using social media, and inviting the public to have a two-way interaction with the museum and the content is discussed along with the related policies that need to be taken into consideration.

The tool also addresses the effective promotion of virtual content, the dilemmas of online security of museum content while retaining public access to their cultural heritage (Orlandi, 2020, p. 60). All issues are presented with the stress on the value of the implementation of assessment of data and feedback on the success of implemented strategies (Orlandi, 2020, pp. 60, 61 & 62). The author concludes by highlighting the importance of user experience research and the power of interactive involvement of the public with the delivery of material in creating a successful and productive museum online (Orlandi, 2020, p. 62).


This edited volume provides readers with a thorough review of theories and practices related to the field of museum studies. The numerous contributors all adhere to the principles of the Leicester School, namely that the development and effectiveness of museums depend upon practices that are both informed and creative. The book consists of seven sections, with each section containing chapters devoted to a particular element of museum studies. The seven core elements that serve as the focus of the volume are information, space, access, interpretation, object, delivery, and futures. The editor illustrates how the subject of digital heritage has matured in its identity and has grown in its intellectual confidence. Moreover, digital heritage has become an interdisciplinary endeavour, featuring contributors with diverse academic and career backgrounds.
In this study, the researchers covered the design and visualisation of virtual museum exhibitions using virtual and augmented reality approaches. The ARCO (Augmented Representation of Cultural Objects) project works on technologies that will help museums better access the massive amounts of cultural goods they have in their archives. Recent advancements in web technologies, as well as virtual and augmented reality, provide museums with the opportunity to exhibit their resources online, considerably expanding the reach of these cultural heritage organisations. Most current museum websites, on the other hand, employ a 2D-only approach, showing viewers flat photographs of cultural items with textual descriptions—in effect, a web-based catalogue. Instead, the ARCO initiative employs a multimodal approach, developing virtual representations of such artifacts and allowing interaction with them.


This article focuses on Gen Z and their behaviours. They value diversity, individualism, collaboration, technology, and organizational support. DITTO is a helpful acronym to aid managers in remembering particular methods to support DITTO, a new research-based paradigm that includes specific recommendations for organizations to adopt and exploit Gen Zers. Gen Zers are more open to diversity, more individualistic, and technology-driven than previous generations.

Gen Z is also more diverse than other generations and is open to embracing different cultures and beliefs. Because of this, they tend to show their support for organizations that make diversity a priority. To promote diversity, organizations are advised to be diverse in employee recruitment. Gen Zers, on average, spend more time alone. They are individualistic in learning so organizations are advised to adopt socialization programs in the workplace. Companies that adopt the DITTO framework are more likely to be successful and more attractive to Gen Z employees.


This review examines research that used gamification in a Higher Education setting for Gen Z. To better suit the diverse learning styles and educational needs of newer generations, higher education institutions (lecturers) must create innovative means of teaching. This research makes a case for a different strategy to teaching Gen-Z students in higher education.

The use of gamification enhances the educational experience of Gen Z. It allows for the hierarchical, and visual organization of activities, which results in favourable learning outcomes. Based on the research that has been done on gamification in higher education, it appears that games can help motivate and engage students while also improving their intellectual activity in the classroom. Points, Levels/Stages, Badges, Leaderboards, Prizes and Rewards, Progress bars, Storyline, and Feedback are some of the most popular gamification components (Nah, Zeng, Telaprolu, Ayyappa, & Eschenbrenner, 2014) as cited by (Saxena & Mishra, 2021, p.14)

Over more than a half-century there has been debate over the value of real versus virtual museum and the definitions of the respective terminology (Schweibenz, 2019, p. 3). Museum experts opposed the simple idea of the purpose of museums as to display objects for their physical allure and monetary worth. Rather, they began to promote the idea of museums and artifacts for meaning (Schweibenz, 2019, p. 4). Information about the artifacts was originally mostly stored. As society and technology change, combining the different values of both becomes more prevalent in the debate (Schweibenz, 2019, p. 5).

