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Venturing into the Virtual: An Analysis of Virtual Museums and Creation of UMACF Southwestern Basketry Virtual Exhibit

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Abstract

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Southwestern Basketry Virtual Exhibit

The prevalence of virtual museums has grown in recent years and this relatively new exhibition format has presented the museum field with opportunities for growth. In an effort to explore the virtual sphere as an effective avenue for museum growth and change, I conduct an analysis of what virtual museums are, the challenges they pose, and the benefits they can provide to museum education. Case studies of University of California Chico, University of New Mexico, University of Arizona, and University of Nevada Reno's virtual exhibition of materials from each university's anthropology collections serves to further the exploration of the efficacy of virtual museums. Informed by the critical analysis of virtual museums and the case studies, I created a prototype draft for a virtual exhibit of baskets from the University of Montana Anthropological Curation Facility. This project serves to showcase the potential of virtual museums to increase accessibility and engage visitors for a more interactive learning experience.

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Introduction

Historically, the purpose and intent of museums has changed over time, from cabinets of curiosity that were accessible only to the wealthy elite to public institutions intended to share knowledge with the wider public (Petrov 2012). It can be argued that museums are facing another shift currently with calls for decolonization and shifts into virtual realms. The International Council of Museums' (ICOM) definition of a museum, as of August 2022, is:

> "A museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing."[1]

As museums work towards living up to this definition by improving equitability in content, access, and input, issues surrounding ownership and control of information become forefront. While there are many avenues for growth and change within physical institutions, the virtual sphere can serve to broaden the options for solutions. As ICOM states, museums are intended to be accessible, to foster sustainability, to include community participation, and to offer varied experiences for education. These four tenants can be accomplished within the virtual sphere successfully.

While moving towards virtual records management and computer-based museum management software is not novel, opening up the virtual sphere to information and content sharing is still in its early stages. As the mission of museums has evolved into the 21st century,

[1] https://icom.museum/en/resources/standards-guidelines/museum-definition/

the inclusion of technology has increased. The use of technology within museum institutions began as a means to improve record keeping and management of collections. Technology's role soon evolved into a means for improving exhibit engagement and interaction. Today, the virtual sphere is becoming ever more relevant and museums have been venturing into virtual exhibition practices. At this point in time, an analysis of virtual museums, through theory and case study, can work to inform what the future could look like in terms of museum education and impact. In the case of the University of Montana Anthropological Curation Facility (UMACF), a virtual exhibit can serve to represent an effort to improve accessibility and information sharing while providing an avenue for the UMACF to stay relevant as an educational resource.

Chapter One discusses how virtual museums represent an opportunity for improving accessibility and limiting institutional control of information. Exploring the criticisms surrounding virtual exhibition helps to acknowledge areas of improvement that the format can work to address as it grows. In order to bring the analysis of virtual museums into more practical terms, Chapter Two covers a multi-sited virtual ethnography of four university's virtual exhibits. Conclusions drawn from the case studies also serve to inform the design of a virtual exhibit for the UMACF, which is discussed in detail in Chapter Three of this paper. The virtual exhibit on southwestern basketry will be available to students, and the general public, to share information not only about the baskets, but about the resource the UMACF can be as a whole.

Chapter One: Virtual Museums

Introduction/Context

The concept of a virtual museum is not new, references to computer-based museum experiences have been happening for decades (Schweibenz 2019) and technology has been increasingly incorporated in museums in many facets as interactive museum exhibits have grown in popularity. In large part, technology has played an assistive role in the museum field by providing alternative forms of communicating and sharing information, serving as an add-on to exhibits, and changing the way museums keep and record institutional information. Virtual museums, defined as web-based collections and displays of art and cultural items, started in the mid 1990s (MacDonald and Alsford 1994). Virtual museums have altered the use of technology– changing its function as an assistive feature to the main foundation. Due to Covid-19 and the halt of in-person events, the virtual museum gained a revitalized interest and popularity. Many museums that did not already have virtual experiences available focused their time during the shutdowns to create those virtual aspects.The growth of virtual exhibits and museum experiences opens up new forms of information sharing and resource accessibility, prompting many to consider the benefits of virtual museums and the possibilities they offer for institutional change and growth. Virtual museums represent an innovative alternative to traditional museum exhibits and the ability to overcome some challenges physical exhibits face.

Challenges/Critiques

In order to critically analyze virtual museums as a new form of exhibition, it is important to note dissenting opinions and existing debates around the topic. As the prevalence of virtual

museums grows, a commonly voiced concern is that these virtual spaces will detract from physical museological institutions. A major aspect of this concern is financially rooted–focused on the belief that a free, virtual museum would limit the amount of in-person visits and therefore the museum would lose the funding that comes from ticket admission fees. Tied to concerns about financial losses, is the belief that in-person experiences offer more value than virtual ones. Ann Mintz argues that:

> "[m]edia can deliver information; it cannot match the totality of the experience a museum provides. For this reason, a case can be made that there will never be a 'virtual museum' in the full sense of the word. High-resolution images, fullscale virtual reality, and rich links to other databases on the World Wide Web do not create a museum. A virtual visit to a museum is fundamentally a media experience, not a museum experience." (Mintz 1998, 28).

