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Opening Doors to History: Improving the Self-Guided Tour Experience at the Grabser Mühlbach

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OPENING DOORS TO HISTORY

Improving the Self-Guided Tour Experience at the
Grabser Mühlbach

Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, Christopher Nelson

Zürich Project Center
11 October 2018

Advisors
Professor John Orr and Professor Dirk Albrecht

IMPROVING THE SELF-GUIDED TOUR EXPERIENCE AT THE GRABSER MÜHLBACH

An Interactive Qualifying Project: Submitted to the Faculty of WORCESTER POLYTECHNIC INSTITUTE in partial fulfillment of the requirements for the Degree of Bachelor of Science

by
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Date:

11 October 2018

Report Submitted to:

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ABSTRACT

The history and community of Grabs, Switzerland were largely shaped by the millstream that flows through the small town. The Grabser Mühlbach association has strived to preserve the historical and communal significance of the mills through its museum. The self-guided tour of the privately owned mills could be improved to provide more access of information for visitors. The project investigated and developed features, such as interactive maps, links to videos of the mill interiors and personal stories of the mills, and a model website with an easily usable layout, that could enhance information accessibility. These deliverables and more, recorded in the form of a manual, will help the Grabser Mühlbach association share history with future generations.

AUTHORSHIP

Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, and Christopher Nelson all contributed to the research, writing, and revision of this document. This table outlines each group member's contributions to the project. Primary writers and editors are listed for the report and for the creation of the deliverables.

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Self-Guided Tour Manual	Andrew	Jennifer, Isabella
Increasing Audience Manual	Andrew, Christopher	Jennifer, Andrew, Isabella

From left to right: Andrew, Jennifer, Isabella, and Christopher

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EXECUTIVE SUMMARY

The people of Grabs, Switzerland have a strong connection to their community, one shaped by the millstream that has run through the small town for hundreds of years (Grabser Mühlbach 2018). This millstream – the Grabser Mühlbach—powers a series of privately owned mills that brought the community together through the impact that the mills had on the industry of the region. These mills, some of which are still functioning today, encompass a large variety of trades. The mills include blacksmith shops, corn mills, washing houses, sawmills, and many others. These sites provided many services for people in the surrounding regions, bringing people to the industrially thriving town of Grabs.

Over time, the importance of the industry that the mills brought to Grabs diminished, but the significance of the mills and the impact that they had on the community is still valued. A collection of people who care about preserving the history of Grabs came together in 2008 and formed the Grabser Mühlbach association. For the past ten years, the Grabser Mühlbach association has been renovating the mills along the Grabser Mühlbach, creating educational programs relating to the mills, and preserving the history of the area. Thus, the Grabser Mühlbach has been turned into an outdoor museum available to visitors. The association has worked to provide much historical context to the museum, offering private tours of various sites that include thorough demonstrations and informational displays along with in-depth descriptions of each mill's history (Figure 1).

Currently, visitors only have the opportunity to get an inside look at the mills and their operations during guided tours or special events. For those who do not go on a private tour, self-guided tours consist of information situated on informational plaques, brochures, and directional signs that people follow through the outdoor portion of the museum. The historical and communal context of both the Grabser Mühlbach and Grabs itself should be conveyed with every visit to the museum, and not solely on

Figure 1. A Grabser Mühlbach demonstrator showing visitors the Messerschmiede Roth mill operating during the 2018 Mill Day (Grabser Mühlbach, 2018)

guided tours. Incorporating aspects of the guided tour into the self-guided tour would improve the visitor experience for those who do not have the opportunity to experience a guided tour.

The goal of this project was to improve the self-guided tour experience, thereby conveying the impact of community at the Grabser Mühlbach. This has been accomplished by completing the following actions:

1. Improving the framework for self-guided tours at the Grabser Mühlbach
2. Improving visitor access to a broad range of information
3. Creating a model website with improved usability and aesthetic appeal for the Grabser Mühlbach
4. Making recommendations for future technological additions to further improve the visitor experience at the Grabser Mühlbach
5. Documenting all methods of improvement for use as a basis for future advancements by the Grabser Mühlbach association

These objectives were shaped by first hand experiences that the team had at the project site. These experiences included a self-guided tour conducted by the project team themselves, a guided tour presented by the Grabser Mühlbach association, an in-depth demonstration of one of the mills, and various other visits to the museum. During the first self-guided tour, there was some confusion regarding the location of the trail's starting point, brochures were somewhat difficult to locate, walking along the trail felt intrusive onto private property, and following the trail was difficult at some points due to limited signs. Due to the winding roads of Grabs, visitors, especially those not from the area, can become confused quickly. The language barrier between the project team and the German information also contributed to the project team's confusion during the self-guided tour (Figure 2).

Figure 2. A map and information about the Grabser Mühlbach at the first mill site along the tour, with text in German

The guided tour provided vast amounts of historical knowledge and information about the mills, including in-depth demonstrations and personal anecdotes. Having a guide eliminated the worry of following hidden trail signs and relieved the tension of intruding on the neighborhoods. The need for improvements to the self-guided tour was reinforced after the guided tour experience. Comparing the two tour experiences side by side revealed that specific parts of the self-guided tour should be modified to better encompass the information received during a guided tour. After these tours, the project team presented their ideas to enhance the self-guided tour to members of the Grabser Mühlbach association. After the members of the association at the meeting discussed the ideas with the entire organization, they provided the project team with feedback on what they would like to see implemented at the Grabser Mühlbach.

After creating a list of recommendations, the team asked other WPI students to come test out the self-guided tour at the Grabser Mühlbach with the additions made by the team. Teams scanned a QR code to access the digital version of the map for the site, followed the new trail using GPS on their phones, and visited a new combination of mills. The project team observed the visitors and took note of the ease of navigation with the digital map, the information that visitors were interested in accessing, and the locations at which they were confused when following Grabser Mühlbach signs. The project team was able to make adjustments and improvements to the recommendations after the feedback from the visitors was collected. The visits to the site increased understanding of the impact of the project, and the potential integration of the recommendations to the current museum proceedings.

The team responded to the common confusion caused by the organization of the website and created a model website to show the Grabser Mühlbach association how their current website could be organized differently and what features could be added. The information from the current Grabser Mühlbach website was moved to the model website, and was organized in a way that is more accessible for those unfamiliar with the site.

Based on the conclusions drawn from the experiences of the project team, it was determined that the following be delivered or recommended:

1. The digital maps created by the IQP team should be integrated into the museum platform. The Grabser Mühlbach association can also choose to make their own maps based on the methods documented in the manual.
2. The model website created by the IQP team should be referenced to improve the current Grabser Mühlbach website, or utilized fully as a new website for the association.
3. The creation of a central starting point is recommended, giving visitors better access to information and a better welcome to the Grabser Mühlbach.

Executive Summary

4. The number of directional signs along the trails of the mühlbach is recommended to be increased to help with navigation around the area.
5. The implementation of QR codes onto plaques should be carried out, so that visitors can follow pathways and access information about each site.
6. The addition of 360-degree photos into self-guided tours, so that visitors can be provided with interactive and informative visuals.
7. The utilization of drones to capture aerial photos and videos for promotional and educational purposes is encouraged, to provide visitors with supplemental visuals of the Grabser Mühlbach
8. The incorporation of augmented and virtual reality technology into educational programs is recommended, and the exploration of a concept for implementation is suggested to be included into the visitor experience.
9. The addition of community events at the Grabser Mühlbach is recommended, to allow more people to experience the Grabser Mühlbach.

All deliverables and recommendations are documented in a manual for the Grabser Mühlbach association, which is included in Appendix D. This manual may be referenced for the utilization and implementation of any deliverables and recommendations. These suggestions can help the Grabser Mühlbach association enhance the visitor experience at the museum and achieve the association's goal of sharing the history and importance of Grabs with the world.

INTRODUCTION

A sense of community is a valuable aspect of any area. It offers a feeling of belonging to something that has meaning to yourself, as well as to the people who surround you every day. Community thrives in the lives of the people of Grabs, Switzerland. An organization of individuals in Grabs looks to share the impact of this sense of community with the rest of the world by providing people with a place to experience history.

The Grabser Mühlbach, translating literally to "Grabs' millstream," represents a series of privately owned mills dating back to the 17th century (Grabser Mühlbach, 2018). The man-made millstream that runs through and around the small town of Grabs is an important part of the locality (Figure 3). Dating back hundreds of years, the Grabser Mühlbach was a paramount location to the region, being the hub of industry for the surrounding communities. The large assortment of mills including blacksmith shops, corn mills, washing houses, sawmills, and many other sites brought people to the industrially thriving town of Grabs. When Swiss Federal Railway construction made its way to the canton of St. Gallen, Grabs chose to defer the interference of the railway through their town to the neighboring town of Buchs, and as a result the millstream town lost its status as the industrial center of the region (B. Dudli, personal communication, August 30, 2018). In 2008, the Grabser Mühlbach association was formed by community members and others who care about the mills, acting with the purpose of providing a spot to convey the valuable role that mills played to both Grabs and surrounding regions.

Figure 3. The Grabser Mühlbach running through the town of Grabs, Switzerland

Introduction

For the past ten years, the Grabser Mühlbach association has been renovating the mills along the Grabser Mühlbach, creating educational programs relating to the mills, and preserving the history of the area, thereby turning the Grabser Mühlbach into an outdoor museum. The group began to make the current seventeen sites along the 1.7-kilometer-long millstream available to visitors (Grabser Mühlbach, 2018). The association has worked to provide much historical context to the museum, offering private tours of various sites that include thorough demonstrations and informational displays along with in-depth descriptions of each mill's history. Additionally, special educational demonstrations are offered to school groups, as the association is interested in getting the youth in the community involved in the history of Grabs. For those who are not on a private tour or part of a school group, informational plaques are available on each important building.

Currently, visitors only have the opportunity to get an inside look at the mills and view the mills running during guided tours or special events. The Grabser Mühlbach association has worked to provide as much information as possible about the site in replacement of guided tours, but the information that is accessible during self-guided tours is limited in comparison to the guided tours. The Grabser Mühlbach is available for self-guided tours 365 days a year, but since all of the mills are privately owned and some are private residences, visitors can only enter the buildings when accompanied by Grabser Mühlbach personnel. During guided tours, the Grabser Mühlbach personnel provide visitors with demonstrations of working mills and stories from the prosperous days of the mills, thereby conveying the historical and communal context that is a rich part of Grabs itself. Self-guided tours are comprised of directional signage, a plaque on each important building, and brochures that are distributed from a few locations. Though there is information provided to those who choose to go on a self-guided tour, there is opportunity for improving the delivery of this information. Incorporating aspects of the guided tour into the self-guided tour would improve the visitor experience for those who do not have the opportunity to experience a guided tour.

Dr. Stefan Bertsch from the Interstaatliche Hochschule für Technik Buchs (NTB) is involved in the Grabser Mühlbach organization and has recognized the opportunity to sponsor improvements at the Grabser Mühlbach. With oversight from both Dr. Bertsch and the Grabser Mühlbach association, the need for a project at the Grabser Mühlbach has been made evident. While the Grabser Mühlbach association has made many improvements, ideas can be further developed and implemented. Both Dr. Bertsch and the association agree that in order for improvements to be made, it would be helpful for the museum to be observed from a new perspective. This provided motivation for improvements at the Grabser Mühlbach to be made with the perspective of the WPI students working on this project.

Introduction

GOAL

The goal of this project is to improve the self-guided tour experience, thereby conveying the impact of community at the Grabser Mühlbach. This will be accomplished by completing the following actions:

1. Improving the framework for self-guided tours at the Grabser Mühlbach
2. Improving visitor access to a broad range of information
3. Creating a model website with improved usability and aesthetic appeal for the Grabser Mühlbach
4. Making recommendations for future technological additions to further improve the visitor experience at the Grabser Mühlbach
5. Documenting all methods of improvement for use as a basis for future advancements by the Grabser Mühlbach association

Providing the Grabser Mühlbach association with many options for improvements will allow them to choose which ideas they would like to further implement. The community impact on Grabs will be conveyed by visitors having a chance to experience the sense of community on self-guided tours as well as guided tours, and to understand why the Grabser Mühlbach has been at the heart of Grabs for centuries. Through the potential implementation of the actions listed above, Grabs' robust sense of community will be shared with the world in the best possible light and will give opportunity for both its compelling history and community to be passed down through the coming generations.

BACKGROUND

This chapter introduces several topics relating to the presentation of museums to engage audiences, and work with available resources to efficiently showcase information. It discusses millstreams and Swiss culture, and draws connections to how these factors will influence the presentation of the museum at the Grabser Mühlbach.

MILLSTREAMS—HISTORY OF WATERPOWER

Before coal and electricity were used to power industrial machines, rivers and streams provided much of the needed natural energy. Being crucial to the development of societies for centuries, villages and towns began to form along these waterways. The town of Grabs, Switzerland follows this theme, sitting along a manmade millstream. The many mills scattered throughout the town operate with the water power that this millstream has historically provided, contributing to the industrial development of the town.

Dating back to ancient times, water power has been a key source of energy in society. By the second century BC, vertical-wheeled mills were being used in parts of the Mediterranean region, such as in Alexandria (Donners, Waelkens, & Deckers, 2002). Harnessing the energy from naturally flowing water has helped communities carry out tasks more efficiently and at a quicker pace. In ancient times the use of water power was limited, only really being used for simpler tasks such as "irrigation and the grinding of grains for bread" (National Park Service [NPS], 2015). Though as time progressed, the processes of "sawing timber, fulling cloth…, and making iron products" (NPS, 2015) have been improved through the use of machinery as water became a source of power, especially during the Industrial Revolution. Across the globe, water power was able to propel the industrial business towards a more modern outlook (Gordon, 1985).

Figure 4. The Messerschmiede Roth mill at the Grabser Mühlbach in Grabs, Switzerland (Grabser Mühlbach, 2013)

Mills powered by water (Figure 4) operate their necessary tasks using the energy created from the turning of waterwheels. There is an abundance of machinery within mills that are able to operate due to the flowing water that turn these wheels, their power ranging from 0.75 to 75 kW (Müller & Kauppert, 2010). The physics behind the waterwheel is extensive, but the main principles lie in

the head differences and flow rates of water into the different types of waterwheels- overshot waterwheels where water enters the wheel from above, breast wheels where water enters approximately at the wheel's axis, and undershot/zuppinger wheels where water enters the wheel below its axis (Müller & Kauppert, 2010). Each of these waterwheel varieties function at varying head differences, the height at which the water will fall, with an overshot wheel's head ranging anywhere from 2.5 to 10 meters and an undershot wheel's head ranging anywhere from 0.5 to 2.5 meters. They also function at varying flow rates, the amount of water that the water power system will use, with breast wheels having flow rates of 0.5-0.95 m^3/s per meter width whereas overshot wheels will have flow rates of 0.1-0.2 m^3/s per meter width (Müller & Kauppert, 2010). Both of these components- head difference and flow rate- contribute to the power output and efficiency of the waterwheel and allow for the generation of power to run the machinery that mills use, whether it be the production of textiles, the cutting of lumber, the carding of wool, or a variety of other tasks.

Water power was taken a step further in the early 20th century with the introduction of high-speed turbines that power generators, thus creating hydroelectric power (Müller & Kauppert, 2010). The harnessing of water power to use for electricity would forever change the industrial world, as well as any functioning mills in both rural and urban settings.

Hydropower is a prominent energy source in Switzerland. Due to the nation's high peaks, low valleys, and large amounts of precipitation, Switzerland has the ideal geography and resources for a highly efficient water power industry (Swiss Federal Office of Energy, 2017). At the project site in Grabs, a rural town situated in the shadow of the Alps, the Grabser Mühlbach's mills have run on the power of water since the 17th century. Since 1927, the mills in Grabs have been using water to generate electricity to run various functions (Grabser Mühlbach, 2018). Industry has moved towards other sources of energy, and some of the mills at the Grabser Mühlbach run on generators. However, the Grabser Mühlbach still relies on the water power from the millstream that runs through the town, and several of the mills are able to function solely due to hydropower.

CURRENT APPROACHES TO MUSEUM PRESENTATIONS

The core concept of museums, preserving historic and cultural information, has influenced many different types of museums. Each museum organization works to best communicate the information of the museum given a particular environment. With these constraints have also come strategies of how to show history and art in a new light. All across the globe, museum owners and developers have been working to achieve the best possible outlet to showcase these histories and galleries to the public.

OUTDOOR MUSEUMS

Open-air museums, or outdoor museums (Figure 5), are museums that present historic outdoor sites and give visitors encounters similar to those that would be experienced in past time periods that the museums are set in. Outdoor museums can be used to effectively portray what life used to look like in different societies. They allow visitors to escape their twenty-first century lifestyles and to experience history in a hands-on, unconfined fashion (Castaneda, 2003). While traditional museums do well with providing the public with a vast amount of knowledge, open-air museums are capable of giving visitors a chance to step back in history and have a unique and interactive experience with both history and culture—concepts that can be difficult to understand. This is especially important to the young museum audience. Outdoor museums allow children, and interested parties of all ages, to personally experience historical differences based on time periods that they may not be able to grasp if the concept were only explained to them in the abstract (Castaneda, 2003).

Figure 5. Visitors walking around an outdoor museum in Skansen, Stockholm Sweden (*Houses at the outdoor museum Skansen in Stockholm in 1960*, 1960)

When the first outdoor museums were formed in Norway and Sweden around the year 1900 (Jakobsen & Barrow, 2015 p.6), experts understood that this interactive presentation was much more engaging for people than static exhibits. Experiencing history in person entices people to visit and learn, often through participation rather than simply looking at historic artifacts in a display case (Jakobsen & Barrow, 2015 p.6).

Other institutions quickly followed suit. In the United States, Colonial Williamsburg set a precedent of high standards for historical recreation and preservation (Jakobsen & Barrow, 2015, p.18). Employees dressed, acted, and spoke the part of their historical time period. Museum designers worked hard to make the activities interesting and historically accurate.

While in Europe it was frowned upon for the staff to wear historical clothing, in the U.S. it became almost required for any respected historical outdoor museum to play the part of the time period in full (Jakobsen & Barrow, 2015, p.17-18). In Massachusetts' Old Sturbridge Village, another outdoor museum, a village from the 19th century was recreated with the

intent to show how people lived during that time. Many museums around the time of Old Sturbridge Village's creation realized that historical outdoor museums needed to become more interactive and interesting, or they would risk losing their patrons to theme parks like Walt Disney World (Jakobsen & Barrow, 2015, p.17-18).

Historical outdoor museums have a certain appeal. To leave the busy life of modern society and to enter a completely different century intrigues visitors as it is an experience largely unfamiliar to them. People may be travelling through an area and come across a historic site and explore it, simply due to their curiosity of what it may contain. The aforementioned Old Sturbridge Village in Sturbridge, Massachusetts has put interaction first and foremost. At the outdoor museum, visitors interact with costumed interpreters who demonstrate what life was like in the 1830s. Visitors are encouraged to ask questions, to explore the village, and to take part in as many hands-on demonstrations as possible (E. Dunnack, personal communication, April 7, 2018). Even something as simple as smelling farm animals while walking down a dirt road and seeing people dressed up in 1830s clothing evokes a feeling of being thrown back in time. Emily Dunnack, the Director of Education at Old Sturbridge Village, emphasized the importance of hands-on activities and demonstrations (E. Dunnack, personal communication, April 7, 2018). Outdoor museums provide educational opportunities for visitors to experience history for themselves and to enrich their experience with interactions with their surroundings whenever possible (E. Dunnack, personal communication, April 7, 2018).