The idea and use of automating the sorting of information being useful in and to museums date back to the mid-twentieth century and evolved with the increased use of computers to store and sort that information. (Schweibenz, 2019, p. 8) Photography brought in a new element to consider as people began their own collections of photos of artifacts and exhibits and shared it with people who may not have been able to go to the physical museum. The museum audience thus became much larger. (Schweibenz, 2019, p. 8)

Between information kiosks and multimedia exhibits, technology and meaningful information augmenting the physical exhibition became more prevalent and the line between the physical and virtual became more blurry. Some key points that drive the continued debate are the authenticity and value of the artifact, (Schweibenz, 2019, p. 17), the amount of public access to culture (Schweibenz, 2019, pp. 17 & 18), the difference in trust of content between real and virtual and whether visits to the physical will diminish with access to the virtual. Studies have shown that with more digital content comes more promotion and the physical and foot traffic increases (Schweibenz, 2019, p. 19) With the virtual world becoming a prominent part of the lives of newer generations, museums will need to reflect this by moving in the direction of immersing the content in information, context and experience. (Schweibenz, 2019, p. 20).


This study looks into the barriers that hinder young adults from visiting museums, how museums throughout the world are now attempting to engage this audience, and what this audience's current requirements and wants are in a museum. The study stated 5 main barriers that hinder young adults from visiting museums: These include misconceptions about museums held by young adults, a lack of relevance to their needs and wants, prior museum experiences, a lack of expandable funds, and a lack of a "comfort zone."

The researcher stated that negative experiences stem from rigid and boring classroom trips to the museums. Another barrier is the fact that museums are not adapting to their wants and needs. Young adults want to make decisions and choices themselves and they want the power to control their narrative and experiences. They crave social avenues where they can meet like-minded people and they do not see museums doing that. They conducted interviews and carried out surveys and they came to some conclusions about the needs and wants of young adults in museums. Young adults want to see and experience new and entertaining things. They
want a nighttime event. They want affordable events and they want museums to be more sociable.

The content of museums is interesting to young adults, according to the research. The biggest issues, however, are getting them into the museum and making it a suitable place for their social requirements. Museums may be perceived in a new light once they accept and adapt to the social demands of young adults; no longer as ancient, uninteresting, dusty institutions, but as fascinating locations that are universally acknowledged social destinations.


The authors of the article conducted a usability study to explore the participants’ perceived sense of being in a virtual museum in relation to visits to real-world museums. To do so, the researchers use a system called the Augmented Representation of Cultural Objects (ARCO). The participants in the study experienced a virtual museum that was based on a gallery in Victoria and Albert Museum in London, UK. Four principal system aspects were assessed. These included domain suitability, technical usability, user accessibility, and sense of presence. The study employs a mixed-methods evaluation approach that combines both qualitative and quantitative analyses. The participants consisted of museum curators from the Victoria and Albert Museum, who were divided into two groups of cultural heritage experts who had no direct knowledge of technological usability evaluations, and usability experts who acted as visitors of the virtual museum.

The participants completed standardized presence questionnaires related to their perceptions of cultural artifacts (the augmented reality of objects’ presence), and their perceptions of the virtual museum (virtual reality presence). The findings indicate that participants’ previous experience with Information and Communication Technologies does not correlate with perceptions of augmented reality of objects’ presence or virtual reality presence while exposed to a virtual heritage environment. Enjoyment of the exhibit was found to be positively correlated with both augmented reality of objects’ presence and virtual reality presence. Therefore, a high degree of perceived presence is closely associated with satisfaction and enjoyment. This can be a contributing factor to having an enjoyable experience while experiencing a museum simulation system.