Mintz's argument is valid in the sense that virtual experiences are not the same as in-person experiences and cannot replicate the same outcomes, reactions, thoughts, etc. But, virtual experiences can offer different forms of information processing and interaction that can be very effective, especially for individuals who learn best from interactive learning rather than transmissional learning (Jonassen et al. 1999; Dickey 2005; Halpern and Katz 2015). Furthermore, I do not aim to argue that virtual museums should replace physical museums; rather, virtual museums offer an additional mode of knowledge sharing that can engage more people in addition to the ones who are engaged by physical exhibits. The virtual mode can compliment the physical one, especially since "[r]esearch has revealed that 70% of people visiting a museum website would subsequently be more likely to go and visit the 'real' museum" (Styliani et al. 2009, 524). The existence, and increased prevalence, of virtual museums does not

threaten the existence of physical museological institutions, venturing into the virtual sphere can actually work to aid physical museological institutions.

Showcasing artifacts and objects online brings up issues of ownership and copyright. Historically, museums generally have ownership and control over the material objects, and information, they possess. By creating a virtual exhibit, the information and digital photographs/videos are now readily accessible to the public. Institutions can combat this with watermarked images or copyright inscriptions, or they can choose to relinquish their rights to the images and instead opt for open access (OA). This would "provide free-use, modification, and content sharing…Terms are commonly expressed through Creative Commons licensing" (Clerkin and Taylor 2021, 169). This could represent a positive shift with options for growth, limiting the institutional control of knowledge and instead encouraging OA and the "free reuse of data published by museums through free licenses guaranteeing free access and reuses" (Benhamu 2016). Moving towards OA would encourage different perspectives and interpretations that could add nuance to the 'authorized discourse'.[2] This nuance could help to improve knowledge and fuel advancement in research within the museum field. Opening such a channel of feedback and information exchange serves to benefit institutions and the general public as it opens up "the possibility for an originating community, within a digital contact network, to both claim and share knowledge about objects that are not in their physical possession as a means of cultural reclamation and intervention into colonial institutions and their practices" (Glass and Hennesy 2022, 170). While OA can limit the institutional control of knowledge and serve as a step in the decolonization of museums, many aspects of OA can also simultaneously propagate

[2] The dominant (Western/Eurocentric) way of talking about/seeing heritage that overrides the multiplicity of viewpoints/interpretations of heritage (Smith 2006).

neocolonialism. For some Indigenous cultures, open access to institutional information, records, and material objects is challenging and not in line with some Indigenous peoples' values. Hannah Turner and Candace Green argue that "the policy of the democratization of knowledge can come into conflict with Indigenous cultural values; including privacy and control" (Turner and Green 2021, 162). For some Indigenous cultures, they have certain protocols for protection on material objects and knowledge that is sensitive and/or significant to them. As a result, it is becoming common practice to consult with tribes about their specific concerns and methods, but this process can be complicated and time-consuming, with the biggest complication being that this process would not be a one and done type of protocol. Since Indigenous communities have varied sets of ideals and values, the same process and solution cannot be applied across the board (Turner and Green 2021). While OA works to limit institutional control and increase the democratization of knowledge, the process does not come without critiques or challenges, especially when relating to institutional records and data about cultures and communities that may not want the information to be publicly accessible, or may not want the institution to make that choice on their behalf.

Benefits

While there are valid concerns and debates surrounding virtual museums, there are also many uncontested, positive benefits that virtual museums provide. Most notably is that creating exhibits that are accessible online increases the reach of those exhibits. People who would otherwise have been unable to, or uninterested in, physically visiting a museum are able to now benefit from the knowledge and experience that institution has to offer. Historically and currently, museum attendance is made up disproportionately of white people, including both

children and adults (Crispin and Beck 2023; Farrell et. al 2010). This can be due to socioeconomic status, museum locations, museum content, and the incentives that encourage people to visit museums (Olivares and Piatak 2021). With virtual experiences, anyone who has computer access can engage with the material and information. Not only can this attract people from different ethnic and socioeconomic backgrounds, but it can also change the narrative around museums as being a place you go to have information 'given' to you. In a study of people aged sixteen to twenty-five with different ethnic and educational backgrounds found that:

> "[s]ignificantly, the young people engaged in these discussions did not describe their museum-going experiences from perspectives shaped by race or ethnicity, but rather in terms of modes of participation. What they want from museums are interactive, immersive, and participatory activities. They want to be more than outside observers looking in" (Farrell et. al 2010, 23).

With virtual museums, the individual accesses the information and interacts with it how they want to–there are no social norms to be followed in the virtual sphere, no pressure on how to read something or how much time to spend at each element in the exhibit. Rather, the individual can interact with the material personally how they want to. Katz and Halpern argue that users can gain "access to that information on an on-demand basis…thus allowing themselves to better comprehend and assimilate the offered knowledge" (Katz and Halpern 2015, 3). Virtual museums not only broaden the reach and accessibility of institutions but also offer a more unique and engaging educational experience.

Along with this, virtual museums can highlight material objects that would otherwise be too fragile to be exhibited in the traditional sense. Many critique the nature of museum collections as not being beneficial to the general public as the majority of the material objects a

museum possesses are not exhibited and instead are stored away from public view. This can be due to the difficulties that could come with trying to exhibit those objects, the risks of jeopardizing the objects, or lack of adequate exhibition space. Capturing photos and or videos of the object and showcasing it virtually offers the opportunity for people to interact with the object and its knowledge without exhibiting the object and potentially putting extra wear on the object (Mamur 2020). In the case of the University of Montana Anthropological Curation Facility (UMACF), the physical space in the facility is limited. The area is intended to have proper climate control and storage conditions that benefit the material objects. Due to this, there is not adequate space for students to congregate and engage with the objects being held there. Furthermore, some students do not feel comfortable being in the space for cultural reasons. Since the Anthropology Department does not have exhibition space apart from the glass display case on the second floor of the Social Sciences Building, many of the material objects held in the facility are never seen or used to complement the curriculum. A virtual museum allows unlimited access, at any time, from anywhere, all while maintaining the integrity of the object and limiting the demands from physical spaces.