An important aspect of outdoor museums like Old Sturbridge Village is that they also appeal to a wide range of visitors. This means that educators and historians need to be able to communicate not only with other historians, but also with the layperson (Becker & George, 2012). This gives museums an opportunity to express their information in different styles to appeal to a variety of interest levels, but this also presents the challenge of reaching as many levels as possible.

In Seattle, Washington, this challenge was partially addressed by including museum goers in the decision-making process for exhibits. Seattle community members were asked about their interests for community projects, allowing the projects to be geared toward locals, garnering support for the projects (Gray, Waentig & Yampolsky, 2012). Additionally, the interviews touched upon the importance of making the projects last. If a lot of money is spent on something that only interests people for a few months, it is not worth the effort or money to create (Gray, Waentig & Yampolsky, 2012). By reaching out to community members or the museum audience, educators and museums can determine the best and most effective ways to present information to their audiences.

In Switzerland, the outdoor museum of Ballenberg is home to preserved old farmhouses and rural buildings. Farmhouses in Switzerland that are found to be of educational value are

Background

relocated to this museum and are available for viewing by the public and for academic research purposes. The organization at Ballenberg works closely with the various cantons' own historic building services to create a centralized location for the buildings to be viewed (Ballenberg Swiss Open-Air Museum, 2018). The Ballenberg is home to the Swiss farmhouse research archive and several research projects, including one regarding a participative museum audience (Ballenberg Swiss Open-Air Museum, 2018). This museum is important because it collects items related to farming from before the 1950s and uses them to furnish the buildings to increase their authenticity, creating a place where visitors can appreciate the history of Switzerland's architecture and see how living conditions have changed throughout the years (Ballenberg Swiss Open-Air Museum, 2018).

The Swiss are appreciative of the history the Ballenberg museum preserves. Their love of heritage and culture is demonstrated in the large number of visitors to the Ballenberg outdoor museum each year (Latter, 1999). Nestled in a valley between snow-capped mountains, the Ballenberg museum previously provided refuge from foreign armies and now provides the Swiss refuge from their busy, urban lives (Latter, 1999). The Grabser Mühlbach is similar in this sense, as the once industrial center of the region, Grabs now hosts a museum in its small town that looks to intrigue visitors with its interesting history.

SCIENCE/INDUSTRIAL MUSEUMS

Industrial museums and science museums play an equally important role in the education of both younger and older generations. The Grabser Mühlbach museum focuses on the industrial and scientific aspects of the mills during both guided and self-guided tours. Learning about these topics at the museum is interesting because many of the mills still run, so visitors can view the scientific aspects of the mills, while also learning about Grabs' industrial importance in the region.

Figure 6. Visitors interacting with exhibits at the Museum of Science in Boston, Massachusetts (Daderot, 2010)

The visiting experience at both science and industrial museums is important, with visitors at science museums having the chance to learn about contemporary science and technology (Figure 6), while the visitors at industrial museums get to look back on industry and are able to see the progress society has made and the progress that can still be made (Cutcliffe & Lubar,

Background

2000). As we become more separated from manufacturing, it is valuable to have industrial museums to remind us of our progress and its costs, and to have science museums to teach us and let us question future technology (Cutcliffe & Lubar, 2000).

There is another museum in Switzerland that engages its audience in a cultural and historical museum setting much like Ballenberg and the Grabser Mühlbach. The Basel Paper Mill has exhibits relating to paper production, writing, and printing. The museum is housed in the original mill building, and visitors get to explore the structure while they learn about aspects of the paper making process. The museum encourages patrons to "try their hand at craftsmanship and experience a visit for all the senses" (Basler Papiermühle, 2018). There are many interactive workshops to complement the historical exhibits in the museum. Many employees are utilized in order to make the activities more accessible to people by helping with any issues and providing more information to guests. Workshops are offered at different times throughout the week, and the museum includes the cost to attend these workshops in the price of a ticket, making it more likely that people will attend as they have already paid for the experience. Additionally, the mill produces paper for use, allowing people to purchase the mill's own products and to further connect with the rich history of the museum (Basler Papiermühle, 2018). Museums such as the Basel Paper Mill and the Ballenberg in Switzerland and around the world work to engage their visitors and show them how an educational experience can also be an exciting and worthwhile experience.

SWISS CULTURE

Switzerland's people are proud of their culture, and many organizations work to preserve history. These organizations must make important decisions about how best to preserve history, and pass along the information to future generations. The decision-making process in Switzerland is lengthy, but thorough. It is very common for the Swiss to thoroughly discuss and challenge ideas in a group environment before making any changes. Through this collaboration, they generally get the best outcomes to put into action, thereby preserving history in the best way possible.

Swiss people's pride for their culture often stems from a long lineage of Swiss families passing down history and customs. Some of the residents of the Grabser Mühlbach area have been living in their homes for over 80 years, and one mill still develops products (S. Bertsch, personal communication, March 28, 2018). The citizens of Grabs are proud of their heritage. This is similar to many other societies around the world where people have long lived in the same community or residence, a sense of pride for their community is almost innately developed. It is important to preserve the culture of societies so that future generations can appreciate the environment in which they reside.

Background

On the Saturday following the Christian Day of Ascension, every year the Swiss Association of the Friends of the Mills (ASAM) encourages mills across Switzerland to open their doors to the public. Known as the Swiss Day of the Mill, or Mill Day, over 25,000 people visit mills across the country and partake in activities, demonstrations, and much more (B. Dudli, personal communication, August 30, 2018). The Grabser Mühlbach is involved in Mill Day, as the Grabser Mühlbach association strives to preserve its culture. Every other year, the association hosts Mill Day, where people of all ages are invited to experience the history and community of Grabs. The privately owned mills are open to the public, and demonstrations occur all day. There is live music, food, and carriage rides (S. Bertsch, personal communication, March 28, 2018). These events are meant to bring people together and transport them to the vibrant history of Grabs, when the town's mills marked the industrial center of the region. The association's hard work allows everyone to have access to a wealth of information, and have a unique experience to step back in time during Mill Day.

One particular aspect of Swiss culture that needs to be recognized when working in Switzerland is that many Swiss people prefer to work in organizations as opposed to working as an individual (S. Bertsch, personal communication, March 28, 2018). This allows them to contribute to the group as a whole instead of claiming individual responsibility and asking for personal recognition. Additionally, they do not have to assume personal financial responsibility for monetary endeavors, which allows them to work with their organization and get the most favorable and beneficial deal. The Swiss are proud of their dedication to their country and to their collective culture (Steinberg, 2015).

The Swiss, like many other cultures around the world, are cautious about change. However, when presented with a good idea, the Swiss are able to objectively think about the impacts of the outcomes and accept an idea with enthusiasm if it will be beneficial (Steinberg, 2015). This being said, the people of Grabs should be open to different methods of engaging the audience of the Grabser Mühlbach and to new ideas of attracting a wider audience to the museum.

ENGAGING THE MUSEUM AUDIENCE

Museums must work to engage their audiences. Without interested visitors, museums will not have patrons that want to come back and the museum will not be successful. There are several ways in which museums try to engage an audience, including having an accessible museum, offering tours, implementing technology, and working to increase audience retention through a variety of methods.

ACCESSIBILITY

The Grabser Mühlbach is home to a number of mills that are privately owned. While these buildings have historic significance, some are private homes and all are privately owned. This poses an issue of accessibility for those wishing to visit the mills and gather information on how they functioned historically, both industrially and societally. Many mills are accessible during private tours and on Mill Day, but they are not open to people on self-guided tours (K. Gähwiler, personal communication, August 30, 2018). Due to the privacy restrictions that the Grabser Mühlbach faces, there is a hindrance on the visitor experience as a whole. Without seeing the inside of these historical buildings, the overall level of engagement at the museum is lowered. In order to combat this issue of accessibility, alternatives should be set in place in order to get the most out of a visit to the Grabser Mühlbach.

Accessibility is vital to attracting potential visitors to a museum; if a visitor cannot easily determine the hours of operation from the museum's website, it is unlikely that the person will visit. "Visitors want their visits to be a seamless experience, which means that difficulty in using the website or understanding the way a gallery is organized can be disappointing but giving them a better experience increases visits and lifts income" (Murphy, 2016). Small changes, like keeping the times and dates of events, operating hours, and an easily available map on a museum's website can make just as big of a difference as making the museum flow in a reasonable order or having places for people to pause while exploring the museum. Continuously considering the museum audience when designing exhibits will ensure that the museum is accessible to its audience (Smeltzer, 2014).

When designing museum exhibits and connected technology, it is important to consider accessibility for the museum staff as well as the visitors. If the technology is too difficult to create or too confusing to use, the effort will be wasted and people will not benefit from it (Tsung-Yu Liu, Tan-Hsu Tan & Yu-Ling Chu, 2009). This is true for museums in general. Exhibits need to be accessible and the information needs to be transferred from one person to another with ease. This will give educators the best possible chance to convey information to visitors in such a way that they will comprehend and retain the information. Museums exist to bring forth knowledge of specific areas to the public and everything that they do must work towards this vision.

Helen Mears and Claire Wintle (2014) agree that museums are moving toward the use of technology to increase accessibility. In order to use technology effectively, those in charge of design must be realistic about their wishes. If the upkeep of the technology is unlikely to occur, or if it is too complicated for the technology to be accessed, it will not be utilized. This could

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have a detrimental effect on the amount of information museums are able to convey to visitors, as well as the interest of the visitors. If people do not have a seamless and engaging visit, they are unlikely to return or recommend the experience to others (Mears & Wintle, 2014). Technology is going to have to be addressed in order for museums to survive in a digital age, but the accessibility of the technology for both the designer and the user must always be kept in mind (Mears & Wintle, 2014).

TOURS

Figure 7. A guide giving a captivating tour to an attentive audience in Trafalgar Square, London, England (Knight, 2010)

One of the many jobs that a museum has is providing a detailed look at its assets. On-site tours like the one in Figure 7, as well as virtual tours, are options to consider for an audience to be engaged in what the exhibits have to offer and for an audience to get a full understanding of the history and purpose of a museum. Virtual tours can be valuable when physical tours are not allowed, such as when buildings are not safe for many visitors or when structures are privately owned (E. Dunnack, personal communication, April 7, 2018). There are many features that a tour encompasses, from the tour guides themselves, to the route that is taken, to the signs and text that describe the exhibits, and even to the presentation of the exhibits themselves (E. Dunnack, personal communication, April 7, 2018). Presentation is important, and for an audience to be fully and happily engaged in a tour they need to be enticed by what they are seeing and hearing.

For the Grabser Mühlbach, guided tours are not conducted often. The mill owners are only available to show off their private properties to the public a few times a year, and the Grabser Mühlbach organization itself does not have staff to constantly run tours around the mill area (S. Bertsch, personal communication, March 28, 2018). Self-guided tours are the primary way for the public to experience the Grabser Mühlbach, but in doing this there is an issue with effectively presenting information to visitors. Plaques and brochures are used to convey relevant information on self-guided tours. However, tours with a guide allow for the sharing of a wealth of information and stories that the general public is not able to access (S. Bertsch, personal communication, March 28, 2018).

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The educational value of guided tours has been researched and observed in other places. In 2008, a study in Connecticut by Reach Advisors, The Connecticut Humanities Council, and Connecticut Landmarks looked in depth at visitors' preferences when visiting museums. They wanted to learn if people preferred to either be part of a guided tour at a museum or rather walk around alone. Based on the study, most people felt that guided tours were too restricting to the museum experience (Wands, Donnis & Wilkening, 2010, p. 21-22). Museum visitors tended to enjoy self-guided tours where they could explore at their own pace and visit the parts of the museum they found most interesting (Wands, Donnis & Wilkening, 2010, p. 21-22). While guided tours can be beneficial when people wish to ask questions and get immediate answers without searching through literature or exhibits, guided tours can cause issues for impatient children, people on a tight schedule, and older people with difficulty hearing. Museums should analyze their audience and make adjustments to their tours based on that data (Murphy, 2016).

Figure 8. A costumed interpreter teaching a visitor how to make pottery (Old Sturbridge Village, 2018)

Emily Dunnack (2018), the Director of Education at Old Sturbridge Village, agrees that guided tours can be restricting. She often works with children and school groups, and finds that visitors of all ages, especially younger people, prefer interacting with costumed interpreters and taking part in demonstrations (Figure 8). She believes that learning happens in a social context, and interaction between interpreters and patrons is as important as the interaction between visitors. At outdoor museums like Old Sturbridge Village, allowing people to explore at their own pace is very beneficial because it gives visitors the chance to find what interests them and to retain more about history. Optional guided tours are useful when people want to narrow down an influx of information to a particular topic, and self-guided tours allow visitors to find what this information is.

If a museum does not have the capability to offer guided tours, providing information can be very useful to visitors. Edward Taylor and Amanda Neill (2008) researched how informal education, such as events or demonstrations, can positively impact the audience experience,

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specifically the amount of information retained. This is particularly important for an adult audience that is no longer accustomed to learning in a formal setting, such as school, but can be equally as helpful to a younger audience that needs a different form of education to pique their interest. While informal education provides unique challenges to educators, finding new ways to interest an audience allows educators to reevaluate their information and their presentation of it (Taylor & Neill, 2008).

TECHNOLOGY IN MUSEUMS

There are many different views on the role of technology in museums. The study in Connecticut, mentioned above, was also aimed at gathering opinions on implementing technology in museums (Wands, Donnis & Wilkening, 2010, p. 21-22).

The study yielded interesting conclusions. The authors note that the responses seemed heavily influenced by the age demographic of the subjects of the study. Surprisingly, older people seemed the most interested in implementing technology into the museum experience. They felt that tour guides were often difficult to hear and suggested that audio guide devices with volume control and apps to provide additional information could make museums more accessible to the elderly (Wands, Donnis & Wilkening, 2010, p. 22). Based on the study, younger people appeared to be less interested in technology appearing in museums. The younger demographic felt that technology was "pervading" their everyday lives and appreciated the escape from the plugged-in world that museums offered. The study revealed that the objects and stories shared at museums were more interesting than loud and confusing audio recordings coming out of speakers on the walls (Wands, Donnis & Wilkening, 2010, p. 22). Looking at this specific study, it could be said that technology can have a positive impact on a museum experience when it is implemented with the patrons of the museum and with the physical museum layout kept in mind.

Scott Sayer and Kris Wetterlund (2008) researched how museum visitors interact not only with technology, but also with each other. They looked at how socialization in museums can have as much of an impact on the museum experience as the actual exhibits in the museum. The authors discuss how one person normally "mediates" the information you receive as you move through the museum (Sayre & Wetterlund, 2008 p. 85-86). This mediation can be a product of the person's interest in specific exhibits or the ease of access to certain areas of the museum. Museums can influence this mediation and encourage visitors to spend more time at certain exhibits by laying out the museum in a certain order, having docents provide extra information on pertinent topics, or by playing a video with information about a certain artifact before showing it to the visitors (Sayre & Wetterlund, 2008 p. 85-86). Again, it is important to think about the museum and the patrons before implementing technology. Having videos playing outside of the privately owned mills of the Grabser Mühlbach would be inappropriate for the

area, but having an app and related technology that people could access with optional videos would allow people to learn more about the museum respectfully, and at their own pace.

One way in which people can access information at their own pace that differs from traditional plaques is through QR codes, or quick response codes (Hicks & Sinkinson, 2011) (Figure 9). Many people have access to smartphones that have internet connection which allows them to scan these QR codes. Hicks and Sinkinson (2011) discuss a QR code pilot program that the libraries of the University of Colorado at Boulder implemented in the fall of 2010. It was recommended that the libraries should find a way to capitalize on the easy transfer of information. QR codes proved to be an effective way of spreading information for educational institutions. It is important to realize that using apps and QR codes is not a fluid experience like surfing the web (Hicks & Sinkinson, 2011). This must be kept in mind when designing the placement of QR codes and the information contained in the link

connected to the code. Making the information that will be accessed easy to understand is critical to ensuring the educational value and success of the QR code. If people get disjointed information, they might be less interested in making sense of the information; they will move on and miss out on a chance to learn (Hicks & Sinkinson, 2011). This can be avoided by making sure the information flows well.

The journal article covers several uses of QR codes by the libraries. It was very popular for QR codes to be used on the outside of the buildings to provide more detailed information for events. This could easily be applied to an outdoor museum, specifically the Grabser Mühlbach, where it would be difficult and distracting to residents to have event posters around the town. A QR code on a plaque (Figure 10) could link to an updated calendar of events and keep interested people up to date, while still respecting the privacy and culture of the residents.

Figure 10. Plaque at the Grabser Mühlbach

Other professionals have identified locations in which QR codes can be utilized the most, and museums are included in the list. Farkas (2010) believes that QR codes will be most beneficial in special collections, museums, and other cultural heritage institutions. Each of these locations connects to pages that display more information than can comfortably fit on a plaque or in a brochure and these pages have restricted access so that only in-person scans at the

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locations activate the link. In these cases, QR codes can give the curious visitor more information when they want it without overwhelming the general audience. Additionally, the links can provide access to pictures or videos that help set the scene for a certain time period, or other environment, enriching the visitor's experience (Farkas, 2010).

Tsung-Yu Liu, Tan-Hsu Tan, and Yu-Ling Chu (2009) agree with Farkas (2010) about the benefits of technology, specifically in outdoor locations. In outdoor spaces, it can be difficult to provide adequate written or visual information to enhance the visitors' experiences. Technology, such as QR codes, can be used to provide more details and to increase the educational value of the visit. To get people even more engaged through the use of technology, events such as alternate reality games and scavenger hunts have been utilized in the past. These games allow people to work collaboratively and problem solve while exploring and learning about the exhibits (Ramsden, 2008). Therefore, if the audience and their use of the technology can be kept in mind throughout the development process, the technology can have a positive impact on visitors' experiences.

Museums such as the Landesmuseum Zürich have incorporated augmented reality into their exhibits to create a more immersive experience. Augmented reality (AR) allows for someone to combine the real world with a technologically augmented world by "placing virtual objects in real environments" (Yildirim, Elban, & Yildirim, 2018). Similarly, virtual reality (VR) implements a "virtually created environment using various tools" (Yildirim, Elban, & Yildirim, 2018) that allows for individuals to be engulfed in a completely different experience than the real world. The Landesmuseum Zürich incorporates AR throughout various exhibits, specifically one exhibit, *Ideas of Switzerland,* centered around a topographical map of Switzerland. Looking at the

Figure 11. AR exhibit in the Landesmuseum in Zürich, Switzerland

map through the provided mobile devices allows the visitor to see flags augmented on the tops of mountains (Figure 11). When these flags are selected on the screen of the device, more information is revealed to the visitor. AR exhibits like this one provide a more enhanced experience for visitors, as it allows for an extra level of participation at museums. The company, Energiepfad Grabs, uses 360-degree photos to show the turbine running in the mill. This allows visitors to explore the interior of the mill without actually entering the facility.