This paper is a presentation of ARCO (Augmented Representation of Cultural Objects) from a 2008 conference: *Computer Applications in Archaeology. Reconstructing the Past.* It describes a technology system that empowers museum staff or subject matter experts to be able to be part of the IT design process of curating and developing a virtual exhibit with virtual and augmented reality (VR and AR) (Walczak et al., 2008, p. 3 & 6). This technology provides a low-cost and efficient means of planning, organizing and presenting the artifacts of the museum in AR or VR (Walczak et al., 2008, p.13).
The subject is introduced with reasons why museums can benefit from online exhibits. Museums lack space and resources to display all the artifacts they have. It would degrade the artifacts to have visitors physically interact with an artifact to be able to see all parts close up. (Walczak et al., 2008, p.3). The technology puts the design process into a layered framework of gathering, managing and visualizing content (Walczak et al., 2008, p.6). Illustrations depict how the virtual exhibition can be set up, and the different roles of the people involved in the design (Walczak et al., 2008, p.8) Descriptions are given of the data management and manipulation of artifacts in the virtual space, including templates of varying ways to display museum collection. (Walczak et al., 2008, p. 10)

Possible virtual exhibitions include giving objects proximity so that they can be compared, tours of the space, the ability to put the artifacts into different contexts, learning activities in the forms of games, quizzes (Walczak et al., 2008, p. 12) and other paths to create a rich, interactive experience for the visitor of the virtual exhibition rather than simply viewing the artifact behind glass onsite or in 2D from HTML format (Walczak et al., 2008, p. 4).


This paper presents the findings of a user survey conducted by the authors for the National Museums Liverpool (NML) museum website, in which data on a wide range of user characteristics was collected in relation to their current visit in order to gain a better understanding of their motivations, tasks, engagement, and domain knowledge. "Understanding online museum visitor behaviour is crucial to the construction of relevant and helpful museum websites," according to Skov & Ingwersen (2014), as referenced by Walsh et al. (2018, p.76). The online survey was piloted with eight experienced scholars and museum professionals and consisted of 21 questions. Although 1118 people were recruited, only 564 were included in the final data set. "General Public" (GP), "Non-professional" (NP), "Student" (S), "Teacher" (T), "Academic" (A), and "Museum Staff" (S) were the six groups in which the participants were divided (Walsh et al., 2018, pp. 77-80).

The "general public" and "non-professional" groups made up the majority of visitors to the museum's website. The "general public" and "non-professionals" were both classified as visitors to the museum's website for purely personal reasons. However, Walsh et al. (2018) found it intriguing that a sizable portion of the "general public" and a smaller subset of "non-professionals" use the website solely to pass time (Walsh et. al., 2018, p. 83). In terms of overall Cultural Heritage knowledge, the two groups were equivalent, but the "non-professional" group had much more specific Cultural Heritage knowledge concerning NML. The users' frequency of visit provided another indication of the amount of knowledge between the two groups, with just 12–13 percent of both groups visiting the site more than once a year. Furthermore, over half of both groups were making their first visit to the website. The PC was identified as the dominant device for viewing museum websites, although mobile and tablet devices accounted for half of all devices used. Both groups preferred navigational links to searching, which could be related to their lack of Cultural Heritage expertise. While "non-professional" users were more inclined to read all of the information on a content page, the "general public" group favoured pictures and illustrations (Walsh et al., 2018, pp. 83-85).
Walsh et al. (2018, p. 85) suggest that individuals from both groups who come to the museum to pass time could benefit from better access to the museum's online assets via engaging interfaces that don't require extensive subject knowledge. Furthermore, this would benefit the broader "non-professional" audience, who have a strong interest in being able to access the museum's digital collections but find that using current search-based systems can be difficult.


This paper gives an overview of Gen Z, or those born after 2000, in terms of numbers, spending power, and behaviours.

They stated three defining behaviours of the Gen Zs. Gen Z values personal appearance above all else. They are the first generation to "grow up in public" online, that is, by documenting their lives on social media. This, according to evidence, is encouraging even young children to use beauty products and promoting body awareness among young people. The social media pressures are also motivating Gen Z to spend on leisure activities like holidays, dining out, and going out. The "Instagram effect" refers to the desire to be regarded on social media as having a fun, engaging, experience-rich life—and the resulting spending on leisure to support that desire. The on-demand economy, which includes everything from video-on-demand services like Netflix to dating applications like Tinder, is making Gen Z the most demanding generation yet.