Virtual museums also create an opportunity for institutions to provide more information and additional sources that is more difficult to do in a physical setting. Glen H. Hoptman asserts that 'connectedness' is an important aspect of museums–connecting visitors not only to objects but also to information (Hoptman 1992). The traditional method of museum exhibition is limited in the ways that information can be shared with visitors, but " the Virtual Museum provides multiple levels, perspectives, and dimensions of information about a particular topic: it provides not only multimedia (print, visual images through photographs, illustrations or video, and audio), but, more important, it provides information that has not been filtered out through these

traditional methods" (Hoptman 1992, 146; Schweibenz 1998). With physical exhibits, curators aim to include the most important information in a succinct way that will allow the participant to learn the knowledge and be able to retain some of it. Providing too much information, or varied sources and further learning opportunities typically detracts from the efficacy of the in-person exhibit. In the virtual realm, information can be presented in a more varied form and additional resources and extended information can be included in a separate portion of the virtual exhibit and individuals can have the option to access it if they so choose. This brings up one of the strongest benefits of a virtual exhibit–people can return to the information easily at any time. Someone could browse the virtual exhibit, end their experience, and then days later can return and access additional information or explore the topic further when they have the time, energy, or need to. While this can be done with in-person exhibits, the virtual sphere limits the time, energy, and resources to do this, once again improving accessibility.

Virtual museums and their prevalence have been growing over the past two decades as technology and social conditions change. It is likely that this growth will continue and institutions will increasingly focus on virtual realms. The concerns about virtual learning efficacy and cultural ownership will continue to be explored and navigated, forcing museological institutions to engage continuously with research and community input/guidance, as they have been working to do for decades. This growth and exploration has already resulted in various forms and iterations of virtual museums including walk-through tours, complete virtual reality experiences, and interactive websites. Each form has its drawbacks and strengths, and each is ever-evolving. The next section will explore four virtual exhibits, all presenting in a different form.

Chapter Two: Virtual Exhibit Case Studies

Multi-Sited Virtual Ethnography

Virtual exhibits come in many different forms and styles, from walk-through exhibits that mirror an in-person visit or show pictures of the physical exhibit, to virtual reality exhibits that create a whole virtual space that one is enveloped in. A multi-sited virtual ethnographic approach allowed for an exploration of numerous virtual museum formats. Many anthropology departments from universities across the nation have created virtual exhibits for the collections that their departments oversee. I conducted an analysis of four of these institutions' virtual exhibits to study the methods/approaches that were used and their effectiveness according to human centered design principles, accessibility, and the efficacy of information exchange. Human-centered design (also referred to as user centered design or human computer interaction) is the process of putting the user, or visitor, first when thinking of the final virtual design–basing design choices on how accessible it would be to users, or how helpful (Mason 2022). To evaluate the accessibility of the virtual exhibits, the mode of access is evaluated, as well as how accessible the virtual exhibit is for visitors who may be hard of hearing or visually impaired. The efficacy of information exchange will be evaluated by how understandable the information is for a general audience as well as how engaging it is. The institutions selected for analysis were determined due to the institutions' geographical location and the content of their collections/virtual exhibits. With these criteria in place, the observations and conclusions are applicable in guiding the design of the UMACF virtual exhibit about southwest basketry. The four selected institutions are: California State University Chico's Valene L. Smith Museum of Anthropology, The University of New Mexico Maxwell Museum of Anthropology, The

University of Arizona Arizona State Museum, and University of Nevada Reno Anthropology Research Museum.

California State University

California State University, Chico's Valene L. Smith Museum of Anthropology serves as both a museum in the traditional sense as well as a hands-on laboratory space for anthropology and museum studies students.[3] The museum hosts exhibits ranging in focus that include content about photography, basketry, and earth science from an anthropological perspective. Students in the museum studies and anthropology programs work on creating the exhibits, practicing curatorial, research, and educational duties. The Valene L. Smith Museum of Anthropology also hosts virtual exhibits through the institution's website. There are currently two virtual exhibits available on the website–"Tu Voz Importa" and "Unbroken Traditions." "Tu Voz Importa" exhibits photography from thirteen different individuals "to amplify the unique voices of Latinx youth and women by harnessing their abilities to tell their own stories through guided photography."[4] To explore this virtual exhibit, one is able to download a one hundred and forty-four page PDF.[5] The PDF pages are organized by photographer with one page that has a personal statement from the photographer and following pages that have one of the artist's photographs

[3] https://www.csuchico.edu/anthmuseum/museum-studies.shtml
[4] https://www.csuchico.edu/anthmuseum/_assets/documents/tu-voz-importa-photovoice-project.pdf page 2
[5] https://www.csuchico.edu/anthmuseum/_assets/documents/tu-voz-importa-photovoice-project.pdf

and their description (Figures 1 and 2).