The Verkehrshaus der Schweiz in Luzern utilizes AR and other technology to provide context to its exhibits, and give visitors a chance to discover more information. There is an exhibit

Background

about air traffic control that has a projection of Switzerland and its airports. When a visitor steps onto the map into one of the highlighted circles, the circle follows them and the visitor can create a flight path as though they were an airplane. The museum also has screens with 360-degree views of certain areas, such a street in Switzerland. There are icons on the image, and when a visitor selects an icon, more information is provided on the screen. This information provides contextual information for the transportation in the exhibit.

In order to provide visitors and other interested parties with a different perspective of a museum, especially an outdoor museum, before arrival, drones can be utilized. People can also gain a better understanding of the site after visiting, if they can see the site in a new way. David Mirk and Helmut Hlavacs discuss how drones can be used to implement virtual tourism. People can view a specific site from a location in a completely different area, thereby increasing accessibility to sites. This idea can be applied to museums, in order to provide people with a view of the museum before or after their visit, and enrich their experience with a new perspective of the museum.

AUDIENCE PARTICIPATION

Museums across the world are faced with a challenge: keeping people engaged. With many other activities to interest people, museums must recognize that they need to be as much of an option as a mall or a hiking trail for a weekend activity (Briggs, 2000). A 2008 investigation into museum audiences revealed that over the prior 20 years there had been a significant

decrease in museum, gallery, and performing arts institute attendance, which the authors of the survey announced as "disappointing" (Simon, 2010).

Figure 12. A guide demonstrating the operation of a corn mill (Grabser Mühlbach 2018)

To combat this issue, many museums have since begun to change the way they present their information to their visitors. Currently, there is a movement "towards a visitor orientated approach" (Waltl, 2006) for museum owners to take in order to more closely align with the way our society values interactive environments. When museums think about their patrons throughout the design of exhibits, museums can work to make visitors of all ages and many backgrounds connect more fully with the museum (Figure 12). By connecting the material presented in the museum with visitors' lives, museums can make visitors feel more invested in the exhibits (Briggs, 2000). Museums can also work to make visitors interact with the museum more, which further engages them in the experience. Simon (2016) agrees with this idea, and supports making exhibits relevant to people's lives by finding ways to connect the topic of an exhibit to patrons' common experiences.

Background

The vast capability of the smartphones that a large majority of the world's population carries around in their pockets allows museums to create experiences where participation is "something possible anytime, for anyone, anywhere" (Simon, 2010). Whether this is through virtual or guided tours, automated guide sources, posters, or text sources, the focus of museums is to now engage their visitors in interactive exhibits or experiences that will make their visit more than just a stroll through a particular exhibit.

Providing knowledge is the main objective for museums anywhere, but the ability to allow visitors to submerge themselves entirely into an exhibit can be influenced through participatory measures. This participatory aspect needs to also consider the specific audience in which the museum is trying to target as "their nature, motivations, expectations and needs" (Waltl, 2006) should be examined in order to best identify what will help audience retention. Most of the time "offering opportunities for engagement" (Waltl, 2006) is the factor that can change one's perspective in their museum experience, and tailoring these engagements to fit a specific audience is integral to retention. "To be capable of placing the visitor at the center of its strategic action, granting him a role as co-creator and co-manager of that action" (Martorell, 2017) allows museums to become successful to a wide range of people and keep them coming back for more. Simon (2016) discusses the different approaches museums can take to communicate that their information is relevant to people. Sometimes museums struggle to bring visitors into their museum, but if they create a dialogue with the community and discover specific interests, the museum can build an appealing exhibit for people to visit.

Additionally, offering special events helps to retain a museum audience. Events accomplish two things: keeping frequent visitors interested and reaching a new audience. Both Simon (2010) and Waltl (2006) agree that people are more likely to visit museums when there is an event or unusual exhibit. Based on surveys in 2004, many visitors said they came to the museum because of a special event (Waltl, 2006). Even something unrelated to the site, like a run that ends at a historical site and includes a traditional ceremony from that time period for the winner, can engage the audience, and draw more people into the museum (Waltl, 2006).

SUMMARY OF BACKGROUND RESEARCH

The mills at the Grabser Mühlbach are important historical sites that must be properly presented to the public, so the significance of the historical buildings can be appreciated. Most museums do not include private residences, so the residential Grabser Mühlbach faces different challenges than many other historical sites. In order to provide more access to site information, the Grabser Mühlbach must use creative solutions, such as an updated website, linkable QR codes, augmented reality, or additional interactive enhancements.

Outdoor and indoor museums generally approach audience participation in different ways, but methods from each museum's approach can be used at the Grabser Mühlbach. Making museum exhibits interactive generally entices audiences to become more engaged in the experience and helps visitors to retain information. Audience participation is influenced by several factors, specifically accessibility, interactives, and technology. People are interested in visiting museums that they see are easy to navigate before they arrive, were highlighted while browsing the website for information, and are interactive when they are exploring the museum. For many historical sites, it is beneficial to incorporate interactives that give people an opportunity to experience life in a different time period. The Grabser Mühlbach invites people to step back in time during Mill Day and other special occasions, but this is not always conveyed to the extent that it is on those special event days. Technology offers visitors more opportunities to access information and interact with exhibits while at the museum and to learn more about the topics from the comfort of their homes.

At the Grabser Mühlbach, QR codes can be utilized to respect the boundaries of private properties and provide information to visitors. Visitors can use the codes to access information about each site. It can become overwhelming to read many lines of text on plaques, while in a location that should be interactive, like at a millstream. With QR codes, people can choose what information they are interested in viewing. They can watch a video of the mill running, or learn about a personal story, which can bring the history of the mill to life.

Augmented reality can be incorporated into the museum's platform to give people more interaction at the museum. Visitors can use mobile devices to aid them in exploring the mills and accessing information that is usually reserved for those on guided tours. This will make the self-guided tour of the museum more interactive, thereby engaging the audience and providing people with a new way to explore the museum.

An updated website with improved accessibility will make people more interested in visiting the site, since they will be able to find information online before their visit. Additionally, it will be easy for them to visit the website and learn more about the site after their visit.

Continuing to host events and demonstrations at the Grabser Mühlbach museum is important. This will keep repeat visitors interested in what the site has to offer, and it will increase interest in a visit for those who may not normally consider visiting the museum for a self-guided tour.

With these points kept in mind, the Grabser Mühlbach can improve the self-guided tours and increase community interaction.

Background

PROJECT IMPLEMENTATION

This project was designed to improve the self-guided tour experience and showcase the impact of community at the Grabser Mühlbach, in collaboration with NTB Buchs. By exploring the current organization of the guided and self-guided tours at the Grabser Mühlbach, areas of improvement were identified, and an implementation plan was constructed for the Grabser Mühlbach association. This project aimed to complete the following actions:

1. Improve the framework for self-guided tours at the Grabser Mühlbach
2. Improve visitor access to a broad range of information
3. Create a model website with improved usability and aesthetic appeal for the Grabser Mühlbach
4. Make recommendations for future technological additions to further improve the visitor experience at the Grabser Mühlbach
5. Document all methods of improvement for use during future advancements by the Grabser Mühlbach association

These objectives were shaped by first-hand experiences that the team had at the project site. Upon the first visit to the Grabser Mühlbach, it was discovered that prior knowledge of the museum did not provide a complete understanding of the reality of the museum. The first personal experience with the museum was a self-guided tour conducted by the project team themselves on August 24, 2018, in which several realizations occurred. There was some confusion regarding the location of the trail's starting point and the location of the brochures. It was also confusing to follow the correct trail because it felt like the project team was intruding into private property and directional signs were limited. The maps at the Grabser Mühlbach are located at different points along the trail, but they are far apart. Due to the winding roads of Grabs, visitors, especially those not from the area, can become confused quickly.

The second personal experience with the museum was a guided tour presented on August 30, 2018 by the Grabser Mühlbach association, with the help of a translator. The tour provided vast amounts of historical knowledge and information about the mills, including in-depth demonstrations and personal anecdotes. Having a guide eliminated the worry of following hidden trail signs and relieved the tension of intruding on the neighborhoods. The need for improvements to the self-guided tour was reinforced after the guided tour experience. It is clear that the Grabser Mühlbach association has done extensive research on the mills and the history of Grabs, and it should be shared with all visitors who visit the Grabser Mühlbach. Without guides providing oral histories or giving demonstrations, the importance of the Grabser Mühlbach to the community of Grabs is not communicated to the extent that it could

Project Implementation

be. Comparing the two tour experiences side by side revealed that specific parts of the self-guided tour should be modified to better encompass the information received during a guided tour.

A later visit to the museum revealed that the company Energiepfad Grabs has incorporated 360-degree photos into its educational platform. This company has also taken 360-degree photos of several mills along the Grabser Mühlbach. The museum could benefit from incorporating these technological improvements into their current museum experience.

After these tours, the project team conducted a presentation to the Grabser Mühlbach association, proposing a variety of ideas. These ideas included creating clearly marked trails, a clear starting point to the tour, increased access to brochures, introducing additional events, updating the current website, capturing aerial footage, implementing QR codes into the tour, creating interactive trails, exploring augmented reality concepts, and marketing Grabser Mühlbach merchandise. A discussion about the potential for these ideas followed, with a translator bridging the language barrier. Each idea that was proposed by the team was discussed in-depth, and the association gave their initial opinions on considering any implementation.

After the association had a private discussion about the proposed ideas, they provided the project team with feedback on what they would like to see implemented at the Grabser Mühlbach. Several favorite ideas revolved around technological advancements, such as augmented reality and aerial photography, that are not feasible with the resources available during the term of the project. The association stressed that any implementation would be valuable, but if the time period of the project did not allow for some ideas to be put into action that recommendations for the future would be equally as valuable. Furthermore, some ideas proposed such as the implementation of QR codes, needed to be modified as some members of the association had been working on the same idea prior to the team's arrival. Rather than creating the specific QR codes and linking pages, there were suggestions to instead find the physical placements of these codes. The presentation and subsequent feedback changed the team's focus to building on the association's improvements, rather than re-discovering the same improvements.

A survey for previous and potential museum visitors was sent out based on the initial implementation plan. After the presentation to the Grabser Mühlbach changed the focus of the project, it was deemed that the survey was not a valuable asset to the project team's approach. It was determined that the new plan would commence without the need to pursue the survey further. Feedback was still received from the survey (Appendix B), and this feedback confirmed that the ideas being pursued by the project team were valid. After some clarification of input from the association, the team was then able to solidify an updated plan of action for

Project Implementation

potential improvements to be made to the self-guided tours. These improvements are documented in Appendix D and also discussed in the following sections.

While the project team originally intended to conduct interviews with members of the association and community members of Grabs, it was deemed unnecessary after the meeting with the Grabser Mühlbach association. Casual discussion with the association proved to be sufficient on the topics related to the project, making the interviews excessive in the context of the project.

In order for the project team to gain a better understanding for the Grabser Mühlbach, they went on several tours of the museum. One was a guided tour, one was an in-depth demonstration, and the rest were self-guided tours. This allowed the team to observe the difference between the two tour experiences. After visiting the museum several times, the team began to test out various recommendation ideas. For example, different trail routes were created and followed, and the team discussed how the addition of certain information at each mill would enhance the educational experience and understanding of the site.

After creating both a list of recommendations and the basic versions of the deliverables, the team asked other IQP and MQP students to test out the self-guided tour at the Grabser Mühlbach with the additions in place. Teams scanned a QR code to access the digital version of the map for the site. They then followed the new trail using GPS on their phones and visited a new combination of mills. When they reached each mill, they scanned QR codes made by the project team that provided videos, pictures, and other information about the mills. The project team observed the visitors and took note of the ease of navigation with the digital map, information visitors were interested in accessing, and locations at which they were confused when following Grabser Mühlbach signs. The project team was able to make adjustments and improvements to the recommendations after the feedback from the visitors was collected, and observations of the visits had been recorded. These are documented in detail in Appendix C.

A website model was created by choosing an easily navigable and appealing template from a program used to design websites – Wix.com. The information from the current Grabser Mühlbach website was moved to the model website, and was organized in a way that is more accessible for those unfamiliar with the site. The team looked at the website on different occasions and made changes based on what made the most sense for the layout.

The project team made additional visits to the Grabser Mühlbach several times to photograph some of the mills for the website, to take detailed notes on the locations of specific improvements at the museum, and to consider the usefulness of the recommendations. The visits to the site increased understanding of the impact of the project, and the potential integration of the recommendations to the current museum proceedings.

Project Implementation

RESULTS

Based on discoveries made during the project, the following ideas will be presented for implementation to the Grabser Mühlbach association for the improvement of the self-guided tour experience:

1. Digital maps depicting the different trail options for the museum and website
2. A model website to show improved organization of information and aesthetic appeal
3. A central starting point with a covered area for information
4. A larger number of directional signs along trails
5. QR codes placed onto existing plaques to provide supplemental information
6. 360-degree photos added to self-guided tours
7. Photos and videos captured by a drone for promotional and educational purposes
8. Augmented and virtual reality technology incorporated into the museum platform
9. Events to allow more people to experience the Grabser Mühlbach

This is a broad set of recommendations, and some ideas have been implemented to some degree, as explained in the deliverables section. Other ideas remain as recommendations.

These deliverables and recommendations were shaped by the experiences of the team. The challenges faced by the team during self-guided tours, observations of first-time visitors navigating the museum, and difficulty accessing information both at the museum and on the website led the team to these deliverables and recommendations. The analysis used to determine the importance of each deliverable and recommendation is further explored in the section relating to each specific topic.

DELIVERABLES

The following deliverables have been developed for implementation and use by the Grabser Mühlbach association:

1. Digital maps depicting the different trail options for the museum
2. A model website to show improved organization of information and aesthetic appeal

These deliverables are not completely ready for implementation into the Grabser Mühlbach museum's platform, but they can be integrated into the museum's platform with relative ease. Alternatively, they can be used as inspiration for changes made by the Grabser Mühlbach association to the self-guided tours and website.

Results

MAP ACCESSIBILITY AND DIGITAL MAPS

In order to improve the navigation of self-guided tours, accessibility of maps throughout the Grabser Mühlbach should be increased. While there are maps posted at the top of the millstream, the starting point for the tour, and at a few other locations along the millstream, more locations for physical maps should be added. Several locations for the storage of physical maps or brochures with maps should be added, such as at the starting point in a covered area as mentioned above. QR codes could provide access to maps when brochures are not available. This would be beneficial because trails can be updated and changed based on construction or other reasons, and the digital map will reflect any changes in real time. The digital maps would be available through the website at all times, making them a vital addition to the self-guided tour experience.

After experiencing the in-depth tour of the Grabser Mühlbach, it is apparent that several different trail options are necessary to make self-guided tours more enjoyable and focused. The advisors for this project, Professor Orr and Professor Albrecht, who tested the initial self-guided tour agreed that there was difficulty in the navigation of the trail and a lack of information provided to curious visitors. Creating trails with different durations, routes, and themes create a more diverse experience for visitors. These trails can be tailored to different interests at the mills, as well as to different time constraints for visitors.
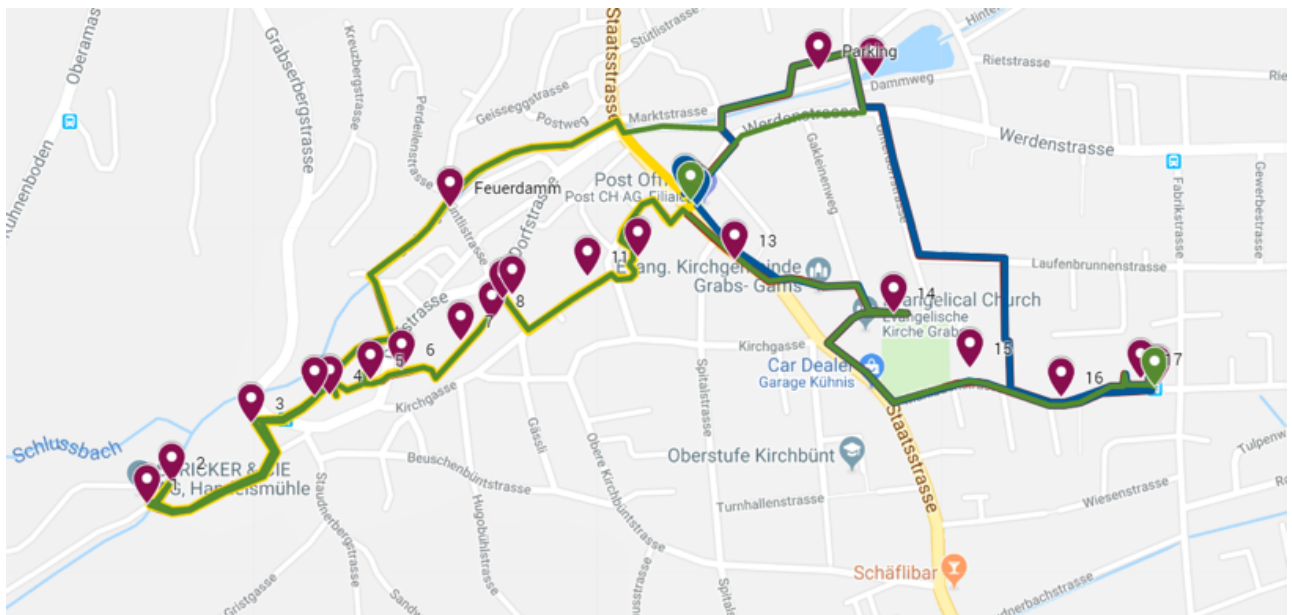

Figure 13. Google My Maps trails for the Grabser Mühlbach, accessible through this link: https://www.google.com/maps/d/viewer?mid=1Sem86rzfK9ZRlRiXpBebzbW85yl71Ssr&ll=47.18164420849262%2C9.443601100000024&z=16 (Google)

Results

Alternative trail options were designed using Google My Maps. Instead of taking several hours to explore the mühlbach, visitors can choose a shorter trail to follow. The locations of important buildings, the seventeen sites on the current brochures, were marked on the map (Figure 13). Different trails were created on the Google My Maps website, connecting the locations. Some trails are shorter versions of the current loop, whereas others highlight certain mills. The maps were then linked to the website and to QR codes, so they could be accessed by different people from a variety of locations. The initial versions of these improved trails were tested by other IQP and MQP groups in Switzerland, and their feedback confirmed that shorter and more focused trails with information provided by QR codes were beneficial to the self-guided tours at the Grabser Mühlbach.

After visitors connect to the map, either through the website or by scanning a QR code, they will have the option to choose which trail they would like to follow. They can select their preferred trail on Google My Maps, and only that trail and its locations will be visible. While visitors are using their phones to follow the trails at the Grabser Mühlbach, the GPS on the device will track their location and show their current position. This will enable visitors to follow the trails with more ease. Additionally, visitors will be able to access the maps at any location and without the need for a physical map, thereby increasing accessibility to information. The maps will have the locations of the notable historical sites marked, and more information will be provided when the location is selected. For example, if one were to select the location marker of one of the blacksmith shops, information about the site and navigation around the site would be provided. The description available after selecting the location marker would tell visitors that they are permitted to go behind the building to see the waterwheel. The information would also provide the visitor with directions to go through a gate beside the building that leads to the next site. With the implementation of these digital maps, visitor navigation and tour-length flexibility for self-guided tours at the Grabser Mühlbach can be improved.