The purpose of this study was to discover the reaction of Gen Z (25 or younger) to different health campaigns, some traditional and some gamified (Zain et al., 2021, p. 975) The authors gleaned from their literature study of Gen Z that many studies have shown the effectiveness of gamified health campaigns, but not much research could be found specifically on the requirements of Gen Z on this subject. As hypothesized, the survey analysis showed a strong ability to affect healthy changes. They positively responded to the aspects of play, connection with others while networking, and feeling drawn into the experience all while learning and being inspired to take action. The authors concluded that gamification of campaigns for health is strongly desired by Gen Z to be able to absorb the information in order to make healthy decisions. (Zain et al., 2021, p. 979)


This paper describes the findings of three focus groups held in Bucharest, Romania, to look into museum visiting patterns, such as what visitors did in an exhibition and which of their interests influenced their actions. Museums have long been thought of as centres of cultural instruction for the social, cultural, and economic elites. However, their educational role has since evolved and museums are being used as mass educators, sites of exploration and experimentation, community centres, and entertainment venues (Zbuchea, 2013, p. 1).
Objects, history, and stories are frequently associated with the museum. The existence of items, as well as the ideas they transmit, were critical for all participants expressing their views on the subject (Zbuchea, 2013, p.6). Many participants appreciated interactivity in a museum, even though they did not expect it (Zbuchea, 2013, p.7). The comfort and sense of discovery were valued by the participants: the ability to see the exhibits at their leisure - without being crowded by other visitors, the presence of interactive models illustrating phenomena, the ability to convey feelings and sensations rather than just information, and the ability to tell stories. They believed that an exhibition should allow visitors to find new things even after multiple visits (Zbuchea, 2013, p. 7). When visiting a museum, the majority of the participants say they strive to see the entire exhibit and read all of the labels. They also stated that they are engaged and participate in the museum's programmes: they request guided tours, use audio guides when accessible, and touch objects when permitted, among other things (Zbuchea, 2013, p.8).

Curiosity is one of the key motivations towards museums, according to Zbuchea (2013, p.9), both while planning to visit an exhibition and when actually visiting one. It's difficult to separate the objects from the story(s) that surround them. Participants enjoy interaction with items and discovering their stories, although they are open to different ways of telling them. According to their remarks on what they expect from a museum visit, participants place a high value on learning new facts. Even if they didn't expect it, participants applauded creativity and originality. The participants praised the interactivity, and feelings and experiences were remembered more vividly than knowledge gained.

Other References


Appendix B

Questionnaire/Survey

This survey about redesigning the online museum experience for Gen Z is being conducted by student researchers from Algonquin College’s Interdisciplinary Studies in Human-Centred Design program on behalf of Ingenium to understand what attracts or repels Gen Z to specific types of online content or platforms for enjoyment. This will help inform the development of online experiences that engage this audience.

You must live in Canada and be at least 18 years of age to participate in this survey.

A detailed version of the consent form is available here. By participating, you are indicating that you have understood the information as described, have been given an opportunity to ask questions, and that you are freely and voluntarily participating in this study.

Screening Questions

1. Are you between the ages of 18 to 24 (inclusive)?
   - [ ] Yes
   - [ ] No

2. Do you live in Canada, or have you ever lived in Canada?
   - [ ] Yes, currently
   - [ ] Yes, in the past
   - [ ] No

3. Do you use the internet regularly?
   - [ ] Yes
   - [ ] No

Participants will no longer be a part of the survey if the answer to Question 1. is ‘No’, Question 2. is ‘No’ or Question 3. is ‘No’.