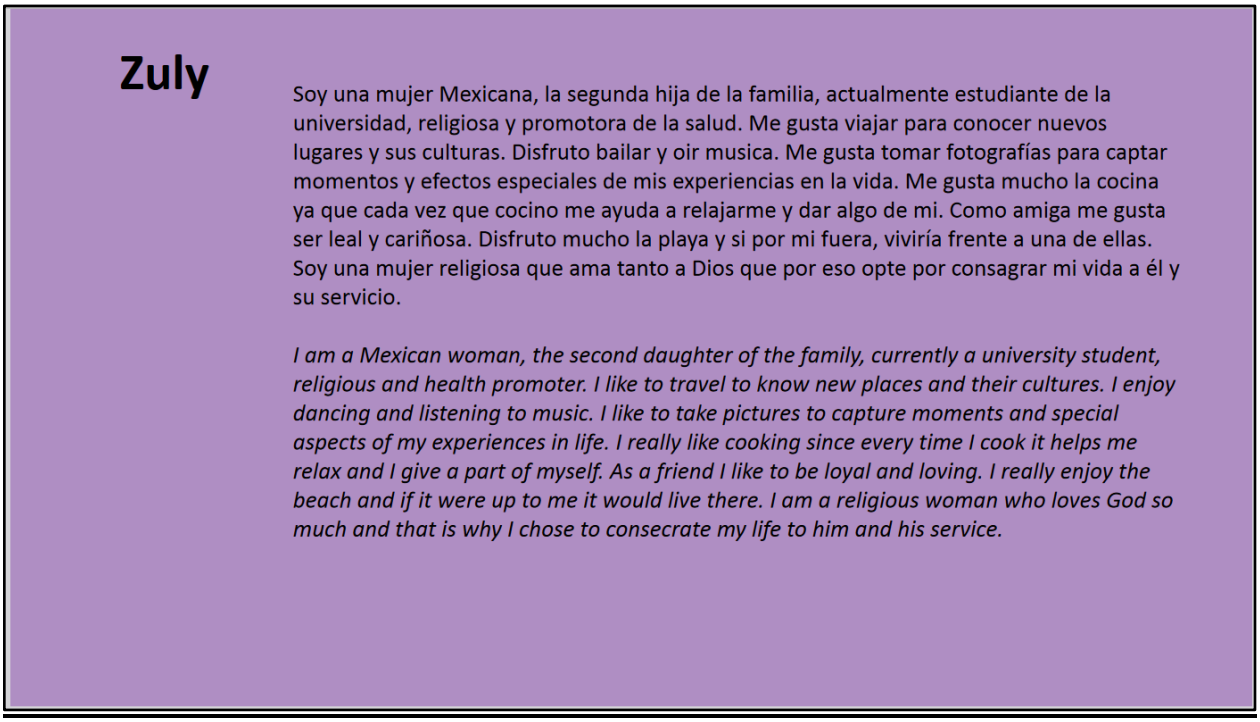


Figure 1: https://www.csuchico.edu/anthmuseum/_assets/documents/tu-voz-importa-photovoice-project.pdf (page 122)

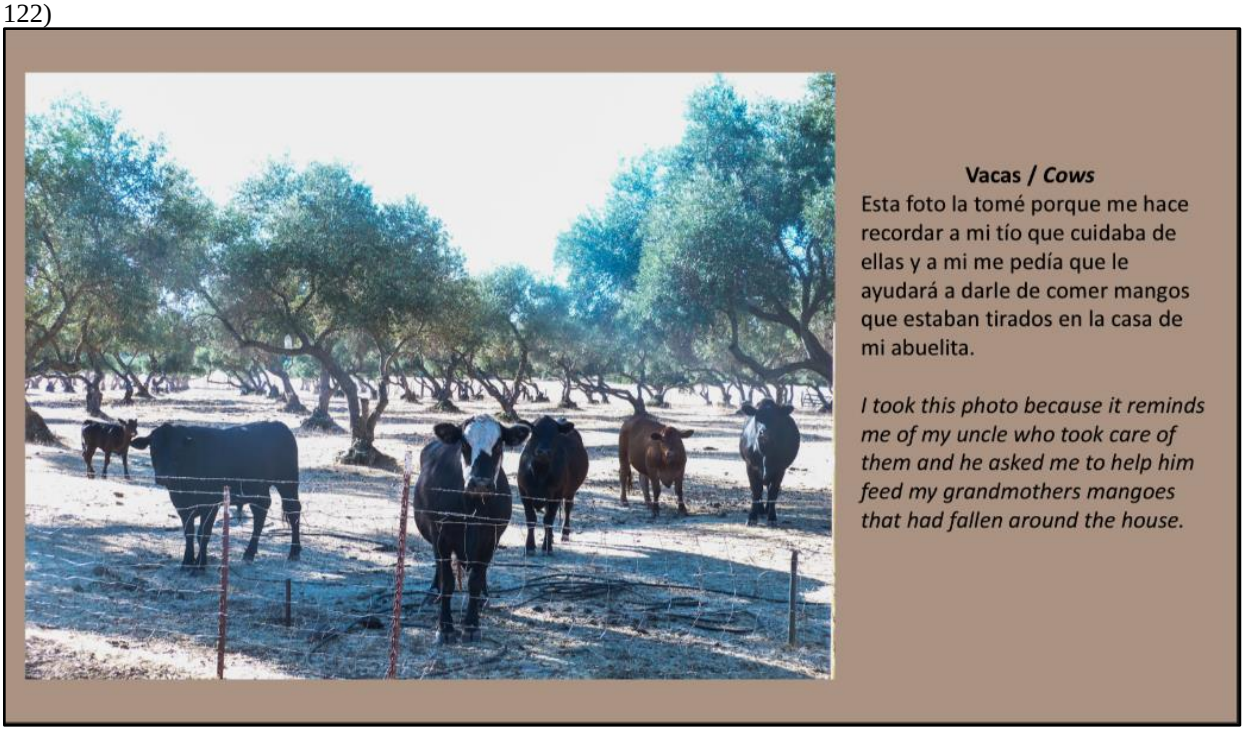


Figure 2: https://www.csuchico.edu/anthmuseum/_assets/documents/tu-voz-importa-photovoice-project.pdf (page 123)

The “Unbroken Traditions” exhibit is about basket weavers from the Meadows-Bakers family in Northern California. This exhibit can be accessed by downloading a thirty-eight page PDF from the institution’s website.[6] In the beginning of the PDF document, there are links to other additional PDFs that could be used for further engagement outside of the virtual exhibit–one is an instructional guide to weave a turtle figurine[7] (a motif commonly found in basketry from this exhibit) and a scavenger hunt activity sheet[8] that can be filled out while exploring the virtual exhibit. The rest of the PDF has pages with a picture and then a text box of information (Figure 3).