WEBSITE

The usability and aesthetic appeal of the Grabser Mühlbach website should be improved, considering the difficulty that many people have finding information on the website (Figure 14). Based on feedback from the survey and from personal communications with our sponsor and other website visitors, it was determined that the website's organization could benefit from

Figure 14. Image of the current Grabser Mühlbach website home page (Grabser Mühlbach 2018)

Results

improvement. Details about visiting the mühlbach should be added, and the format of the website should be optimized for use. In order to showcase the Grabser Mühlbach in the most positive light, the website design should be made more appealing. A model website was created to show these potential changes. The model website can be accessed by visiting

Figure 15. Sample website design for the new Grabser Mühlbach website (Wix Grabser Mühlbach 2018)

https://aml395.wixsite.com/grabsermuhlbachfinal. While the website only provides a framework for the Grabser Mühlbach association, its organization and design can serve as inspiration for future website changes, and perhaps become the foundation for a new website.

The current platform used by the Grabser Mühlbach association, jimdo.com, was not used to create the model website. It was not clear if the free version of jimdo.com offered the editing options necessary for the model website, so a different platform was selected. The website development platform, Wix.com, was utilized due to the aesthetically pleasing template, ease of creation, and free accessibility for creating the website. A thorough examination of the current Grabser Mühlbach website was conducted, in which the team went through each page and decided how the information could be better organized. Then, construction on the Wix.com webpage began. The template "Timberland" was chosen due to the clean layout and ease of navigation (Figure 15). Additionally, the mobile version of the template was easy to use, and kept the website content readable and organized. This makes it easy for features on the website, such as "Object Info" or the "Map" to be used at the museum on a mobile device.

Pages from the Grabser Mühlbach's current website were referenced, and headings and subheadings were reorganized into clear sections. The information from the pages is still available, but in a more visible way. A Google Calendar, Google Map, videos, pictures, and

Results

various other features were added to the website. These features were organized into tabs that are instinctive and easy to find. The Google Calendar shows the dates that are not available for guided tours, and can be updated with event dates. The Google Map shows the trail loops created for the Grabser Mühlbach self-guided tours over a satellite image of Grabs. After selecting the map, visitors can access the Google Map and use it with their GPS as a means for following the trail, or to simply view it to gain a better understanding of the millstream area. The videos of the mills were added to the website, and were linked back to YouTube. Furthermore, pictures of the Grabser Mühlbach were included in the appropriate locations, and a photo gallery was created to have all images in one central location for those looking for a variety of pictures. Specifics on the construction on the website are outlined in the manual, which can be found in Appendix D.

RECOMMENDATIONS

The following recommendations have been explored and recorded for the Grabser Mühlbach association to consider for future implementation:

1. Create a central starting point with a covered area for information
2. Increase the number of directional signs along trails
3. Implement QR codes onto existing plaques to provide supplemental information
4. Incorporate 360-degree photos into self-guided tours
5. Use a drone to capture photos and videos for promotional and educational purposes
6. Incorporate augmented and virtual reality technology into education programs
7. Organize other events to allow more people to experience the Grabser Mühlbach

STARTING POINT

After visiting the Grabser Mühlbach and experiencing a self-guided tour, it was determined that establishing a clear starting point, giving better access to information, and offering different trail options would be beneficial to visitors. Currently, the Grabser Mühlbach's tour starts near the Grabs post office, where a map and large millstone are situated outside of the store, Volg. This starting point for the self-guided tours can be made more clear and useful, so that visitors are provided with a better welcome. By creating a starting point, such as that pictured in Figure 16, there would be less confusion as to the start

Figure 16. An information area at the start of a hiking trail (*Start of the River Trail*)

Results

of the tour. At this location, brochures and maps could be stored, making for a clear and informative start to the tour that can be distinctly identified. The maps that could be incorporated into the self-guided tours at the Grabser Mühlbach could be presented on paper and through a QR code. The paper maps could be located at the starting point, as well as the bus stop at Mühlbachstrasse, as it is a starting point for a new trail created by the project team, and possibly at the top of the millstream. By incorporating this feature of a clear starting point, visitors should have a straightforward destination to start their self-guided tours.

DIRECTIONAL SIGNS

The Grabser Mühlbach association has worked to add signs to the site to help with navigation around the area. Additional signs would be helpful to the navigation of the museum, especially for visitors who are not familiar with the area (Figure 17). Several visits to the museum by IQP groups and advisors confirmed that more signage is needed at certain points throughout. One such location is on the road toward the knife mill, the Messerschmiede Roth. The split in the road causes some confusion as to which way visitors should continue. Placing a directional sign at this location will make the navigation of the self-guided tour more obvious to the visitor. Other specific locations of improvement throughout the Grabser Mühlbach tour are addressed in Appendix D with recommendations as to how these locations can be improved for increased visitor navigation. If

Figure 17. A directional sign at the Grabser Mühlbach museum

the association approves of proposed trail additions, color-coded signs could be added for the additional trails. These signs will provide increased understanding of self-guided tour navigation as visitors can follow a specific trail (for example, an upper loop trail indicated by red trail markers) through the Grabser Mühlbach without the need for a guide or even digital assistance. Nevertheless, these different trails can still be implemented into a digital form through QR codes that can be placed strategically around the mühlbach. The QR code links can have directional information to allow visitors to pursue these different pathways through the museum.

QR CODES

The implementation of QR codes onto signs should be carried out, so that visitors can follow pathways and access information about each site. The QR codes should be linked to information that is not available during self-guided tours (Figure 18). The purpose of the QR codes is to allow for a perspective into and about the mills – details currently only conveyed to visitors who embark on a tour with a guide present. Visitors could experience more of the mills during self-guided tours by being provided more easily accessible information at the site. The physical location of the QR codes will be on the already existing plaques (Figure 19). The sites which will include these QR codes have been determined after visiting the museum several times, where the sites were pinpointed for the addition of information that would enhance the visitor experience. The locations for the QR codes are specifically outlined in Appendix D, along with recommendations for specific information to be included.

Figure 18. This QR code links to the model website, showing information about the Sandfang

Figure 19. Image of a sample QR code on a plaque

Results

The codes should link to the map of the Grabser Mühlbach, videos of specific mills, 360-degree photos of mills, personal anecdotes about the community, and more information relating to the mills. This information can be compiled on webpages – either public webpages such as the Grabser Mühlbach website, or another private domain. Additionally, the web pages the QR codes link to could be updated at any time, thus giving updated information without having to replace an entire plaque. If the web page is no longer used or necessary, replacing the small QR code stickers is an easy task for the association.

360-DEGREE PHOTOS

After meeting with the Grabser Mühlbach association, it was decided that several technological advancements should be recommended for future implementation. One such implementation could be 360-degree photos. They would be an interactive solution to the lack of visitor interaction with the interiors of the mills during self-guided tours. The company Energiepfad Grabs has already utilized this technology in their educational outreach programs. The 360-degree photos Energiepfad Grabs has should be used as inspiration for more photos, so all mills can be documented in this way. These photos can be made to be more interactive and showcase information about the mills in a more technical manner. The photos can then be linked to a QR code at the Grabser Mühlbach, so they are accessible to visitors on a self-guided tour. This will help simulate a guided tour, through the use of virtual technology.

Visitor exploration can be further enhanced by the 360-degree photos. The 360-degree photos can be captured through the use of equipment by contacting the company, Energiepfad Grabs. Their methods can be shared with the Grabser Mühlbach, and explanations on how they created their program can be given. Similar methods can be applied to 360-degree photos for all of the mills, since several have already been documented. In the case that the association and Energiepfad Grabs do not wish to work together, the Grabser Mühlbach can explore other ways to create similar videos and photos (Appendix D). Additionally, the Grabser Mühlbach association can improve upon these photos by having an interactive component. After loading the images, users could select certain sections of the images. For example, a waterwheel could be selected, which would prompt it to turn and to show the viewer how it functions. Additionally, more information could be provided with interactive features, such as a virtual plaque, as explained in Appendix D, being added to a building which would provide further material when selected. These changes will provide information in an interactive and interesting manner to visitors.

DRONE USE, AUGMENTED REALITY, AND VIRTUAL REALITY

Based on the enthusiasm for drone footage from the association, research on aerial footage was conducted. This aerial footage of the millstream could be used for informational and promotional purposes. In order to increase understanding of the Grabser Mühlbach's physical characteristics when visitors cannot actually visit the site, the utilization of a drone to capture aerial videos and photographs is highly recommended. By recording the mühlbach, people will be able to see the scope of the area, and appreciate the site in a new way. Having the drone fly along the millstream and video its path will provide a new perspective of the Grabser Mühlbach. Viewers will be able to feel as though they are following the millstream themselves. Capturing images of the area from above will be beneficial for promotional pictures and will again provide an interesting look at the millstream. Photo galleries on the website can show this aerial footage, as well as future technological implementations such as augmented and virtual reality programs.

Research was largely conducted for other technological implementations by visiting several museums, such as the Landesmuseum in Zürich and the Verkehrshaus der Schweiz in Luzern. These visits inspired augmented reality ideas for the Grabser Mühlbach to implement in the future. The possibilities for augmented reality (AR) and virtual reality (VR) development and implementation for the Grabser Mühlbach were discussed with a student from NTB who is currently designing a virtual reality game. The Grabser Mühlbach could use AR to allow visitors to explore the insides of many of the mills without being accompanied by a personnel member. By holding a mobile device up to the mills, visitors could see images augmented onto the buildings on their screens. Certain locations on the augmented image could link to information or images such as a 360-degree photo of the inside of the mill. Visitors could then select the information or image and interact with the mill on their mobile devices. This will give guests a more interactive and memorable experience at the Grabser Mühlbach.

A VR concept to be explored in the future could be designed by using blueprints of the mills, which are accessible through the Grabser Mühlbach association. These blueprints could be made into an interactive 3D program, where people can see the mills running virtually from a different perspective. This concept is beyond the scope of this project, but future implementation should be explored as it could be an interesting feature at the Grabser Mühlbach for visitors.

EVENTS

In order to engage people in the reality of the Grabser Mühlbach, planning additional events is suggested. After hearing about the success of Mill Day and seeing photos and videos from the

Results

event, it is recommended that the association plan to host a similar event every year, instead of every other year (Figure 20). While there are special member events occurring more often, Mill Day's community bonding would be beneficial to experience every year. The Grabser Mühlbach association is successful in its goals to preserve and to share history and community through this event, so its continuation and expansion would be advantageous to the association and its mission.

Figure 20. Visitors attending Mill Day (Grabser Mühlbach 2018)

DOCUMENTATION OF RECOMMENDATIONS

The recommendations and deliverables for a plan of potential improvements to the self-guided tour experience at the Grabser Mühlbach have been documented into a comprehensive manual. The full manual is found in Appendix D. This manual is for reference for the Grabser Mühlbach association and connected parties when implementing the recommendations and deliverables outlined above. The chapters of the manual include:

1. Updating the Grabser Mühlbach Website
2. A Guide to Google My Maps
3. Technology Recommendations
4. Self-Guided Tour Improvements
5. Increasing Visitors at the Grabser Mühlbach

It is the hope of the project team that the Grabser Mühlbach association discuss the improvements outlined in the manual, and implement them into the museum in order to improve the self-guided tour experience.

EVALUATION OF THE SUCCESS OF SOLUTIONS

Aspects of the implementation plan have been evaluated to determine their success, and to predict their future success with further implementation. Two other 2018 Switzerland IQP teams, as well as an MQP team, tested the version of the trails created by the project team on Google My Maps (Appendix C). The teams agreed that the Google My Maps worked well and that the QR codes provided information in an easily accessible way. They also expressed interest in having more directional signs placed around the Grabser Mühlbach to assist with navigation. The second IQP group that visited agreed that more directional signs would improve the ease of navigation, especially if visitors did not have phones for GPS tracking, as several members of the group did not have access to data on their phones. Again, the Google My Maps worked well for those using the program, and they found the information provided after selecting the locations on the map itself, such as "you can continue through the fence" and "go behind house for a view of the waterwheel," to be helpful. Additionally, having more videos, pictures, and photo spheres available for viewing through QR codes was a common interest between the groups. Based on this information, it was determined that the self-guided tour improvements being recommended to the Grabser Mühlbach association would positively benefit the visitor experience at the museum if implemented.

The parties who tested the website, mainly members of other 2018 Switzerland IQP teams, agreed that the model of the website was more visually appealing and easier to navigate than the current version of the website. While the current version has vast amounts of information, for visitors unfamiliar with the website it can be difficult to access all of the information. It was confirmed that the new layout, especially the drop-down menus, helped visitors to the website find information quickly and efficiently. It is apparent that incorporating aspects of the model website in the current website, or moving information over to the model website will make information easier to access for website users.

With the feedback received on the trails and website, it is evident that the recommendations to be put into place are valuable to the improvement of the Grabser Mühlbach's self-guided tours.

CONCLUSION

The Grabser Mühlbach association has worked hard to find information about the mills and millstream to make available to the public. We hope that the recommendations and deliverables documented in this report will help the association continue to achieve their goal of communicating the historical and communal importance of the Grabser Mühlbach to generations to come. The different opinions, those of young and old and those from different cultures, presented a challenge to the project team to make deliverables and recommendations presented to the Grabser Mühlbach association appeal to many unique groups of people. This should ultimately impact the visitor experience at the museum in a positive way. Providing a place for people to congregate and resources for people to learn about the Grabser Mühlbach and its impact on the lives of many people is extremely valuable. The unique features of the site, its running mills, and its location at the heart of a community and town, can be communicated for years to come with the assistance of the recommendations for the association at the Grabser Mühlbach museum.

APPENDIX A

SPONSOR DESCRIPTION

1. INTERSTAATLICHE HOCHSCHULE FÜR TECHNIK BUCHS

The Interstaatliche Hochschule für Technik Buchs, commonly known as NTB (standing for Neu-Technikum Buchs), was founded by the cantons of St. Gallen, Graubünden, and Liechtenstein in the year 1968. The institute opened its doors in 1970, and by 1998 NTB became one of the four Universities of Applied Sciences in Eastern Switzerland, known as the Fachhochschule Ostschweiz (FHO). Its three sister campuses are located throughout Eastern Switzerland: one at the center of the Rhine Valley, one at St. Gallen, and one in Chur (NTB Interstaatliche Hochschule für Technik Buchs [NTB], 2018). The school itself is humble in size at about 400 students, 40 professors, and 120 academic research engineers, but its size certainly does not have an effect on its high level of education (NTB, 2018). Much like WPI, NTB highly values the outlook of theory and practice for its students to garner hands-on experience while still developing fundamental classroom learning. With its practice of fusing education with hard work, NTB strives to have its students become lifelong learners, and still be financially independent once leaving the institution.

Chiefly, NTB is an applied sciences and engineering school offering six undergraduate areas of study: Mechanical Engineering, Microtechnology, Electronics and Control Engineering, Engineering Computer Science, Information and Communications systems, and, since 2015, Photonics (NTB, 2018). In addition to these undergraduate options, NTB has three areas of graduate studies: Master of Science in Engineering, Mechatronics, and Energy Systems (NTB, 2018). Comparable to WPI, NTB focuses on a hands-on, problem solving environment that encourages the employment of projects in students' education. There is a strong presence of technology transfer and research and development by the institute from its partners in industry. NTB's own project managers and engineers with either a Bachelor's or Master's degree are encouraged to take on projects to target specialized services for individual clients (NTB, 2018). Through their research and performance, NTB allows their project managers and engineers to be able to develop systems solutions in the real world.

NTB's vision is as follows, "We, the NTB, create value and add value in everything we do. Our strengths are: our holistic, interdisciplinary and application-oriented approach; summarized under the NTB's term system technology, our courage to innovate, and our implementation of the leadership idea" (NTB, 2018). The university educators cling onto their ideology tightly and try to stay true to the values that they pride themselves upon. "We exude enthusiasm. We go together. We use the change. We create something special" (NTB, 2018). These values that

Appendix A

NTB boasts can be implemented to support the improvement of the outdoor museum, which they sponsor.

NTB has undergone some changes throughout its history. Similar to WPI and many other technology institutes throughout America, NTB is working to increase the number of women who are interested in STEM fields. NTB has a "Girls' Day," where the institution invites young women from the surrounding area to provide them with the opportunity to be exposed to STEM environments where they will hopefully become interested in non-stereotypical areas of study. The program gives the girls a chance to learn about "mechanics, chemistry and electronics by assembling their own radio" (NTB, 2018). Additionally, NTB has a program called the "training pass" which allows young people-- boys and girls alike-- to "develop, manufacture and control technical everyday objects, such as street lighting, coffee machines, signal transmission and packaging" (NTB, 2018). Through programs that focus on the youth of the country, NTB hopes to boost the nation's interest in STEM across the board. They even want to reach people of all ages, as they offer lectures in chemistry and physics that are open to the public. NTB is dedicated to offering opportunities for people to expand their knowledge and apply what they learn to their everyday life, hopefully increasing their interest in science and technology.

As a university that traditionally takes an interest in the community, NTB is continuing its community involvement by working to improve a museum that shows technology's roots in society. Transferring education into practice is a mission of NTB. The Rector of the NTB, Lothar Ritter emphasizes that "curiosity is a driving force that must be applied and transformed in the right way; it must be tangible and effective" (NTB, 2018). It is necessary to learn the application of what one learns to be successful. Working towards a more engaging outdoor museum fits into the university's mission remarkably. Developing a deliverable plan to increase patrons' interaction and takeaway from Grabser Mühlbach will align with NTB's goals (NTB, 2018).

2. GRABSER MÜHLBACH ASSOCIATION

The Grabser Mühlbach features the use of a 1.7-kilometer-long millstream that has the capacity to power workshops, extinguish fires, and power mills in the community. Before modern sources of energy, water power is what powered the world. Without water power, mass production of textiles, metal works, and a multitude of other mechanically manufactured items would have been delayed until much later in history. Based on past projects that NTB has sponsored related to topics such as expanding women's interest in scientific fields of study, the university has an interest in improving the outreach of a community-based organization, like the Grabser Mühlbach association.

Appendix A

The goal of the Grabser Mühlbach association is to preserve cultural assets and improve the mill's accessibility for people to learn more about the rich history of the millstream. Before the age of technology, the stream served as the community's main destination for social interactions. It was a vital part of most people's days, even acting as the place for gossip and news-sharing while the townspeople would do their laundry along the stream's banks. Being such a source of daily interaction, neighbors would even comment if someone missed their usual washing time slots as it was a daily occurrence to be there every day at the same time. This sense of community generated by the mills was just as important as the mills themselves. The organization of the Grabser Mühlbach strives to bring these pieces of culture to life, while still showcasing the historic site of the mills.

To achieve this goal, the museum currently participates in an annual historical event called "Mill Day" which is put on annually in May. On even-numbered years, Grabser Mühlbach hosts events and demonstrations of the mills, as well as other activities such as horseshoeing and live entertainment. On odd-numbered years, mill workers visit other historic locations, such as the Landolt corn mill and participate in activities at the other locations (Grabser Mühlbach, 2018).

Currently, the Grabser Mühlbach does not have regularly scheduled guided tours-- only rarely offering them to groups and school classes for a fee. Although, there are signposts and informational plaques with pictures situated by the historical buildings along the four kilometers of the route for visitors to view for themselves as they travel along the path at their own pace. Because most of the mills are privately owned, the public cannot access them while giving self-conducted tours. Only during the special cases of a guided group tour or on Mill Day do these mills get to be accessed by the visitors. Due to this, implementing alternative measures for accessing these mills would greatly improve the Grabser Mühlbach's overall visitor experience.