“Thank you so much for participating in this survey but unfortunately, you do not meet the criteria to progress to the next steps. Thanks for your time and have a great day!”
4. What province do you currently live in?
   - Alberta
   - British Columbia
   - Manitoba
   - New Brunswick
   - Newfoundland and Labrador
   - Northwest Territories
   - Nova Scotia
   - Nunavut
   - Ontario
   - Prince Edward Island
   - Quebec
   - Saskatchewan
   - Yukon
   - I don’t currently reside in Canada
   - Prefer not to answer

5. What do you use the internet for? (Select all that apply)
   - For fun & enjoyment
   - For work
   - Communicating with friends & family
   - Other: Specify

6. What activities do you do for fun online?

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<th>A Few Times Per Week</th>
<th>Once Per Day</th>
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85
7. How do you usually prefer doing these online activities?

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<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other: Specify</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

8. How do you prefer to learn things online? (Select all that apply)
   - ☐ Watching videos
   - ☐ Listening to audio (podcasts etc.)
   - ☐ Reading articles/blogs
   - ☐ Watching presentations
   - ☐ Attending webinars
9. How important is it for you to have fun while learning new things?
   - □ Not at all important
   - □ Slightly important
   - □ Neutral
   - □ Important
   - □ Extremely important

10. In your opinion, how useful are the following (that apply) for learning new things:

<table>
<thead>
<tr>
<th></th>
<th>Very useful</th>
<th>Somewhat useful</th>
<th>Neutral</th>
<th>Not very useful</th>
<th>Useless</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Streaming</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Podcasts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Blogs/Articles</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Video Games</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Media</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

11. Do you use Social Media?
   - □ Yes
   - □ No

12. Thinking about the social media platforms you use, how often do you visit or use these? (Select all that apply)

<table>
<thead>
<tr>
<th></th>
<th>Do Not Use</th>
<th>Rarely</th>
<th>Weekly</th>
<th>Once Daily</th>
<th>Several Times A Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>TikTok</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instagram</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snapchat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twitter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13. Do you use Video Streaming services?
   - [ ] Yes
   - [ ] No

14. Thinking about the video streaming services you use, about how often do you visit or use these? (Select all that apply)

<table>
<thead>
<tr>
<th>Service</th>
<th>Do Not Use</th>
<th>Rarely</th>
<th>A Few Times Per Week</th>
<th>Once Daily</th>
<th>Several Times A Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netflix</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Prime Video</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Disney+</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>YouTube</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Hulu</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>CraveTV</td>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Twitch</td>
<td>[ ]</td>
<td>[ ]</td>
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<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>AppleTV</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Other: Specify</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

15. What type of content (that apply) do you like watching on the selected Video Streaming services?

88
<table>
<thead>
<tr>
<th>Category</th>
<th>Do Not Watch</th>
<th>A Few Times Per Year</th>
<th>A Few Times Per Month</th>
<th>A Few Times Per Week</th>
<th>Once Daily or More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sports Programming</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Network Drama &amp; Crime Shows</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Documentaries</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Talk Shows</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Comedy</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other: Specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. Do you play Video Games online?
☐ Yes  ☐ No

17. What kind of Video Games do you play online? (Select all that apply)
☐ Adventure  ☐ Horror  ☐ Platformer  ☐ Simulation  ☐ Strategy  ☐ Music  ☐ Sports  ☐ Board/Card  ☐ Mystery  ☐ Role Playing Games (RPG)  ☐ First-Person Shooter (FPS)  ☐ Puzzle  ☐ Fighting  ☐ Racing  ☐ Educational
18. Which platforms do you use for playing Video Games? (Select all that apply)
- PC/Desktop
- Mobile
- Console
- Other: Specify
- Prefer not to answer

Museum Specific

19. Do you enjoy going to museums?
- Yes, and I visit regularly
- Yes, but I don’t visit as often as I would like
- No, I don’t enjoy going to museums

20. Rank the three in order of your interest.

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>Not Interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture &amp; Food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aviation &amp; Space</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science &amp; Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21. How important is the role of museums in raising cultural awareness & historical knowledge according to you?
- Not at all important
- Slightly important
- Neutral
- Important
- Extremely important