Figure 3: https://www.csuchico.edu/anthmuseum/_assets/documents/unbroken-traditions-virtual-exhibition.pdf (page 12)

[6] https://www.csuchico.edu/anthmuseum/_assets/documents/unbroken-traditions-virtual-exhibition.pdf
[7] https://www.csuchico.edu/anthmuseum/_assets/documents/turtle-weaving.pdf
[8] https://www.csuchico.edu/anthmuseum/_assets/documents/scavenger-hunt-for-virtual-tour.pdf

The two exhibits are visually pleasing to look at and include informative text written in a digestible manner that would be easy for the general public to comprehend. While the second exhibit includes optional activities that provide an interactive component, the PDF format does not otherwise have any interactive elements and is therefore not driven by Human Centered Design (HCD). Because of this, the virtual exhibits are similar to a handout or pamphlet and are not as engaging as other formats. The PDF documents are easily accessed as it only requires access to a computer and internet. Additionally, the PDF documents have a feature where the PDF can be read aloud, improving accessibility for visually impaired individuals. The PDF format is not ineffective in terms of information exchange and reach, but the format does not highlight the ability virtual museums have to engage and share information differently.

The University of New Mexico

The University of New Mexico Maxwell Museum of Anthropology holds archaeological, ethnological, and osteological collections–the combination of which total over 3 million objects that the university preserves.[9] The institution displays both permanent and temporary exhibits and also hosts rotating virtual exhibits. Of these virtual exhibits, six are in the form of youtube videos and four are separate informational web pages.[10] The virtual exhibits that are youtube videos range in topic and video format, some being more effective than others. The most effective youtube virtual exhibit is "Charles Fletcher Lumis: Photos of the American Southwest"[11] which can be accessed through youtube or the institution's website. The video is roughly fourteen minutes long and explains the photographer's life and his photography while

[9] https://maxwellmuseum.unm.edu/about/about-us
[10] https://maxwellmuseum.unm.edu/exhibits/explore
[11] https://www.youtube.com/watch?v=PKAg-02TOGs

showing correlating images (Figure 4).

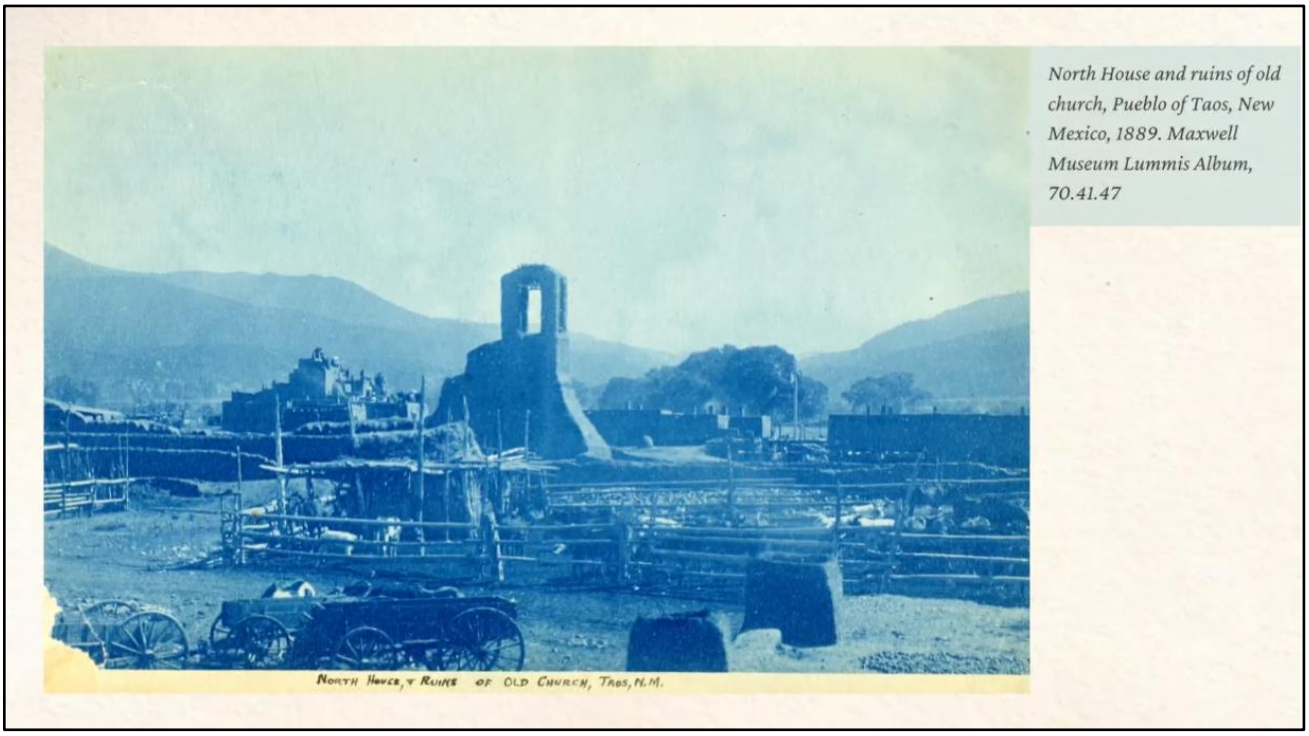


Figure 4:https://www.youtube.com/watch?v=PKAg-02TOGs

The video's narration is engaging in tone and content and very few of the frames include captions or phrases that the narrator simply recites back to the viewer. The video replicates a historical documentary movie incorporating audio and visuals in a complementary way.