Appendix A

APPENDIX B

SURVEY QUESTIONS

We are a group of students from Worcester Polytechnic Institute in Worcester, Massachusetts, USA. We are looking to measure the current visitor experience at the Grabser Mühlbach. The Grabser Mühlbach is a historical site in the town of Grabs, Switzerland that allows people to explore mills along a millstream through self-guided tours and occasional demonstrations. This survey will help us understand what the museum currently does well in terms of accessibility for visitors, and what can be improved going forward. The final goal of our project is to improve the experience of visiting the Grabser Mühlbach, so your feedback will help us to achieve this goal.

Thank you for volunteering your time to complete this survey. Your completion of this survey is optional and you may refrain from responding to any questions. This survey should only take 5-7 minutes, and your responses will remain anonymous, as no names or identification will be taken. The submission of this survey indicates your willingness to disclose your responses.

This project is sponsored by NTB Buchs, Grabser Mühlbach, and Worcester Polytechnic Institute. If you have any further questions or comments regarding the survey or project, you may contact us via email at ntbgrabsproject@wpi.edu. Again, thank you for taking time out of your day to help us improve the Grabser Mühlbach experience.

1. Which language would you prefer?
   a. English
   b. Deutsch
2. Have you visited the Grabser Mühlbach before?
   a. Yes
   b. No
3. Why did you come to Grabser Mühlbach?
   a. For a school-sponsored trip
   b. For an event
   c. To attend Mill Day
   d. For a guided tour
   e. To see demonstrations
   f. To walk around the area
   g. To visit the mills
4. What did you like most about the Grabser Mühlbach?
   a. The history
   b. The freedom to explore at your own pace

      c.   The events

      d.   The atmosphere of your experience

      e.   Any interaction with experts or volunteers

5. What about the Grabser Mühlbach would you like to see improved?
   a. Guided tours
   b. The technology
   c. The ease of finding certain buildings
   d. The ease of finding information

6. Which of the following did you experience?
   a. Interesting information
   b. Easy access of information
   c. Helpful people
   d. Effective signs
   e. Helpful maps
   f. Difficulty in reading signs
   g. Confusion of where to go
   h. Limited information
   i. Lack of assistance in directions
   j. Lack of hands-on activities

7. Would you like to see more interactive exhibits?
   a. Yes
   b. No

8. Have you visited the Grabser Mühlbach during demonstrations days before?
   a. Yes
   b. No

9. Have you visited the Grabser Mühlbach during Mill Day?
   a. Yes
   b. No

10. What did you participate in during Mill Day?
    a. Demonstrations
    b. Guided tours
    c. Interactive exhibits
    d. Interaction with animals
    e. Interactions with experts/property owners
    f. Horse and carriage ride
    g. Experience live music
    h. Purchase of food and/or drink

11. Would you return to visit during Mill Day?
    a. Yes
    b. No

12. Would you be interested in any of the following events at the Grabser Mühlbach?

Appendix B

a. Farmer's Market
b. Food Festival
c. 5K race at the Grabser Mühlbach
d. Folk/ Music Festival
e. Antique Show
f. Holiday Festival
g. Children's Day

13. Do you prefer a self-guided tour, or a guided tour of the Grabser Mühlbach?
    a. Self-guided
    b. Guided

14. Do you plan on visiting the Grabser Mühlbach?
    a. Yes
    b. No

15. Would you return to visit the Grabser Mühlbach if there were special events happening?
    a. Yes
    b. No

16. Have you visited an outdoor museum before?
    a. Yes
    b. No

17. Have you visited a museum before?
    a. Yes
    b. No

18. What did you like most about the museum?
    a. The history
    b. Tours
    c. The events
    d. The atmosphere of your experience
    e. Any interactions with experts, staff, volunteers
    f. Gift shop
    g. Interactive exhibits
    h. Demonstrations
    i. Informational plaques

19. Do you think interactive exhibits make you more engaged in your museum experience?
    a. Yes
    b. No

20. Have you attended any of the following in the past?
    a. Farmer's Market
    b. Food festival
    c. 5K Race
    d. Folk/Music Festival
    e. Antique Show

Appendix B

   f. Holiday Festival

21. Would you attend any of the following if they there were at the Grabser Mühlbach?
   a. Farmer's Market
   b. Food Festival
   c. 5K Race
   d. Folk/Music Festival
   e. Antique Show
   f. Holiday Festival
   g. Children's Day

22. Have you ever used virtual tours?
   a. Yes
   b. No

23. Have you heard of the Grabser Mühlbach before?
   a. Yes
   b. No

24. If the Grabser Mühlbach had access virtual tour options, would you use them?
   a. Yes
   b. No

25. Would you still visit the Grabser Mühlbach if there was virtual tour access online?
   a. Yes
   b. No

26. Have you visited the website for the Grabser Mühlbach?
   a. Yes
   b. No

27. What did you like about the website?
   a. Ease of accessing information
   b. Videos
   c. Pictures
   d. Event Information
   e. Information provided that is not available at the physical museum?

28. Do you feel as though the website is difficult to navigate?
   a. Yes
   b. No

29. What would you like to see on the website that is not currently available?
   a. Calendar of events
   b. Updated pictures
   c. Updated videos
   d. More oral history stories
   e. Interactive games

30. Are there any features of the website that could be improved?
   a. Better layout

Appendix B

b. Better contact methods
c. Better format of events calendar
d. More pictures
e. More information about history of mills
f. More information about specifics of mills
g. More information about guided tours
h. More information about what to expect when you visit the mill without a guide
i. Update map
j. PDF files converted to normal webpage content
k. Multiple language translations
31. What features generally attract you to explore a website?
a. Appealing layout
b. Calendar
c. Pictures
d. Pages with information about topics
e. Multiple translations of a website available
32. If you indicated that you prefer to have multiple translations of text, which languages do you prefer?
a. German
b. French
c. Italian
d. English
e. Romansh
33. If you have not attended before, do you plan on visiting the Grabser Mühlbach?
a. Yes
b. No
34. Would you visit the Grabser Mühlbach if there were special events happening?
a. Yes
b. No
35. What is your age?
a. Under 22
b. 22-27
c. 28-35
d. 36-40
e. 41-50
f. 51-60
g. 61-70
h. Over 70

Appendix B

APPENDIX C

TEAM VISITS SUMMARY AND SURVEY

Several WPI students from other project teams came to visit the Grabser Mühlbach throughout the duration of the Zurich A '18 IQP as first-time visitor test groups. They were asked to follow self-guided tour routes using the maps created by the project team. The visiting teams were given no tour guides or additional help navigating the museum, as to allow the students to explore the Grabser Mühlbach just like a regular visitor would on a self-guided tour. In order to get impressions, other than spoken feedback, of their experiences at the Grabser Mühlbach, the students were observed as they went through the tour. Some of the factors that were monitored included the students' confusion about the trail routes through the Mühlbach, the interest for information or visuals at a specific site, and the overall enjoyment of their experience at the Grabser Mühlbach. After the self-guided tours, the students were given an individual survey to fill out about their experience at the Mühlbach. Through the observations, surveys, and general feedback, more information was gathered about what improvements would be beneficial to the self-guided tour experience.

The student groups came to the Grabser Mühlbach on two separate days. On each of the days, the groups were given a different trail route to follow. The change of trails was made to test if either of the routes were hard to follow, and if each of the routes had enough interesting content for the students.

On the first day, the students toured through the 'Grabser Mühlbach Highlights' trail. They were given a QR code to scan, which brought them to the trail on Google My Maps. Using their phones and watching the GPS tracker on the map, the students followed the trail through the museum. Along the trail, QR codes were provided for a few of the sites that have videos of the mills operating.

As the students walked around the Grabser Mühlbach, they occasionally struggled to follow the trail. This was due to the Google My Map trail leading down incorrect pathways at some points. At other times, the signs at the Grabser Mühlbach that students could use to supplement the Google My Maps caused confusion for the students. While on the tour, the group had to ask if certain areas could be entered or not, such as the area behind the blacksmith building. These issues that the group came across show that there are points along the Grabser Mühlbach's trails that could benefit from improvement. These improvements would be especially valuable to visitors who are not familiar with the Grabser Mühlbach.

The visiting group was interested in learning more information about the mills through pictures or videos, since most of them could not read the German signs. They enjoyed the

videos of the mills included in the QR codes provided for the tour test, but wished that they could see and learn more. Oral histories were conveyed by the project team to the visiting group during the tour, and the students confirmed that these would be interesting to include in the self-guided tour. Having a QR code link to written stories, or a video of a personal anecdote would make the tour more personal and memorable.

After the tour, the group completed the survey below. Overall, the group enjoyed the history and found the trail and QR codes helpful to the experience. Some of the improvements that were suggested in the surveys included making the direction signs larger so that they would be more visible and posting signs that state that it is acceptable to go through people's property.

On the second day, the second group of students toured the trail of the upper mills. They were given an improved version of the Google My Map trail to follow. The group had an easier time following the updated Google My Map trail through the Grabser Mühlbach museum than the previous students. Occasionally they were slightly confused about where some of the locations marked on the map were, since the location icons were too far away from the trail on the digital map. The trails still needed to be improved slightly but many of the issues that the first group came across were no longer present when these students toured. The group of students were also given access to the links that the QR codes would connect to. This group did not seem particularly interested in physically clicking these links to get more information or videos, however they were very interested in the anecdotes and wanted to see inside the mills. After the tour, the group completed the same survey as the first group, and the results were fairly similar to the first group. Both groups of students agreed that the links and QR codes positively added to the experience, adding more signage would help them feel like they were trespassing less, and that the Google My Maps were easy to follow.

Appendix C

9/27/2018 IQP Groups Tour Survey

IQP Groups Tour Survey

Thanks for testing out our trails!

1. Did you find the Grabser Mühlbach to be interesting?

Yes

No

2. If so, what did you find interesting about the Mühlbach?

3. Did the QR codes positively add to the Mühlbach experience?

Yes

No

4. Did you feel confused about where to go at all? If so, where?

5. Was the My Maps route easy to follow?

Yes

No

6. Did you feel awkward walking through people's backyards?

Yes

No

7. Would you come back to the Mühlbach?

Yes

No

Appendix C

APPENDIX D

MANUAL

IMPLEMENTATION PLAN

A comprehensive manual for use at the Grabser Mühlbach

Created by Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, Christopher Nelson

Table of Contents

UPDATING THE GRABSER MÜHLBACH WEBSITE

USING WIX TO MAKE CHANGES AND OTHER GENERAL IMPROVEMENTS TO INCORPORATE INTO THE GRABSER MÜHLBACH WEBSITE

For use by the Graber Mühlbach association and parties involved in website improvements

Created by Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, and Christopher Nelson
11 October 2018

CURRENT WEBSITE APPROACH

The current Grabser Mühlbach website offers a wide range of information and media. While this site is a very helpful source for Grabser Mühlbach visitors, not all of the useful resources are easy for them to find. In order to get the most use out of the website and to make information accessible to visitors, it is advised to make changes to improve the organization and design of the website. This manual offers information on how to change the organization of the website to make it easier to navigate. Additionally, information about how to add features to make the website more user-friendly is provided.

While the current website was made using jimdo.com (hereafter Jimdo), the model website was made using wix.com (hereafter Wix). This decision was made because Wix is an easy platform to use, and it was unknown if Jimdo allowed website creators to use all the features necessary to make a model of the website free of charge. Even though a different website was used for the model website, a change from Jimdo to Wix is not being suggested. The changes in website aesthetic and format of information are the improvements being recommended. However, Wix can still be used to modify the model at any point or if needed, the model could be used as the official website of the Grabser Mühlbach. Since the model is currently in English, the page would need to be translated before it could be used as the official page, as most people visiting would speak Schweizerdeutsch instead of English.

USING WIX

Here is the URL of a short video in Deutsch briefly explaining how to use Wix: https://www.youtube.com/watch?v=M14VosOIFBY.

Wix can be accessed by going to wix.com. At the homepage of the website, it is required to log in to a Wix account. The account for the model website will be provided to the Grabser Mühlbach association in person. The name of the model website page is "Grabser Mühlbach Model." It can be viewed through this link: https://ntbgrabsproject.wixsite.com/grabsermuhlbachmodel.

 Since the website account is defaulted to English, the language can be changed, if needed, to Deutsch by clicking on the drop-down menu in the top right and clicking 'English' to bring up language options and then clicking 'Deutsch'. This can only be done after logging in.

At the main menu of Wix, the account's created websites can be viewed. Here, you can choose the Grabser Mühlbach Model website to visit its dashboard. On the dashboard, there are

several settings that can be controlled for the website. By clicking the drop-down menu for site actions, the site can be edited, renamed, shared, previewed, or transferred to another account.

On the far right of the dashboard there are options to change your account's plan. This means that the user can choose to pay for several different features by upgrading its plan. Some of the features that could be utilized include unlimited bandwidth, removal of ads, an online store, and upgraded storage. If the Grabser Mühlbach website were to completely move to using Wix for its official site, this would be how the model website could get its own domain name (i.e. grabser-muehlbach.ch).
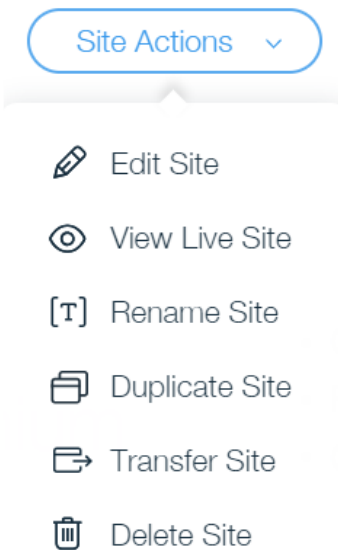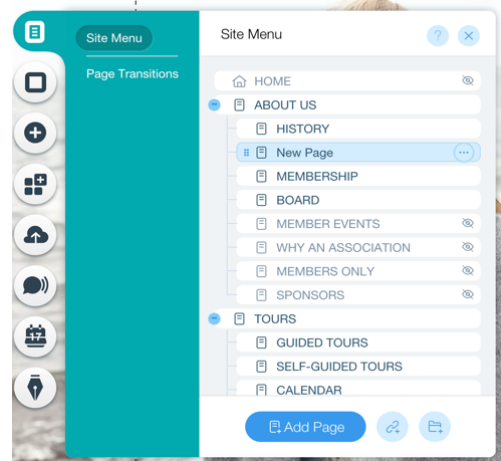
If changes are to be made to the current model, then 'edit site' can be selected from the site actions drop-down menu (see image on left). This will bring the user to the editing page for the website. On this page, the current version of the website can be viewed and all of the pages can be modified to the user's liking(see image above). The left hand side of the screen has a menu that includes many helpful editing features. This menu is where one can manage pages, add any necessary media, and change the background and color schemes. Some of the media used in the Grabser Mühlbach model website include content strips, buttons, calendar applications, and a trails map imported through HTML code. After the editing of the project, the model can be saved and published online. Both of these options are located in the top right corner of the editing screen. Once finished publishing, Wix will let the user know the given domain name of the site.

CONSTRUCTION OF A PAGE

Creating pages on Wix is important for organization and aesthetic appeal. The process to create a new page is relatively simple.

GENERAL CONSTRUCTION OF A PAGE

Creating a new page on Wix is fairly easy to do. Once in Editor, a column of icons will be present on the left hand side of the screen. The top icon titled "Menus & Pages" will display all

of the current pages on the webpage. By clicking "Add Page," a new page will be created in which the name can be changed, the page could be hidden, the page can become a subpage, or even be deleted. After creating the new page, it can then be visited and modified to fit a specific purpose.

The left-hand icon column can be used to change the background of the new page, or add a variety of media or displays. The third icon down titled "Add" can be used to add a number of things to the page, including text, interactive buttons, strips, galleries, and much more. The Grabser Mühlbach model website frequently utilizes "Strips" and "Buttons."

To implement these functions into a new page, these steps can be followed (view image below to reference where the buttons are located):

Hover cursor over "Strips" where a variety of designs will be displayed. Any design can be chosen based on the best fit for the content that will be added. To choose a design, either double click on the desired design, or drag it onto the empty webpage.

Text can be edited by double clicking on the already present text. Text settings will appear, and the format of the text can be changed. These text boxes can also be moved to a desired position, with positional lines to indicate centering and other justifications.
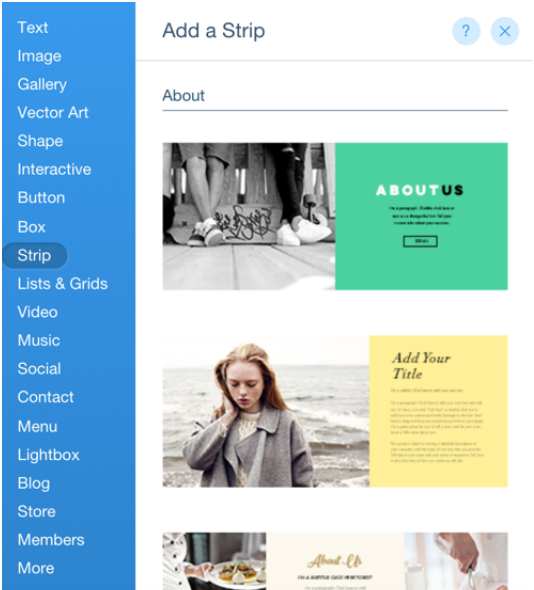
Columns can be edited by clicking anywhere on the strip, where the option to "Manage Column" will appear. This allows for the addition of columns, changing of layout, and duplication of the strip.

To change the picture or background, choose "Change Column Background." This allows for the input of a solid background, preset backgrounds, images, or videos. Additionally, settings can be changed for image transparency, scroll effects, and image scaling.

To add a button, hover cursor over "Button" where a variety of button designs will be displayed. Any design can be chosen based on the best fit for the page design. To choose a design, either double click on the desired button, or drag it onto the webpage. The button can be positioned in any location.