22. Where do you go online for cultural & historical information? (Select all that apply)
- Youtube
- Wikipedia
- Museum Website
- Search Google
- Other: Specify

90
☐ I don't search for cultural & historical information online

23. When was the last time you visited a museum website?
   ☐ In the last month
   ☐ Over a month ago
   ☐ Over 6 months ago
   ☐ Over a year ago
   ☐ Never been to a museum website

24. What do you usually look for on a museum website? (Select all that apply)
   ☐ Check hours & timings
   ☐ Check what’s on exhibit
   ☐ Admission Fee/Tickets
   ☐ Learn new things
   ☐ Educational Programs
   ☐ Check for events
   ☐ Shop
   ☐ Donate
   ☐ Other: Specify

25. According to you, how important is it for museums to provide digital content (videos, games, podcasts etc.) on their website?
   ☐ Not at all important
   ☐ Slightly important
   ☐ Neutral
   ☐ Important
   ☐ Extremely important

26. What kind of museum content are you more likely to engage with online? (Select all that apply)

<table>
<thead>
<tr>
<th></th>
<th>Extremely Likely</th>
<th>Unlikely</th>
<th>Neutral</th>
<th>Likely</th>
<th>Extremely Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Videos</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Podcasts</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Articles/Blog Posts</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Video Games</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other: Specify</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
27. What would make museums’ digital content stand out from other digital content on the internet? (Select all that apply)
   □ Credibility
   □ Interactivity
   □ Accessibility
   □ Exclusivity
   □ Variety
   □ Fun
   □ Aesthetics
   □ Other: Specify

28. Would you be interested in participating in a 1-hour follow-up interview?
   □ Yes
   □ No

If you answered “Yes” to the previous question, please provide your full name and email address. We will only contact you should you choose to participate in the follow-up interview.

First Name

Last Name

Email

Many thanks for taking the time to answer our questionnaire. Your information will help us design digital content for the museum that Generation Z would like to interact and engage with. Have an amazing day!

Link to Questionnaire
Hi, thank you for agreeing to take part in this interview today. My name is ________________ and I am a User Experience Researcher from Algonquin College’s HCD program. We’re conducting this research to examine motivations and barriers to interacting with museums’ online content and consuming digital content on the internet. Understanding what attracts or repels Gen Z to specific types of online content or platforms for enjoyment will help us inform the development of online experiences that engage Gen Z with the physical and informational artifacts of the museums. I will ask you questions but mostly listen to your responses. At times it may seem like you are giving mundane details, but I want to assure you it will be interesting and useful for us. There are no right or wrong answers and you always have the option not to answer a question. Because your feedback is extremely important, there are two other researchers from Algonquin College’s HCD program here with us taking notes as we go along to help us analyze the data later. You are one of several people providing feedback. Your name will not be associated with the feedback that I ultimately provide to our client, Ingenium. To help with data collection, I will be recording these sessions to analyze later. Do I have your consent to record our session today? The interview is scheduled for 60 minutes. Is that still okay with your schedule? Any questions before we get started?

Warm-up

1. What country do you call home?
2. (For anyone currently outside of Canada:)
3. When were you in Canada and for how long?
4. What do you like about living in Canada?
5. Have you heard of any of the 3 museums: Canada Agriculture and Food Museum, Canadian Aviation and Space Museum, and Canadian Science and Technology Museum?
6. What are some of your hobbies? How do you express yourself creatively?

Museum-specific

1. You said, ‘You enjoy going to the museum but don’t visit as often as you would like’. Why is that? or 
You said, ‘You don’t enjoy going to the museum’. Why is that? or 
You said, ‘You enjoy going to the museum and visiting regularly’. What attracts you to museums?
2. Tell me about your most memorable museum visit. 
   a. What did you like about the museum?
   b. Any particular exhibits? What type of museum(s) do you prefer?
   c. Can you share your experience? (Actions, thoughts, feelings, mindsets)
3. Have you had any less positive experiences at museums?
   a. If so, please explain or describe your experience.
Online behaviours

Social Media
1. You mentioned you use ‘XYZ’ social media platforms in the questionnaire. Why do you use it?
   a. What do you like and dislike about these platforms?
   b. What feature(s) do you use the most on these platforms?