In contrast, the virtual exhibit "Caritas Sonrientes: Smiling Figurines of Mexico"[12] is similar to a narrated powerpoint presentation. The eight minute video cycles through numerous slides that mostly include a photograph and a text box while the narrator reads the text box and

[12] https://www.youtube.com/watch?v=yCpYGQIZdDQ

occasionally includes other remarks that are not included in a text box (Figure 5).

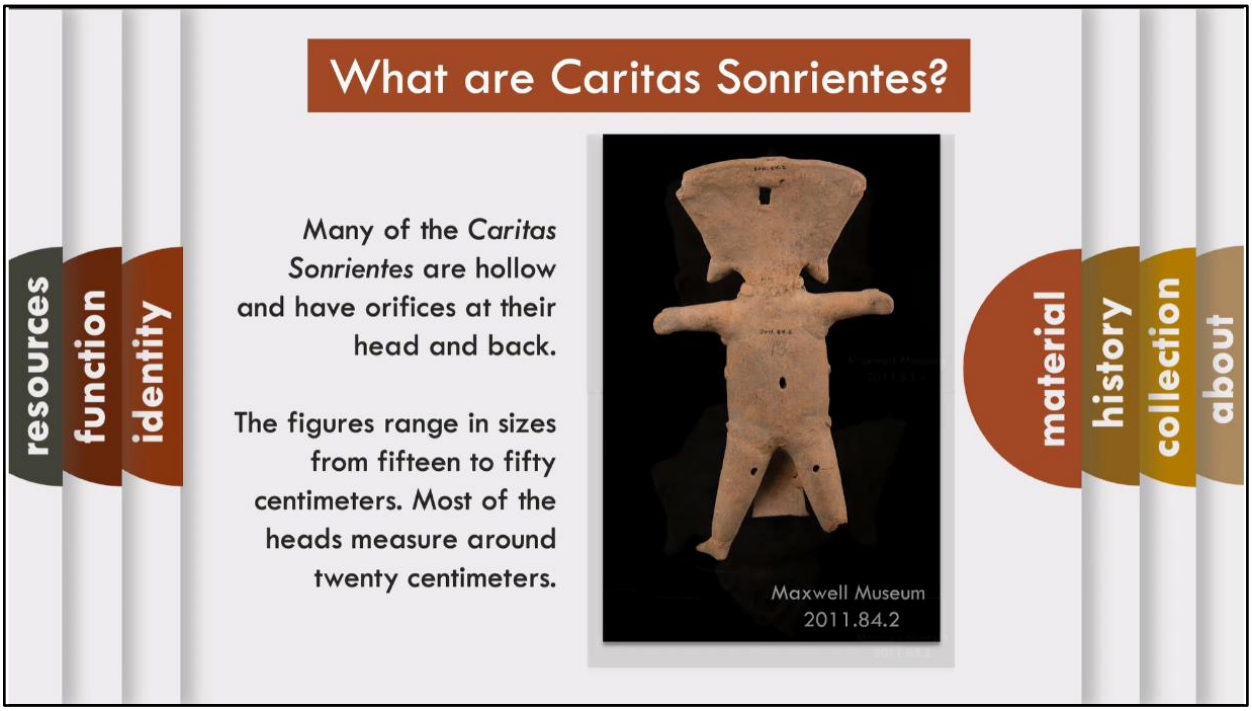


Figure 5: https://www.youtube.com/watch?v=yCpYGQIZdDQ

While the content and information is interesting, the video format is less engaging. The youtube video exhibit format is easily accessed through the institution's website and the videos have accompanying subtitles, making them successful in terms of accessibility. Although not innately interactive, the video format can be effective in engaging visitors and sharing information.

The informational web pages vary in topic and form as–two of the virtual exhibit web pages are single pages with text and images and two are separate websites that include multiple pages. The "2019 Chile Wars" exhibit[13] is one of the single page informational web pages. It includes a three paragraph exploration of the anthropological themes associated with memes, growth of chiles, and community identity. The page includes a photograph that showcases the institution's

[13] https://maxwellmuseum.unm.edu/exhibits/online/2019-chile-wars

creation of a meme (Figure 6).

Figure 6: https://maxwellmuseum.unm.edu/exhibits/online/2019-chile-wars

This virtual exhibit, as the institution refers to it, is informative and the language used is understandable and digestible, but it does not have any interactive elements or other features that engage the user past visuals. The "Covid-19: Concepts of Sickness and Wellness"[14] exhibit is on a website domain separate from the institution's and includes six main pages, two of which include numerous sub-pages. These two are the pages titled "Sickness" and "Wellness" and their subpages include titles like: "A History of Epidemics" and "Dancing for Healing." All pages of the virtual exhibit website have titles, followed by paragraphs of information and a few related

[14] https://www.covid19exhibition.org/

images (Figure 7).