Buttons can also be used as a "Read More" option (see image to right). This can be used on a generalized webpage to link short descriptions of a topic to another page for more in-depth information. On the sample website, this is utilized especially on the "Tours" page, where for example, a short description of Guided Tours is provided and upon clicking on it, it links to a separate "Guided Tours" page that provides more information.
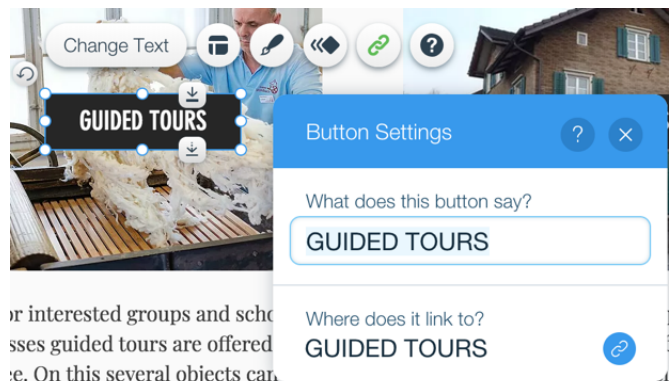
Double click on the button, which will allow for renaming. The option for linking the button will also appear, which allows for linking to another page on the website, an external website, documents, and a number of other sources. To link to another page on the website, the option "Page" should be selected on the left-hand side of the menu, and the drop-down menu on the right will allow for the selection of the desired page to be linked (see image on left). Single clicking on the button will allow for the design, text, layout, and animation of the button to be changed based on the desired function of the button.
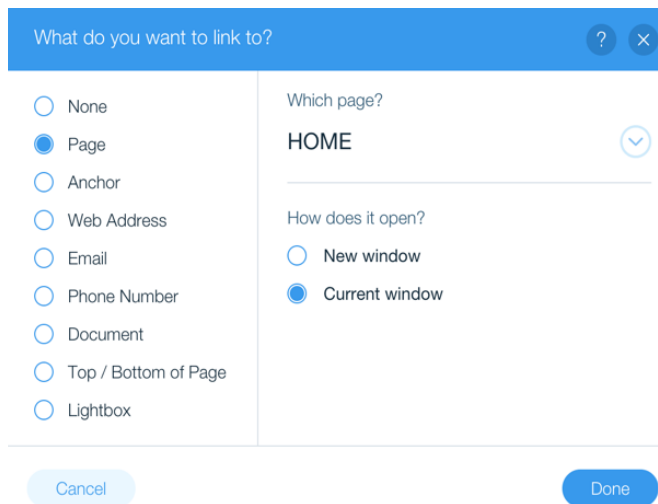
The steps outlined above explain the most commonly used designs implemented onto the sample of the Grabser Mühlbach website. Any other display or media can be implemented onto a webpage similar to the steps above. Text, vector art, shapes, and menus can be easily inputted anywhere onto a webpage. Displays that take up the entire screen such as interactives, strips, lists and grids, and lightboxes are also easy to implement, though the webpage may need to be expanded to allow for the fit. If a page needs to be expanded, clicking the footer at the bottom of the screen will have an icon appear that is titled "Adjust Page

Height," which can be selected. This will allow for the dragging of the footer, thereby elongating or shortening the page (see image below).
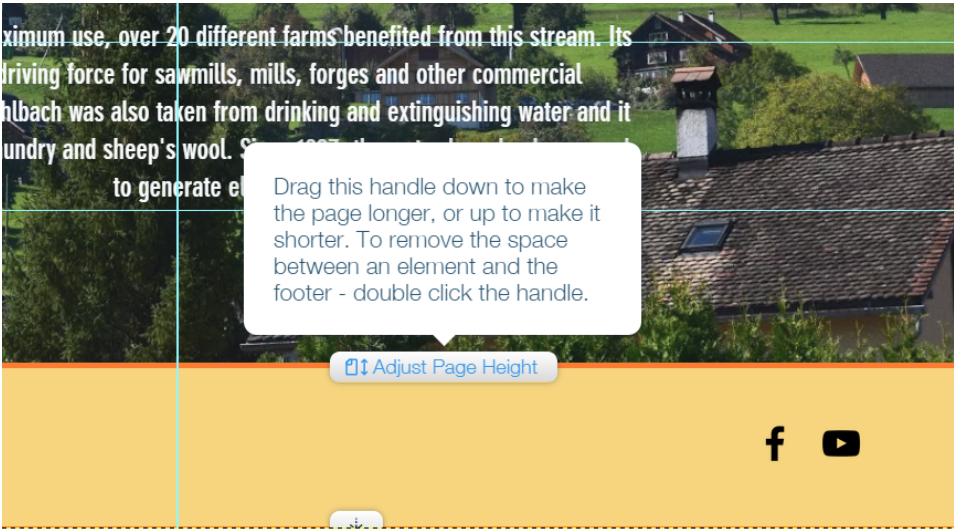
CALENDAR

Visitors should be able to find the best times to visit the Grabser Mühlbach with ease. Adding a calendar to the website would enable visitors to easily see when guided tours are available and when special events are scheduled. This calendar could be connected to an online calendar allowing people to set tour dates right on the website. This system could also be linked to the personal online calendars of the Grabser Mühlbach association members, so that they will be notified when a group schedules a tour. The current model of the website has a calendar in the 'Tours' section. While not all versions of Wix will link a personal calendar to a Wix calendar for a user, Wix offers the option for users to add HTML code to a page. Since it is possible to copy the HTML code for any Google Calendar, it is possible to connect a Google Calendar to any version of Wix. To do this, one must go into the settings of their Google Calendar and make the calendar available for public viewing. Then, copy the HTML code found by clicking 'customize' in the 'integrate calendar' section (see images below for visuals on this process).
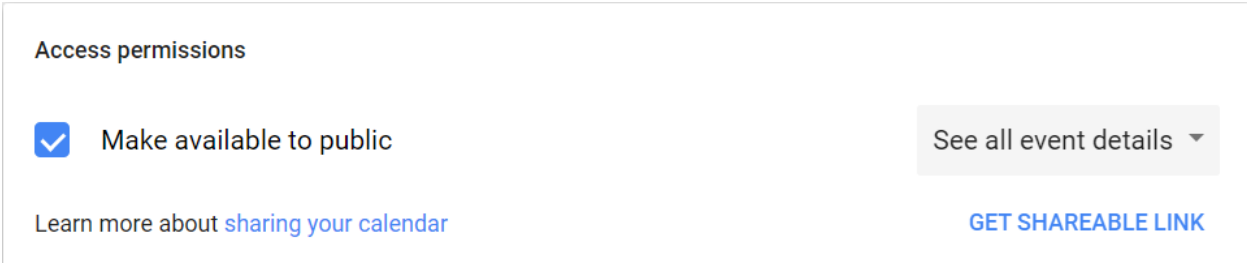
Integrate calendar

Calendar ID
rtifokaqa3nee1em7vp20gn3k0@group.calendar.google.com

Public URL to this calendar
https://calendar.google.com/calendar/embed?src=rtifokaqa3nee1em7vp20gn3k0%40group.cal

Use this URL to access this calendar from a web browser.

Embed code
<iframe src="https://calendar.google.com/calendar/embed?src=rtifokaqa3nee1em7vp20gn3k0'

Use this code to embed this calendar in a web page.

You can customize the code or embed multiple calendars.   CUSTOMIZE

Google Embeddable Calendar Helper

Copy and paste the HTML below to include this calendar on your webpage | Update HTML |

```
height=600&amp;wkst=1&amp;bgcolor=%23FFFFFF&amp;src=rtifokaqa3nee1em7vp20gn3k0%
40group.calendar.google.com&amp;color=%232F6309&amp;ctz=America%2FNew_York"
style="border-width:0" width="800" height="600" frameborder="0" scrolling="no">
</iframe>
```

This code can then be pasted into Wix by clicking 'add' and then 'HTML iFrame'.

Currently, the calendar linked to the model website is connected to the Google account that will be given to the Grabser Mühlbach association.

TRAIL MAP

On the website, a trail map can be utilized as a helpful tool for visitors. While there are already flyers with maps located at areas near the Grabser Mühlbach, some people may want to follow along on an online map that shows their location through GPS as well. Wix currently does offer a map feature, however there are very few customization options. In order to showcase all of the customizable trails on a map with GPS, a different online map should be utilized. Google My Maps (which the team used to create interactive maps) is easy to use, and it can be added to Wix through HTML code (see image above).
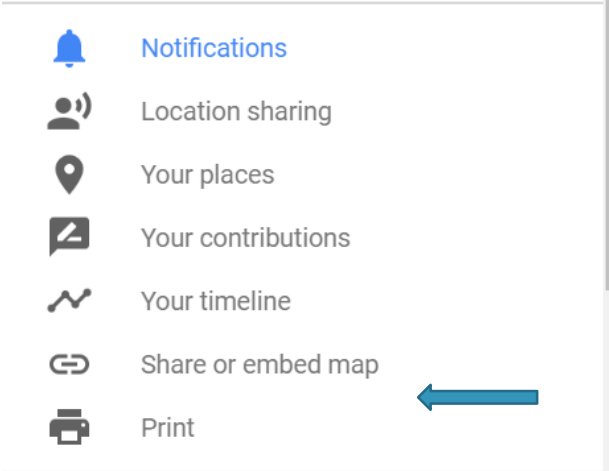
Similar to Google Calendar, the HTML code can be easily obtained for any Google Map. This can be done by copying the HTML code in the 'Embed map' section of the menu of any Google Map. This code can then be copied into Wix just like for the calendar in the previous section (see calendar section in website chapter).
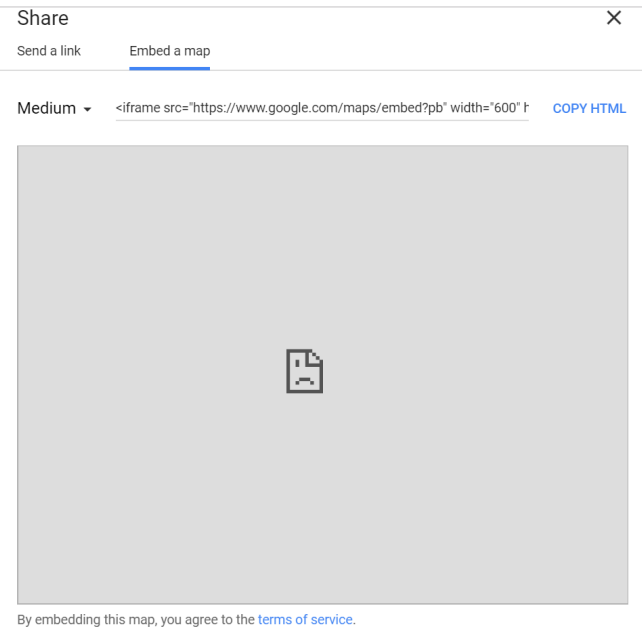
A GUIDE TO GOOGLE MY MAPS

USING GOOGLE MY MAPS TO CREATE AND USE TRAILS AT THE GRABSER MÜHLBACH

For use by the Graber Mühlbach association and parties involved in trail improvements

Created by Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, and Christopher Nelson
11 October 2018

IMPORTANCE OF TRAIL IMPROVEMENTS

The Grabser Mühlbach currently has a walking path that travels along the entire mühlbach, with various sites to see along the way. This path is used in the self-guided tour experience, but due to the fact that self-guided tours do not have a guide, this pathway is often hard to navigate. Outsiders may have difficulty finding their way through Grabs, even with the help of the current map and sign posts. In order to make these paths easier to follow, developing online trails is a way for visitors at the Grabser Mühlbach to be able to experience the tour with ease and enjoyment.

Additionally, using electronic trails allows for GPS tracking while maneuvering through the Grabser Mühlbach. This allows visitors to better find their way to specific sites throughout the mühlbach as each important site is indicated with a locational pin on the map. At each of these pinpoints is the name of the site, a short description of the site, and navigation information if the path to the next location may not be completely clear. With these features, the self-guided tour can be further improved. After the map is created, it can be linked to the Grabser Mühlbach website through HTML code, or directly linked through a QR code.

CREATING MAPS

Google My Maps is a platform that can be used to easily implement these aspects in a concise manner. In order to create the maps, sign into a Google account and visit Google My Maps. The maps could also be linked to a personal account of one of the Grabser Mühlbach association members, so that ownership is with the association. The trails created by the WPI team were created using their Google account, but after the conclusion of the project ownership will be transferred to the Grabser Mühlbach association. The link to the current maps is: https://www.google.com/maps/d/viewer?mid=1Sem86rzfK9ZRlRiXpBebzbW85yl71Ssr&ll=47.18164420849262%2C9.443601100000024&z=16.

To create a map, the following steps should be taken:

Step 1: Creating a Map
- Click "+Create a New Map," which will be in the top left-hand corner of the page. If you wish to edit an existing map, this can be done by simply clicking on said map.

Step 2: Adding a Layer

- Select "Add Layer." This creates a new level that the trail will reside in. Once "Add Layer" is selected, a layer titled "Untitled layer" will appear. This is where a specific trail can be named.
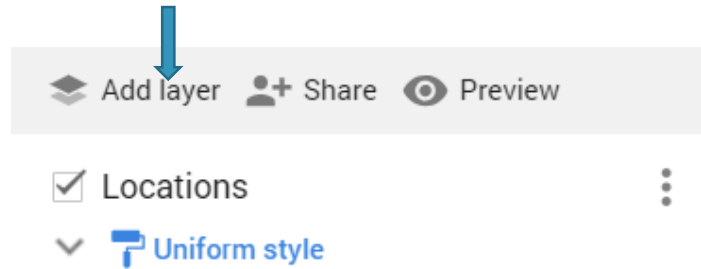
Step 3: Adding a Location

- After clicking the location button (shown below, icon is highlighted) and then pressing on the map to denote a location/start/end, a panel to name the location and add information will appear.
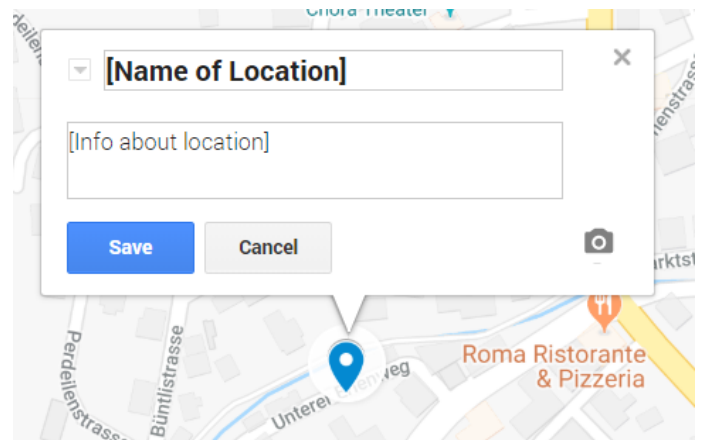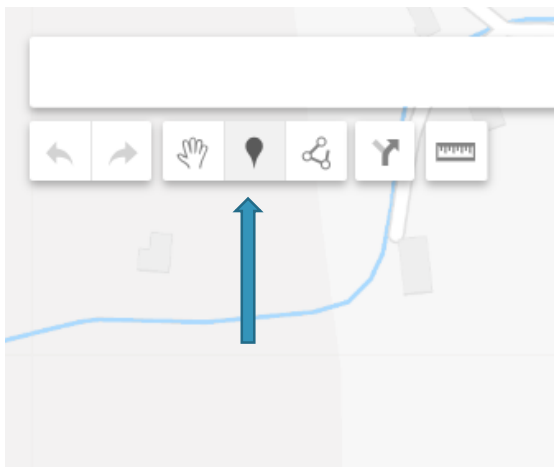
Step 4: Creating a Trail

- After clicking on the "Draw a line" button, a drop-down menu will appear
- Then click "Add line or shape"
- Next, draw the desired trail. Once the trail or section of trail is finished, press enter to finalize.
- In the case that an error has been made, the trail can either be deleted by pressing on the trail line and pressing the trashcan icon and redrawing the trail again, or by clicking on the trail and then altering the dots that appear (click on the x at the top right will make altering the trail easier).
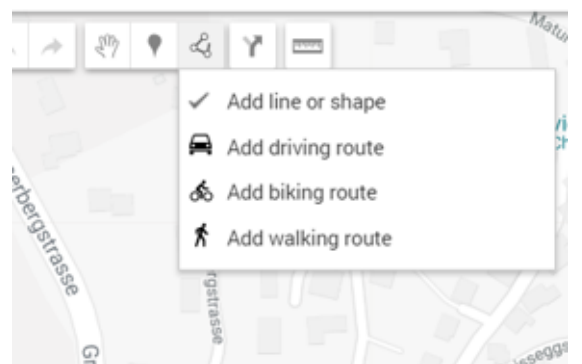
Step 5: Changing the style of a trail

- To differentiate trails from each other, trails can have their own distinct color. To do this, click on "Individual styles." A menu will appear and then click on "Individual styles" again, which will open a drop-down menu. From the drop-down menu, select "Uniform style." This will change all the parts of that layer to the same color

- After the trail has the "Uniform style," click on the paint can icon that pops up to the right of "All items"

- Once the paint can icon has been pressed, a menu will appear. Choose the desired color for the trail as well as increase the width of the trail line to make it more visible. The effect of changing the color and width can be seen below
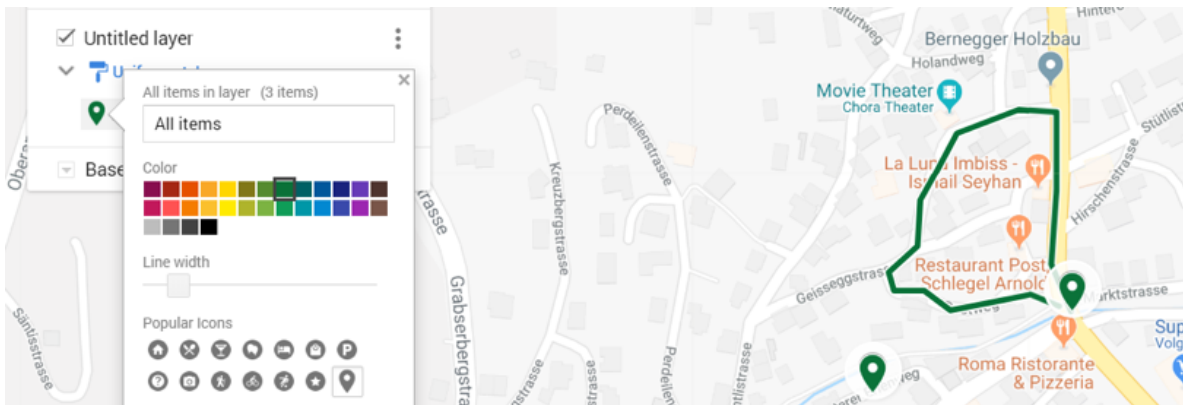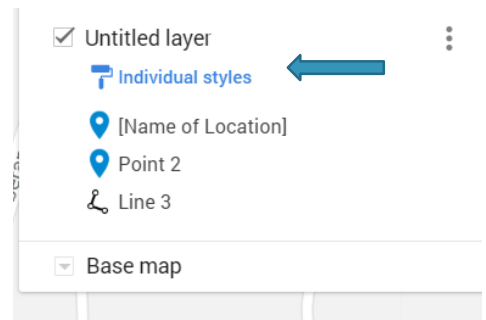
USING CREATED MAPS

Once maps are created, it is fairly easy to use these maps. They can be accessed through a link, and this link can be posted on both the website or through a QR code that is posted at the starting point of the Grabser Mühlbach.