Video Streaming
1. You mentioned you use ‘XYZ’ video streaming services in the questionnaire. Why are you drawn to the ‘XYZ’ video streaming services the most?
   a. What do you like and dislike about these video streaming services?
   b. What feature(s) do you use the most on these services?

Video Games
1. You mentioned you like to play ‘XYZ’ games in the questionnaire. Why do you play these over others?
   a. Do you play multiplayer or individual games?
   b. What do you like and dislike about these video games?
   c. You mentioned you play games on ‘XYZ’ platforms in the questionnaire, why is it that you prefer these platforms over the others?

Try it out virtually

Click on the link that I have shared with you in the Zoom chatbox. Please share your screen and think aloud as you explore the collection and research section for about 2 minutes.

1. Link: https://ingeniumcanada.org/collection-research/collection-highlights
   a. How was your overall experience using that digital catalogue?
      i. What did you like/dislike about the same?
   b. What value do you see in using a museum digital catalogue?

2. Link: https://artsandculture.google.com/experiment/play-a-kandinsky/sgF5ivv105ukhA
   a. How was your overall experience going through this virtual exhibition?
      i. What did you like/dislike about it?
   b. What value do you see in visiting a virtual museum exhibition?

3. Link: https://www.rijksmuseum.nl/en/masterpieces-up-close
   a. How was your overall experience playing that game?
      i. What did you like/dislike about the same?
Online artifact sharing

1. If you wanted to attract people from your generation to an online museum-digital experience, what three things would you suggest?
   a. What would be your preferred formats of an online museum experience that would capture your interest?
   b. If you experienced that delivery, how would you tell others about it?
2. How might Ingenium keep online content updated to your needs and wants?

Wrap-up

1. Do you have any additional comments before we end this interview?
Thank you so much for your time and input! I hope that your information, together with all our research will eventually lead to exciting new ways for you to have a fantastic online museum experience.
Appendix C

Subject Matter Expert Interviews (Transcription Notes)
Nepean Museum:
promoting awareness,
audience development. GEN Z
exhibition development and collection management,
Catherine Emont

Catherine found her passion for educating in museum settings. She works at the Canada Science and Technology Museum as part of the Visitor Experience team. She enjoys testing and creating ingenious activities for Explorables, the museum’s maker studio, where she invites people to try a variety of tinkering challenges. She’s inspired by visitors’ creations and loves coming up with new Science, Technology, Engineering, Arts, and Math (STEAM) projects to try out.

Ellen Morrison

Ellen is the Science Communication and Engagement Officer at the Canada Science and Technology Museum, and a member of the Ontario College of Teachers. With a background in science and a master’s degree in Education, she is experienced in developing and delivering educational science programming for diverse audiences. Ellen is passionate about informal and accessible learning; she loves guiding participants in their personal journey towards a broader understanding of the scientific world around us.

Founded by Canadian musician David Ullyot, Reimagine AI’s work is a mix of art and science — with a goal to spark the audience’s imagination, understanding, and interest in artificial intelligence. The museum is using the partnership with Reimagine AI to gauge visitor interest and plan for additional AI-related content in the museum.

“...The students are studying digital literacy, and will be considering potential applications for a technology like Ophelia,” says Morrison. For example, they’ll be discussing how an AI technology might fit into classrooms in the future.”

Until March 31, 2020, visitors to the Canada Science and Technology Museum can chat with Ophelia daily from 10 – 11 a.m. and from 1:30 – 2:30 p.m., in the museum hub.