Figure 7: https://www.covid19exhibition.org/

The content is thorough and well-organized and the visitor can choose which sub-pages to visit and the order in which the topics and information are viewed. This engages the visitor and adds some level of interaction. Although the website is the most interactive of the institution's virtual exhibits, it does not engage users who are visually impaired. The video format is less interactive, but more accessible to a wider range of people.

The University of Arizona

The University of Arizona Arizona State Museum serves as the state's official archaeological repository and presides over a large collection of archaeological and ethnographic materials.[15] This includes their collection of Native North American basketry which is the largest and most comprehensive collection in the world.[16] The museum has two core exhibits, "The Pottery

[15] https://statemuseum.arizona.edu/about/asm
[16] https://statemuseum.arizona.edu/collections

Project" and "Woven Through Time: American Treasures of Native Basketry and Fiber Art" and also has rotating exhibitions. The institution hosts a large amount of virtual content including thirty informational web pages about materials from the museum's collections and four virtual tours of physical aspects of the institution. One of the virtual tours of the institution is the"Virtual Reality Tour of the Woven Through Time Exhibit"[17] The virtual tour is accessible through the institution's website but it is hosted and created by Google Maps. The tour allows the virtual visitor to click and navigate through the exhibit. It is engaging because it puts the visitor in charge and they are able to view the display cases of baskets. A major drawback of this format is that while it is engaging and interesting to explore the exhibit in terms of the visual components, it is very difficult to read any of the information that is displayed in the physical exhibit. The picture quality is too blurry or too zoomed out to be able to examine anything very well (Figure 8).

Figure 8: https://www.google.com/maps/@32.2323301,-110.9559733,3a,90y,113.97h,84.18t/data=!3m7!1e1!3m5!1sAF1QipM5323S2nL2WW0h69ekl_ycXHZRr2fSf_CHSgo-!2e10!3e12!7i12000!8i6000

[17] https://statemuseum.arizona.edu/online-exhibit/virtual-reality-tour-woven-through-time-exhibit

Additionally, the virtual tour is not supplemented with any other information about the baskets on display or the exhibit itself.

The institution also has a multi-page website exhibition titled “Wrapped in Color: Legacies of the Mexican Sarape”[18] which includes a virtual tour of the physical exhibit at ASM in which one is able to navigate through the exhibit and view the materials. Although the tour is thorough and easy to navigate, it is once again difficult to read the posters that have descriptions and information about the materials. The website also has subsections about the history and geography relating to the materials, the natural dyeing method, and the philosophical background to name a few. It can be assumed that these sub-sections include the same, or similar, information to that which is displayed in the physical exhibit. These sections have paragraphs of information and a few related images (Figure 9).

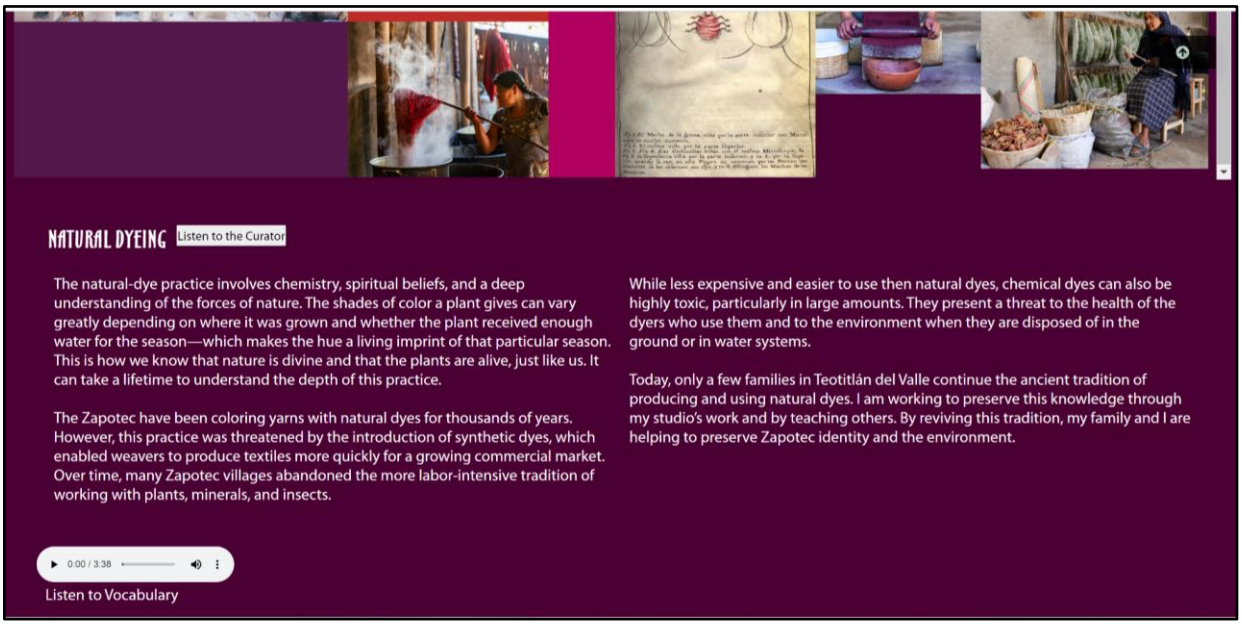


Figure 9: https://sarape.aws.coh.arizona.edu/dyeing

[18] https://sarape.aws.coh.arizona.edu/

The virtual tour of the exhibit adds an interactive element that the web pages otherwise do not have. Additionally, one has the option to listen to audio of the curator explaining the information written on each page. By combining a website with auditory options, visitor-driven navigation, and a virtual walkthrough tour of the physical exhibit, the "Wrapped in Color: Legacies of the Mexican Sarape" exhibit is very engaging and informative. This combination of elements provides the visitor with differing levels of interaction and accessibility to information visually (through video, image, and text) and auditorily. By providing visitors with control of the navigation both for the walk through virtual tour and the website engages the visitor and successfully communicates information.