Once able to access the map on a device, it will appear on the screen. A menu will appear on the left-hand side of the screen with various trail options. In the figure to the right, two trail options are checked (Lower Trail, Mühlbachstrasse Trail) and two trails are not checked (Full Trail, Upper Trail). This means that the trail routes for the Lower and Mühlbachstrasse Trails will appear on the map, while the Full and Upper Trail routes will not. In order to choose a specific trail, simply click the box and the trail will then be available to follow. To hide a specific trail route on the map, simply click the checked box and the trail will no longer appear on the map.
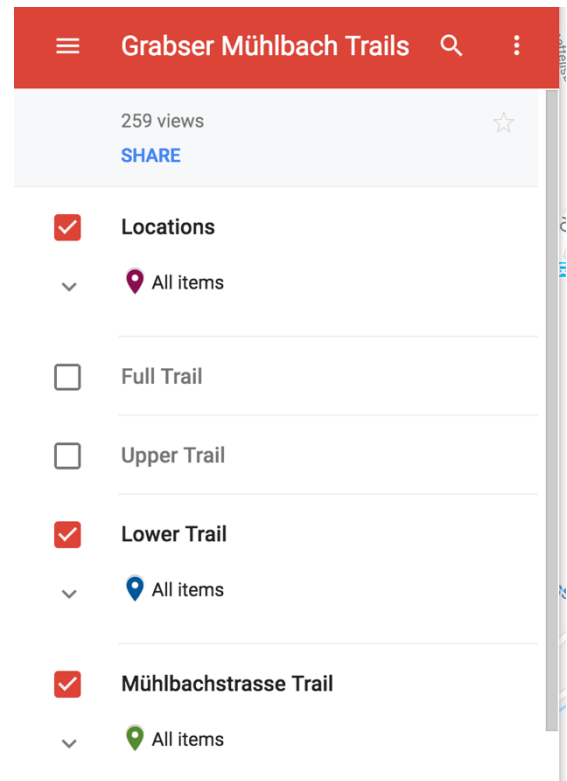
Once a trail route is chosen, the trail can then be followed through the Grabser Mühlbach. One's location will be tracked using GPS, so that navigation through the trails is simple. Also, there are pinpointed locations throughout the trail that are marked on the map. These locations are the important objects of the Grabser Mühlbach. By clicking on the pinned location, the number of the object will appear along with the name of the individual object. Some locations will also have short instructions that provide additional information for navigation through some sites that may be unclear.

The map can also be viewed in satellite view or traditional map view. This can be changed by clicking on the square icon in the bottom right of the menu. The directions for using the map on a computer are the same as those for using the map on a phone, making the maps easily accessible and easy to use on any device.
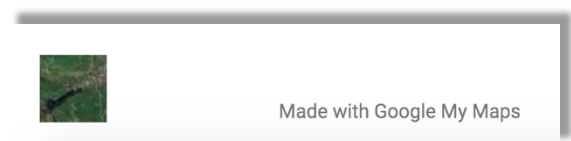
TECHNOLOGY RECOMMENDATIONS

A GUIDE TO CONSIDERING CONCEPTS FOR AERIAL PHOTOGRAPHY AND AUGMENTED REALITY AT THE GRABSER MÜHLBACH

For use by the Graber Mühlbach association and parties involved in visitor improvements

Created by Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, and Christopher Nelson
11 October 2018

IMPORTANCE OF TECHNOLOGY IMPLEMENTATION

Technology is increasingly being used to reach audiences at museums. It is often used at indoor museums, but using technologies such as augmented reality (AR) and photography allows for the application of technology outdoors. This means that museums, such as the Grabser Mühlbach, can integrate technology into their educational platform. Aerial photography can be used for a variety of purposes, such as aerial tours of locations or photos to be integrated into other technology, like AR. AR is beneficial when visitors should interact more with exhibits, and personnel are not available to help with the interaction. It can be applied in a variety of locations, both indoor and outdoor, and it can be used to positively impact the visitor experience at the Grabser Mühlbach.

AERIAL PHOTOS

Recently, aerial photography has experienced increased use in the tourism industry with the advent of increased drone access to the public. Aerial photographs and videos allow for views that cannot be seen from the ground to be shared with a wider audience and can increase interest in the location that was recorded. This would be beneficial for the Grabser Mühlbach, as the scope of the area can be better captured through this style of documentation. Instead of being limited to videos or still images of small areas, people can see the entirety of the mühlbach and even feel like they are travelling down the millstream themselves.

For the Grabser Mühlbach specifically, drone footage could be implemented in a number of different ways. A unique way to view the mühlbach would be to have a drone follow the water flow through the town. This could provide a better understanding of the scope of the mühlbach, while it could also give a perspective of how the town was shaped around the millstream. Travelling down the mühlbach through an aerial video would provide a more diverse and entertaining experience for viewers than simply seeing images from the ground of certain sites. Additionally, drones could be utilized to take various aerial shots of the Grabser Mühlbach. This would allow for the extent of the mühlbach to be captured, and for the opportunity to capture images to help with mapping of trails. The image above is an example of an aerial photo taken by a drone.

PHOTO SPHERES

A recent development in photography is the idea of 360-degree photography, commonly known as photo spheres. A photo sphere is created when a number of photos encompassing a 360-degree view of a location are taken and then "stitched" together to create a seamless 360-degree photo. This can be compared to an interactive panorama photo. The photo can then be manipulated by a viewer by scrolling around the screen to change the view. This can also be paired with AR to make a truly in-depth viewing platform.

It would be beneficial for the Grabser Mühlbach association to incorporate photo spheres, not only because they are interesting but because they allow for an interactive way to experience an exhibit or location. It is possible to access more information for objects of interest by having a virtual marker placed on the image of the object in the photo sphere. By clicking on this marker, additional information would be given on that specific object.

This method of photography can be used in conjunction with aerial photography, as Energiepfad Grabs, a company connected to the millstream in Grabs, has done.

AERIAL PHOTOS/PHOTO SPHERE EXAMPLE

Energiepfad Grabs has already photographed much of Grabs and incorporated an interactive map onto their website. These photos include a large number of aerial views and 360-degree scenes inside some of the mills, such as the Stricker-Mühle, the Messerschmiede Roth, and the Tuchfabrik.

When the program is first opened (visit www.energiepfad.ch/360/index.html?s=pano570 to test the program), a view of the doorway to the Stricker Handelsmühle's turbine is visible. From there the user can navigate through many other sites and locations in the surrounding area. Many of these locations are not related to the Grabser Mühlbach, but some sites from the millstream are included in Energiepfad Grabs' documentation. While exploring, the Energiepfad Grabs logo can always be selected to go back to an overarching aerial view of the area.

● Kleinwasserkraftwerk «Messerschmiede»

Gegenüberstellung alter und moderner Nutzung der Wasserkraft am Mühlbach

Die Messerschmiede am Grabser Mühlbach wurde am 21. Dezember 2011 von Buchs nach Grabs versetzt und wieder mit einem Wasserrad versehen.

Messerschmiede mit Wasserrad

From the aerial view, buildings that have more information are slightly translucent and can be selected, accessing a page containing information relating to the selected item. The yellow location markers in the lower left corner of the image below can also be used as navigation to another viewing location. Once a yellow location marker is selected, the user will be taken to a 360-degree photo correlating to the selected location marker. From there, a yellow circle (like the ones in the bottom left corner of the image found below) can be selected, so a new viewing location can be visited.

The image above is a 360-degree view of the interior of the Messerschmiede Roth. The image can be rotated by selecting a location on the screen and dragging the image. The yellow circles in the image can be selected to either bring the viewer to the second floor of the Messerschmiede Roth or to a view of the outside of the Messerschmiede Roth, similarly to how the initial viewing location was selected.

The Messerschmiede Roth has another view that shows the water wheel outside of the building operating. The water wheel turns and stops when pressed – an interactive component that is interesting as it gives insight to the operation of water wheels and mills. This component could be incorporated into the other mills to show how they work as well.

At the Ehemalige Obere Säge, there is also an interactive plaque on the building, pointed to by the arrow in the photo above. When selected, the plaque provides information such as the mill's history, the power output of the wheel, and a diagram of how a sawmill works. This technology could be used at other mills to provide additional information about the site. Additionally, this could be a useful tool to provide a translation to other languages for foreign visitors.

AUGMENTED REALITY

Augmented reality (AR) is the mixture of physical reality with a virtual aspect with the aid of an electronic device. Generally, the reality is captured by a camera on either a mobile device or webcam and then displayed onto a screen. The virtual aspect refers to a projection of computer-generated imagery (CGI) onto the display to appear to be mixed in with the reality. This CGI can be used in many different ways to create different experiences for the user. AR

makes it possible for information to be accessible without the need for a physical medium, or can make something that may not necessarily be able to move, move.

The Landesmuseum in Zürich has incorporated augmented reality into their exhibits to create a more immersive experience. The museum incorporates AR throughout various exhibits, specifically one exhibit centered around a topographical map of Switzerland. Looking at the map through the provided mobile devices allows the visitor to see flags augmented on the tops of mountains. When these flags are selected on the screen of the device, more information is revealed to the visitor (see image below). AR exhibits like this one provide a more enhanced experience for visitors, as it allows for an extra level of participation at museums and historical sites, such as the Grabser Mühlbach.

FURTHER TECHNOLOGY RECOMMENDATIONS

Augmented reality would be very beneficial for the Grabser Mühlbach. Due to the fact that the mills are not often running and many locations are only accessible when accompanied by a Grabser Mühlbach personnel member, AR could give visitors the option to explore inside buildings at all times. By holding their phones up to the mills, visitors could be able to see projections on the mills that could link to information or to a 360-degree photo of the inside of the mill. This will give guests a more interactive and enjoyable experience at the Grabser Mühlbach.

It is also suggested that the Grabser Mühlbach association captures 360-degree images for all of the mills and aerial photos of the entire millstream and surrounding areas. This will provide visitors with a way to explore the Grabser Mühlbach without having to enter the mills.

Considering the fact that a specific type of software is needed to access the photo sphere, it may be beneficial to partner with Energiepfad Grabs or create a Grabser Mühlbach specific project with the help of Swisspano.ch, which is the company that Energiepfad uses. The Grabser Mühlbach can also explore other options for capturing these images that best fit their resources and interest in this addition. These images should be linked through QR codes, so they are available to visitors at the museum. If the association chooses to implement this concept, they can decide if they would like to link the map of photo locations and photos to their website, or keep the images exclusive to visitors to the museum.

SELF-GUIDED TOUR IMPROVEMENTS

A GUIDE TO MAKING IMPROVEMENTS FOR SPECIFIC OBJECTS ON GRABSER MÜHLBACH SELF-GUIDED TOURS

For use by the Graber Mühlbach association and parties involved in website improvements

Created by Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, and Christopher Nelson
11 October 2018

IMPORTANCE OF FURTHER TOUR IMPROVEMENTS

In order to improve the self-guided tour experience even further at the Grabser Mühlbach, specific additions at various locations throughout the site should be implemented. Improvements such as a clearer starting point, more directional signs, and new QR codes can be used to enhance the self-guided tours. With recommended changes to the website, maps, and other technology, these improvements look to improve self-guided tours mainly through online assistance. There should also be physical improvements, such as the addition of informational signs for visitors, when they are actually on site. These will allow for improved navigation through the Grabser Mühlbach, while also providing more information directly to the visitors.

STARTING POINT

The current Grabser Mühlbach trail starts at Grabs Post, where there is a large sign with information about the site and a map for navigating around the millstream. Nearby, there are several locations that one can visit to obtain a Grabser Mühlbach flyer that includes a map and information about the mills. While the current starting point is helpful for visitors, it could be improved. Creating a small structure, such as the one in the image on the right, would be very useful for the Grabser Mühlbach museum. The structure could still have the information and map from the current sign, but could also hold the flyers in a small box. This would allow visitors to quickly and easily pick up flyers and begin their self-guided tour without needing to stop into local stores beforehand to pick up the flyers. More people will be likely to take a flyer and thus more people will have a trail map for an easier tour around the mühlbach.

The structure could also have a sign with large words saying "Welcome to the Grabser Mühlbach! Start Tour Here!" or something similar. It is important for the starting point to be very welcoming so that more people are excited to start their self-guided tour and have a more

enjoyable experience overall. This would also make it easier for people to find the starting point in case any new visitors are confused or lost.

IMPROVING NAVIGATION

Many visitors who come to visit the Grabser Mühlbach are from outside of Grabs. Since the millstream is not always visible, and the trail travels through many parts of the town, they may have a hard time finding their way through the trail. While there are helpful flyers and maps online, some people may not utilize these tools or may not think that they are allowed in certain areas. A few changes to the trail can improve navigation through the mühlbach for visitors.

The locations for the recommended changes are marked on the following maps. Each location has a corresponding number, an image, and a short description providing more detail about the proposed additions.
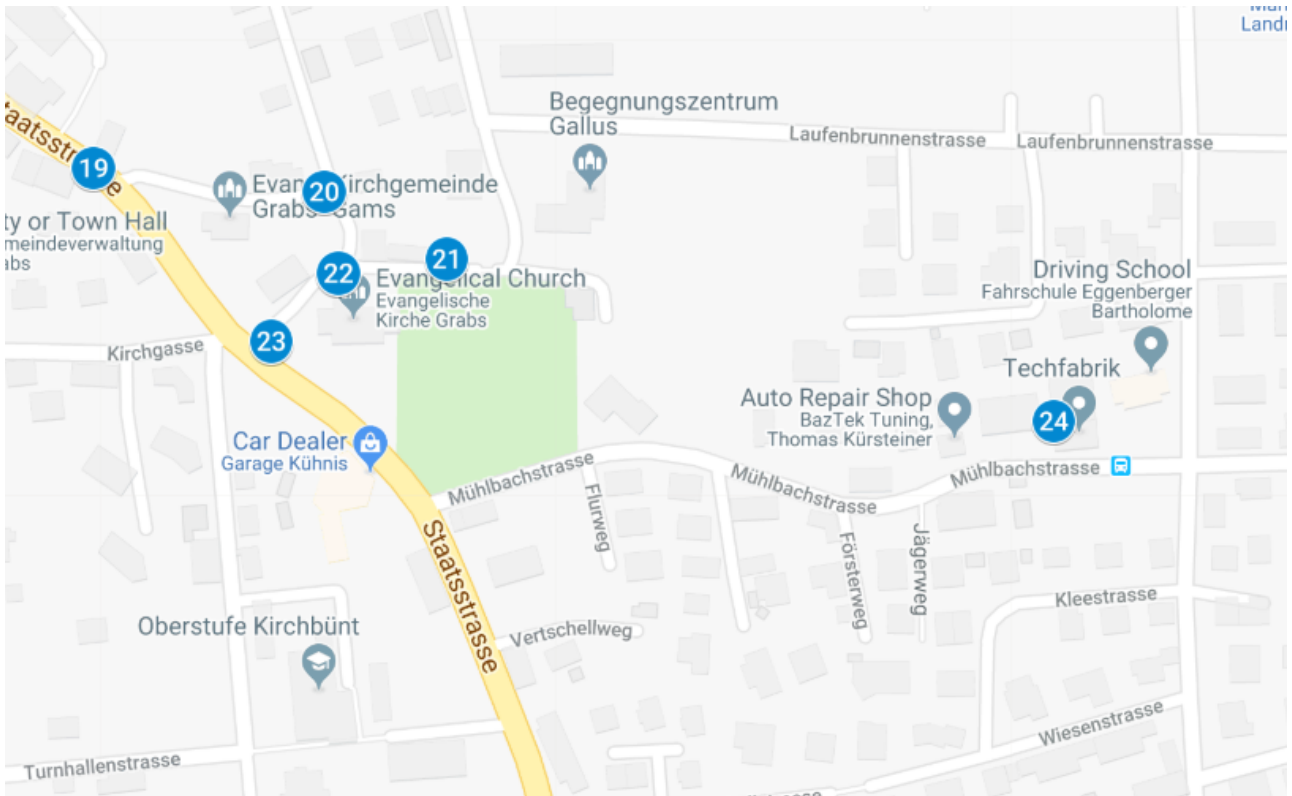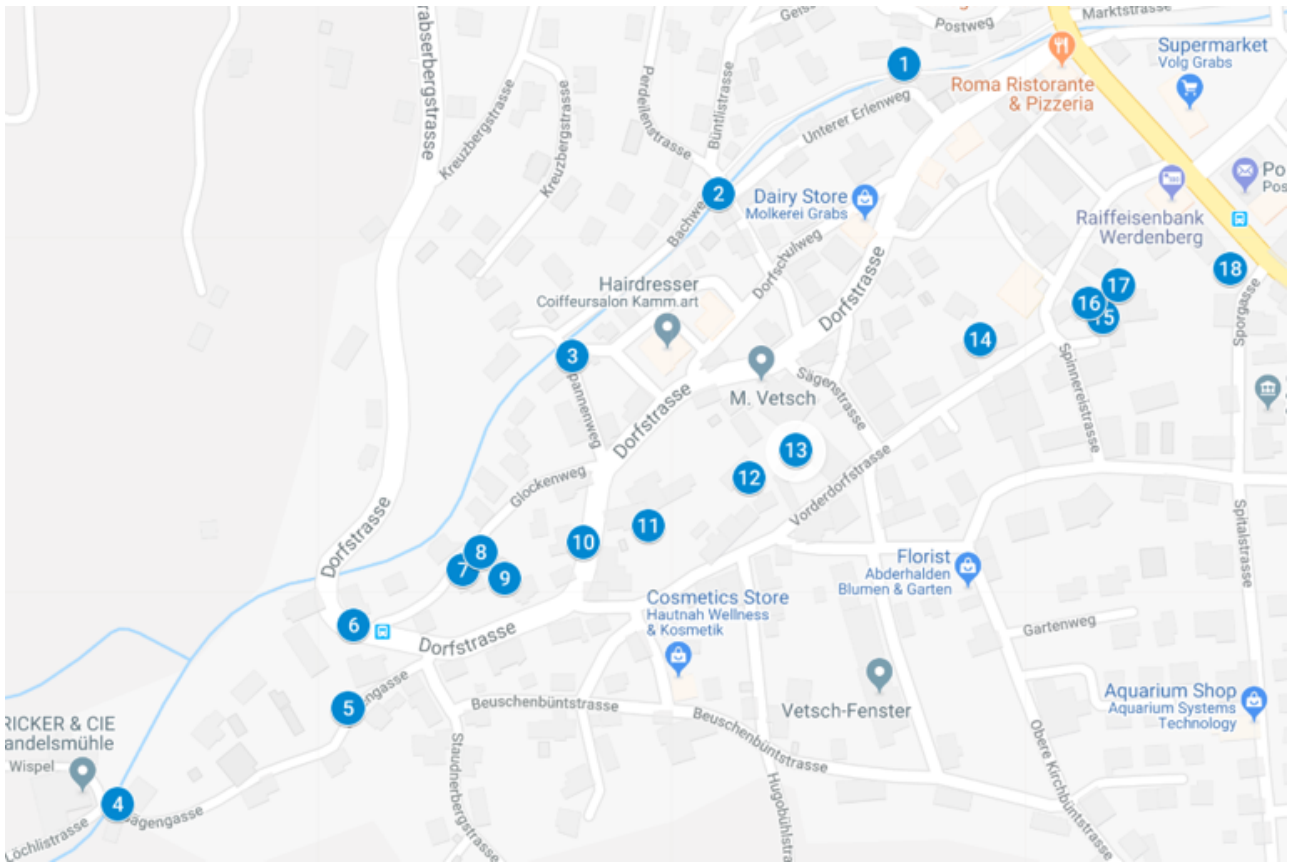
1. After visitors leave the starting point, it is important for them to know how to navigate to the top of the hill so that they can start their self-guided tour down the mühlbach. It would be easier for visitors if there was a sign right at the starting point directing people on where to go to reach the start of the trail. It would also be helpful to add a few signs in between the starting point and the first mill. Once on the trail and walking up the path next to the runoff stream, it would be useful to add a sign at the first wooden bridge telling people to keep going straight up the pathway so that they don't cross the bridge too early.