Observations

David Pantalony
Curator at Ingenium: Canada’s Museums of Science and Innovation

Neuropsych and history of science
Appendix D

User Interview (Transcription Notes)

User 1 – ID #19
User 3 – ID #20

**Observations**

- Lives in Canada, calls it home
- Has two older sisters available to help with the baby
- Likes to help others
- Works with one engineer, responsible for flight simulator
- Summer job, applied to CASM & CSTM

- Between battle & CSTM, CSTM is more interactive
- Recommend a lot of TV & YouTube, calming player
- Likes to do nail art to express creativity
- Likes watching contemporary Chinese TV shows

- Last year, on vacation
- Likes to do research on music
- Likes to communicate with friends, shopping, news, Facebook similar to it
- Likes to communicate with friends, shopping, news, Facebook similar to it
- Likes to communicate with friends, shopping, news, Facebook similar to it

- Likes to communicate with friends, shopping, news, Facebook similar to it
- Likes to communicate with friends, shopping, news, Facebook similar to it
- Likes to communicate with friends, shopping, news, Facebook similar to it

- Plays both multiplayer and individual
- Mostly uses console for gaming
- Plays as many games as possible
- Plays as many games as possible
- Plays as many games as possible

- Videos explaining things could be helpful
- For research, needs to read, but wants more help to pass time
- Likes to watch, might want a help text on it
- Likes to watch, might want a help text on it

- Likes to watch, might want a help text on it
- Likes to watch, might want a help text on it

- Like that there is a voice & can follow along the reading
- Simple & effective, explanation clear & keeps attention on everything attractive
- Simple & effective, explanation clear & keeps attention on everything attractive

- Originally, the descriptions were uninteresting, but to ask for help to understand

- Original description: "In the beginning, the project was to make a list of all the books that are available in the library."

- Original description: "In the beginning, the project was to make a list of all the books that are available in the library."

- Yet, others also think about a description of a project or a concept, as well as understanding a concept

**1 key quote per post-it**

- "Don't have a lot of time to go to museum" "If feels like I have a point to play, I have context" "I was cool! I liked the experientor" "Understanding text, not really understanding the meaning" "Tell others about it, can't admit to understanding a concept"
Appendix E

Empathy Map (Direct Notes)

Empathy Map (Synthesized)
Iceberg Model

User Persona

Every interesting experience at a museum has been something to do with interactivity. It either be bold or eclectic, never regular.

About
Jasmine, Born in Kenya, loves creating content for her graffiti art and charcoal sketches and posting them on Instagram, TikTok, and YouTube. She recently graduated with a Bachelor’s degree in 3D computer animation from Emily Carr University of Art & Design. She hopes to use her urban art to help raise awareness of climate change issues to people’s everyday lives.

Characteristics/Interests
- Content Creator
- Skateboarding
- Bachelor in 3D Computer Animation
- Graffiti Artist
- Climate Change Activist

Pain Points
- Not feeling connected to exhibitions
- Cost barrier to access
- Content that is not visually attractive
- Flat and boring displays with no interaction
- Not getting inspiration when visiting the museums

Needs
- Visually appealing exhibitions
- Exhibitions she can interact with
- See herself represented in museum exhibition displays
- Activities she can experience with friends
- Try new things/ have new views
- Diversity/ Inclusion
- Express herself

Jasmine Carson
In: British Columbia
Brands
Instagram, TikTok, Blendm, Mike
Tech Literacy
High (Bik I-Book 2)
Journey Map

Concept Storyboard
Validation Feedback (Subject Matter Experts)

Validation Feedback (Users)

111
Tell a story is confirmed
Want to know what the long-term engagement is - progressive challenge

The initial draw
RPG: is the interactive game itself
- Levels of the game and new adventures
Trading Cards: is going after people/groups who are already interested in the subject (collection)
- Have hook stories, strong visualizations that relate the object to something familiar to

Challenges/Drawbacks
RPG
- How to make it simple to get involved at the beginning
- Keeping Ingenium staffing involvement to minimum
Trading Cards
- Need interest in the subject in the 1st place

Monetization is possible
- older opinions want to pay for the initial set-up and all-inclusive
- Gen Z - get into it for free and then more willing to pay for upgrades, powers, avatar development, new episodes may involve new