2. In the runoff stream, there is a very interesting part of the Grabs history: The Fire Dam (feuerdamm). This dam is discussed later in the tour at another location, but it would be useful to have a plaque at the dam. This would allow people to see the fire dam and understand how it works.

3. A sign denoting that you are supposed to go on the street to the right at the intersection of Bachweg and Spannenweg. There is a fork in the road here so it would be beneficial to have a sign pointing toward the correct path so that visitors immediately know which direction to go.

4. Wasserfassung:
The path to the Wasserfassung is behind a metal bar that is blocking the trail. If people want to see the area and read the plaque, they have to walk over the bar or move it out of the way. While this is not a difficult task, it may be confusing for guests if they do not know that they are allowed to walk over or move the bar to see the site. It is suggested to have a sign indicating that it is allowed for visitors to go past the bar. Another small improvement that could be made is that one of the signs near the Wasserfassung is missing the letter "r" in the word Grabser, so it could be added.

5. Ehem. Mühle zur Glocke:

The sign that directs visitors from the top of the mühlbach to this mill is covered by leaves. It would be easier to find the Mühle zur Glocke if this sign was more visible.

6. Sandfang und Hammerschmiede und Wasserradtypen

The sign that leads to this part of the Grabser Mühlbach is hard to see because it is blocked by a pole when viewed from the Mühle zur Glocke. There should be another sign somewhere telling people to walk down the road towards the aforementioned sign so that they see it and don't get lost. At the Hammerschmiede, the backyard of the house is where the water wheel is located. While there is a sign pointing to the water wheel, the area feels like someone's personal property and people may not want to intrude on that. Having a sign there to tell people that they are allowed and encouraged to go to the backyard will allow people to feel more comfortable going behind the house. Also, there is a separate pathway along the mühlbach in the backyard with no signage at all, but a small house at the end with the Grabser Mühlbach logo located on the house. It would be helpful to have some indication or signage letting visitors know what this is and if it is really a part of the tour or not.

7. Sandfang und Hammerschmiede und Wasserradtypen
At the Hammerschmiede, the backyard of the house is where the water wheel is located. While there is a sign pointing to the water wheel, the area feels like someone's personal property and people may not want to intrude on that. Having a sign there to tell people that they are allowed and encouraged to go to the backyard will allow people to feel more comfortable going behind the house

8. When you are viewing the water wheel at the Hammerschmiede (Bicker) there is also a little path and bridge that leads to a small building that has the Grabser Mühlbach logo located on it. It would be helpful if there were some signage near this location.

9. Öffentliche Waschküche und Mechanische Werkstätte
To enter into the area where the waschküche is, visitors have to open a gate and walk along a pathway. Similarly to the backyard of the Hammerschmiede, it would be helpful here to have a sign saying that visitors are allowed to enter the gate and that it is not a private gate/area.

10. Going from the Öffentliche Waschküche to the Ehemalige Obere Säge there is a sign that is low to the ground and on the side of a set of stairs. It may be hard for some visitors to see this sign when exiting out of the gate from the waschküche.

11. Ehem. Obere Säge und Stromerzeugung mit Wasserrad
After this mill, there is a sign to the next mill but it is hard to see from the waterwheel. Adding some extra signage here would be helpful to notify people on where to go. Also, the area past the waterwheel appears to be someone's property so adding a sign assuring people that it is okay to go through the property would be helpful for people so they know not to turn around and to keep going through this area.

12. Ehem. Hammerschmiede Beusch
After the Hammerschmiede Beusch, it would be helpful to add a sign pointing towards the next location letting people know to keep going straight. The sign for the next mill may not be visible to visitors from this location.

13. Ehem. Mittlere Säge und Mosterei
Next to this site is a store that sells products made from apples, such as cider. This store is a very interesting location along the path of the mühlbach and adding a plaque or sign talking about the store and its products would be enjoyable for visitors who may not know if they are currently selling to visitors. They can either learn about the store or go in and buy a nice refreshment during the tour.

14. Ehem. Mühle und Säge Vorderdorf
At this location, the mühlbach is running through a pipe behind the house. There is no attention brought to the pipe here and it would be good for visitors to have a sign at the pipe talking about the significance of the pipe. In addition, information letting visitors know that the mühlbach is in the pipe would be helpful at this site.

15. Schafwollverarbeitung Vorderdorf

On the walk to the wool mill, visitors must walk through a driveway and then over a bridge in the front yard of a house. Some visitors may not know if the owner of the house is okay with people walking on their property, so there should be a sign letting people know that they can approach this area.

16. Schafwollverarbeitung Vorderdorfand

After the bridge, there is no sign pointing towards the wool mill, so if visitors are not looking around they may accidentally walk past the wool mill without even seeing it.

17. Additionally, it would be beneficial to put a sign pointing towards the Sticklokal. Visitors may not realize that it is a separate object from the wool mill since the path stops following the mühlbach at this point to loop around roads to the lower part of the tour.

18. Ehem. Reisserei und Karderei (Ettlin)
To reach the next sites visitors must travel down the main road in Grabs. Due to this, the path could be slightly confusing for visitors. It would be helpful for visitors if there were more signs leading them through the trail on the main roads so that they do not take a wrong turn and get lost. Some places where signs could be placed include behind the Raiffeisen building pointing towards the road, near the post office pointing down the road, at the corner of spitalstrasse and sporgasse pointing towards the site, and after the Reisserei und Karderei at Gakleinenweg there could be a sign at the fork in the road pointing right towards the next mill.

19. The plaque on the Reisserei und Karderei (Object 13) is usually hiding by a car or a trash can. Also, there should be a sign pointing from the Reisserei und Karderei (Object 13) to the Werkzeugschmiede (Gehler) (14a)

20. There is a fork in the road where Wassegasse and Gakleinenweg meet. It would be helpful for visitors if there was a sign directing visitors to Unterdorfstrasse.

21. Werkzeugschmiede (Gehler) und Niederdruckturbine und Messerschmiede Roth
After visitors explore this location, visitors are supposed to turn around to continue the trail instead of going straight. Adding a sign at the farther down the road past the mill telling visitors to head back the way they came would stop them from continuing straight on the road and potentially getting lost.

22. On the path to the next mill adding a sign by the church telling people to take a left toward the main road would inform people of the quickest way to reach the main road, and of the path to get to the next mill.

23. It would be beneficial to put a sign telling visitors to take a left at the intersection of Unterdorfstrasse and Staatsstrasse.

24. Keinkraftwerk, ehem. Tuchfabrik
Right before the final mill there is an auto-leaf remover. This device is very interesting and could have its own plaque talking about its creation and more information. This could also have a QR code on it that links to a video of the device removing leaves so that people can see it in action if there does not happen to be many leaves in the mühlbach on that day. Lastly, visitors might be confused on where to go after the final mill so there could be a sign telling visitors where the next places they could go are (i.e. Post, Mühlbachstrasse bus stop, local restaurants...).

QR CODES AT DIFFERENT MILLS AND LOCATIONS AT THE GRABSER MÜHLBACH

Making a QR code is a simple and easy process. In order to do so, one must use an online QR code creation website. There are many of these websites available online and most of them are very simple to use. Once a creation website is chosen, it will prompt you to input the URL of the location that the QR will link to. Once this is done, the site will make a QR code that links to that website. This code can be downloaded or saved to a computer at that point and no matter when or where this image is scanned, it will link to the URL.

One website that is recommended is http://goqr.me/ for making QR codes. This site works very well and it is completely free to make and download codes. This website also allows companies to send a logo so that the code will show that image in the center. This could be helpful for the Grabser Mühlbach because QR codes could be placed anywhere around the millstream and people would know that scanning them would lead to the Grabser Mühlbach website specifically.

QR codes allow for the easy access of information by visitors with a simple scan. For use at the Grabser Mühlbach, QR codes would be able to provide visitors with supplemental information directly at each mill. Additionally, the QR codes can be linked to a webpage so that information can be easily added or updated when necessary.

Above is an example of a QR code situated on a plaque. This plaque is located at the Hammerschmiede. The QR code links to a video of the Hammerschmiede in operation.

Many mills already have a lot of information to put on site-specific QR codes, but some objects do not have a lot of extra information already on file to link to QR codes. The following is an outline of recommendations for information to be added to QR codes at specific objects.

Location	Recommended Source for QR Code Link
Mühle im Wispel	Stricker Mühle website, which is comprised of a large quantity of information about the mill and company.
Wasserfassung	Video of the slider adjusting how much water goes into the mühlbach. People will be able to see exactly how the Wasserfassung regulates the amount of water that goes into the Grabser Mühlbach.
Ehem. Mühle zur Glocke	Photo album of pictures of this mill. Visitors will be able to see how it used to look before the many renovations.
Sandfang und Hammerschmiede und Wasserradtypen	Video that shows the Hammerschmiede in operation. Additionally, the QR code could link to a diagram of the hammer inside of the Hammerschmiede
Öffentliche Waschküche und Mechanische Werkstätte	Videos of inside the waschküche.
Ehem. Obere Säge und Stromerzeugung mit Wasserrad	Information pages about this site, along with videos and description of the Stromerzeugung mit Wasserrad.
Ehem. Hammerschmiede Beusch	Photo album of pictures of this mill, if one exists, or to a longer personal anecdote about the mill before it was demolished.

Ehem. Mittlere Säge und Mosterei	Photo album of pictures of the former sawmill. This will allow people to see how it used to look before the sawmill business was discontinued.
Feuerkämpfung früher, Löschwasserkanäle	Video of the fire dam being used. This will allow people to see the dam in action blocking the water for use.
Huf- und Wagenschmiede:	Photos or videos of this mill inside the building. This will allow people to see the wagon smith in action when the building is closed off.
Ehem. Mühle und Säge Vorderdorf:	Photo album of pictures of the former sawmill. This will allow people to see how it used to look before the sawmill business was restored.
Schafwollverarbeitung Vorderdorf:	Videohare of the wool mill in operation and to videos of all the different machines at the wool mill. This will allow people to see the entire process of how the wool is turned into pillows and blankets here.
Ehem. Reisserei und Karderei (Ettlin)	Photo album of pictures of this mill or a longer personal anecdote about the mill before it was discontinued.
Werkzeugschmiede (Gehler) und Niederdruckturbine und Messerschmiede Roth	Video of inside the corn mill. This will allow visitors to see the mill working if the building is not open.

Knochenstampfe u. Ehem. Schlosserei	Video of inside this mill and also the history of this mill. This will allow visitors to see the mill working if the building is not open.
Keinkraftwerk, ehem. Tuchfabrik	Video of the leaf remover working and a video of the inside of the building if possible. This will allow visitors to see it working since it only actually works once enough of the leaves have blocked the vent.

INCREASING VISITORS AT THE GRABSER MÜHLBACH

A GUIDE TO WIDENING THE AUDIENCE AT THE GRABSER MÜHLBACH

For use by the Graber Mühlbach association and parties involved in visitor improvements

Created by Jennifer Gomes, Andrew Levy, Isabella Morrison-Ouellette, and Christopher Nelson
11 October 2018

WHY IT IS BENEFICIAL TO INCREASE THE NUMBER OF VISITORS

The Grabser Mühlbach is a beautiful outdoor site that offers much information about the history of Grabs and the mühlbach. While it is important that visitors enjoy their experience at the mühlbach, expanding an audience may be important in the survival of the historical site. Many people can benefit from learning the information available at the Grabser Mühlbach, and experiencing the unique nature of the millstream with many working mills. Increasing the audience at the Grabser Mühlbach will help spread its history, ensure its continuation, and be a way to bring in revenue for further improvements.

COMMUNITY EVENTS

Hosting events is important for organizations, as it allows for publicity and an immersive experience into a cultural occasion. New visitors have a reason to visit, and repeat visitors have a fun event to look forward to. Mill Day has been successful in bringing awareness to the history of the Grabser Mühlbach and bringing the community together. It is suggested that the Grabser Mühlbach association host a similar event in the years they do not host the actual Mill Day. With the Grabser Mühlbach hosting Swiss Mill Day every other year, it brings both old and new visitors to the site to experience the community of Grabs and the sense of community that was forged by the mühlbach.

By hosting an event on the years where Mill Day does not occur, it would further allow for the Grabser Mühlbach to provide this same experience of cultural education. This event could be similar to the current Mill Day, but would not have to occur on this date so that other mills could still be visited. Additionally, the event could be a smaller version of Mill Day, and may consist of opening a few mills and having some entertainment if the organization of a Mill Day event every year would be too much to coordinate. The Grabser Mühlbach association has had the insight of creating successful events such as Mill Day, so the organization of another similar event should be just as successful.

Additionally, hosting smaller events at the Grabser Mühlbach could have a similar result in attracting more visitors. These events do not have to be specifically related to the objects, but rather focus on the mühlbach as a backdrop for an external event. The Grabser Mühlbach personnel have stated that the Grabser Mühlbach is a community driven endeavor, and hosting an external event can allow for the showcasing of the community while still having the location of the mühlbach publicized. These events can range anywhere from a farmer's market, a 5K walk, food festival, holiday festival, or an outdoor concert. These events would all be great ways to bring the community together in one place to share experiences and connect with each other, while enjoying their time at the Grabser Mühlbach. This can create a culture at the Grabser Mühlbach that creates a stronger interest in the historical site and can bring in more people to potentially increase the audience, spread the history, and ultimately expand the Grabser Mühlbach brand.

MERCHANDISE

While some items, such as knives are already available for purchase, there is other possible merchandise that the Grabser Mühlbach could look into selling as well, such as stickers, hats, and shirts. Selling more merchandise has many benefits that could help the Grabser Mühlbach. Merchandise acts as advertisement for a location. When people see Grabser Mühlbach products they may become more interested in the mills and may end up visiting the site. This could lead to an increase in visitors and more people will get to experience the mühlbach in person. Another advantage of selling merchandise is that the Grabser Mühlbach could earn extra revenue. This revenue could go towards further improving the mühlbach by paying for various technology to better improve the visitor experience. This merchandise could be sold either online or at a store somewhere at or near the mühlbach. There are many online websites where companies can make and sell their own merchandise. Some of these websites include stickeryeti.ch, tshirt-printing.ch, and spreadshirt.ch.

An important part of selling merchandise is advertising. This does not have to be large scale advertisement such as on a television or a billboard. Having a page on the website about merchandise would allow website viewers to know that there is merchandise available if they come visit the Mühlbach or buy it online. The advertisement could also be on signs and plaques at the mühlbach so if people see the signs, they may decide they want to purchase something to remember their visit.

TIMELINE

Objectives/tasks	Aug.-Week 1				August/September-Week 2							September-Week 3							September-Week 4							Septmeber-Week 5							September-Week 6							October-Week 7							Oct.-Week 8			
	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11

Objectives/tasks:

- Tour the Grabser Muhlbach
- Observe the Grabser Muhlbach
- Finalize draft of survey questions
- Re-visit proposed ideas & adjust project goals and deliverables
- Survey potential museum audience
- Transcribe surveys
- Analyze results
- Meet with Grabser Muhlbach society to present ideas
- Determining new trails
- Work on website mockup
- Make adjustments to website mockup
- Drone use
- Add trails to Google Maps
- Test and revise trails
- AR research
- AR concept
- Manual Information
- Manual Formatting
- Extend literature review
- Implementation Plan
- Introduction and Goals
- Results and Recommendations
- Final Draft of Paper
- Prepare report & recommendations
- Prepare for presentations
- Progress report and update
- Check in with sponsors
- Reception
- Present to Sponsors

	Aug.-Week 1				August/September-Week 2							September-Week 3							September-Week 4							Septmeber-Week 5							September-Week 6							October-Week 7							Oct.-Week 8			
	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11

Appendix E

APPENDIX F

MEMORABLE MOMENTS

Over the course of the seven weeks we spent in Switzerland, the word "mühlbach" was said roughly 5,347 times, give or take a couple hundred. The obsession started on our guided tour when our guide Karl had us stop over a manhole cover which had water running through it, pointed and said "Listen………mühlbach."

Frank was our feline friend and partner at the mühlbach. While we were taking photographs of the mühlbach to provide context of where additional signs should be placed, he wandered into our field of vision and immediately into our hearts. While there were other cats, Frank was by far the best of them all. He provided stress relief when tensions were high during our project.

While trying to wash his hands in the mühlbach after petting Frank, Chris became very close to falling face first into the mühlbach. He was promptly teased for trying to swim in the mühlbach.

In the middle of IQP, our beloved sponsor invited us into his house to break bread with his family. While there, Chris showed Stefan and his family videos of goats being literally paralyzed with fear after a discussion about Stefan's neighbors owning goats. Shortly thereafter, Stefan's eldest daughter brought out her inflatable toy alligator. Chris tried repeatedly tried to acquire the alligator and after many, many attempts, finally succeeded. He then promptly bopped Andrew on the head. Jen then asked to see it to which Chris tossed the alligator over the table and hit Jen in the face. After the alligator was returned to Chris, it was swiftly grabbed by Stefan who then went on to repeatedly whack Chris on the head. Chris then

began to feel ill and an air of seriousness took over our group as Chris tried to focus on not becoming sick. The feeling began to subside after some time and was completely gone after the Läderach chocolate that we had brought as gift was shared with us.

While testing out the early versions of our Google My Maps trails, we found the Grabser Bach's sand trap. While determining our next action, a bright orange car pulled up. The car window rolled down to reveal Bernadette, of the Grabser Mühlbach association. Bernadette then proceeded to exit her car and give us all a big hello and ask us if we were "just chilling." We responded with "just exploring" and Bernadette wished us a good day and continued on her way. We then began to laugh that a local had noticed four young adults who looked like students wandering around the mühlbach and had contacted Bernadette who had ventured out to find us.

During our guided tour, we had lunch at a renowned Grabs restaurant. Due to the presence of the language barrier, conversing with Bernadette and Karl was somewhat difficult. Luckily, Bernadette's daughter who is mastering in English was there to act as a translator. During lunch, it was brought to Bernadette's attention that Jen and Andrew had never eaten a Toblerone before. A little after lunch, Bernadette mentioned she had to leave, but she would meet us at the end of the tour. Once the tour had concluded, we returned to the Grabs Post bus stop and were met by Bernadette. Bernadette then proceeded to reach into her bag and pull out a large Toblerone chocolate bar for each of us. We were ecstatic.

La Luna was a magical restaurant in Grabs. It had schnitzel and döner kebab and little Swiss flags to wave in each other's faces. The first time we went to La Luna was with Professor Orr and Professor Albrecht for a weekly meeting. It was so enjoyable that we planned to go the next week. On the day of, we failed to look up opening hours prior to visiting, and Isabella – being the practical one of the group – looked up the hours and found that it was closed. Our hearts broke, and we planned to go the following week. Each day visiting Grabs, we checked to see if was open, and finally La Luna was "open." We got on a bus to Grabs, hearts happy and stomachs and hungry, but when we arrived we learned that La Luna was closed! The owners were on vacation, and our hearts broke once again. This prompted a spontaneous, yet sad, trip to Liechtenstein. Luckily, when our visitors James, Andrew G, Nicole, Milap, and Evan came to test out our trail system, we finally got to experience La Luna once more. Our hearts, and stomachs, were once again satisfied.

Appendix F

Our time in Switzerland has been time that we will cherish for the rest of our lives. There were ups, there were downs, there was a lot of budget chocolate. But we couldn't imagine a different group of fuzzy hat wearing hooligans.

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