The University of Nevada, Reno

The final analysis is of The University of Nevada, Reno's (UNR) "Virtual Museum of Native American Basketry." UNR's Anthropology Research Museum and the university library's media and technology center worked together to create this exhibit using baskets from the anthropology department collections.[19] The UNR Anthropology Research Museum has temporary physical exhibits that are designed by students in the anthropology department's course on museum studies.[20] Apart from the "Virtual Museum of Native American Basketry" there are no other virtual resources or exhibits. UNR's virtual museum is by far the most technologically advanced in relation to the other exhibits analyzed, and the most interactive. The exhibit uses virtual reality to allow users to pick up and look at the baskets virtually, being able to see the finer details on the baskets. The exhibit also uses virtual reality to allow users to

[19] https://library.unr.edu/baskets
[20] https://www.unr.edu/anthropology/research-and-facilities/anthropology-research-museum

explore and be immersed in dioramas of the environment in which the baskets were made (Figure 10).

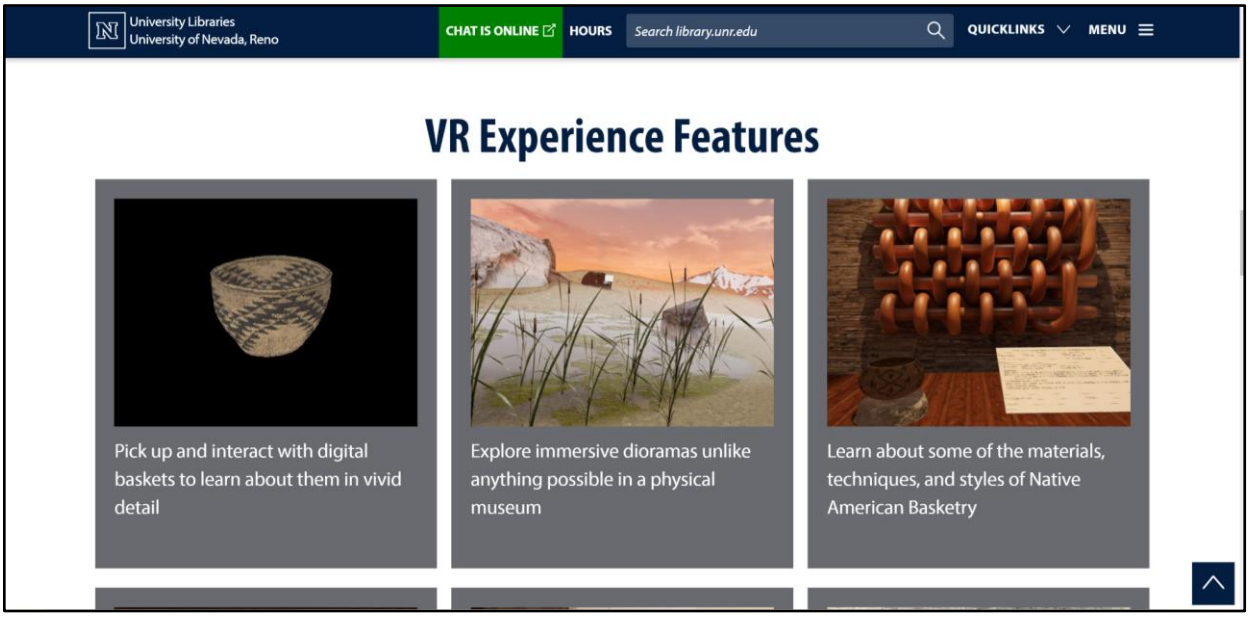


Figure 10: https://library.unr.edu/baskets

This exhibit really engages the user and puts them in charge of their viewing experience. UNR's virtual exhibit is representative of what the future of virtual museums can look like and is an example of how current institutions could grow their virtual content. While the exhibit is incredibly immersive and engaging, it is not very accessible. In order to experience any aspect of the exhibit, one must use a virtual reality headset. The university does not offer additional forms of the exhibit that one could explore without a virtual reality headset so their reach is incredibly limited and rather exclusionary at this point in time. While this may change over the next few years, virtual reality headsets are very costly and as of 2023, only about 15% of Americans own a virtual reality headset.[21] Even universities and public libraries have a limited number, or zero,

[21] https://www.zippia.com/advice/virtual-reality-statistics/#:~:text=There%20are%2065.9%20million%20VR,market%20size%20is%20%247.72%20billion

virtual reality headsets available for public use. While a main goal of virtual museums is to create interactive and engaging content virtually, it is also equally as important to make that accessible to most individuals.

Conclusion

Analysis of the four universities' virtual museums illuminates the varying virtual museum formats and their strengths/weaknesses. The PDF and single web page article formats were informative but not particularly engaging or interactive on their own. The youtube video format demonstrated the value and engagement that videos can elicit with their combination of visual and auditory information sharing. While these presentation style videos on their own were interesting, they can be even more effective in combination with other multimedia components. The technique of combining formats was best exemplified by the University of Arizona's virtual exhibit on the Mexican sarape which combined auditory elements with interactive visual elements. Apart from creating a complete virtual reality experience like the University of Nevada Reno did, the University of Arizona's website including multiple webpages of information, virtual tours, and the ability for the visitor to lead their experience was the most successful in providing an engaging, informative, and interactive virtual exhibit.

Chapter Three: The UMACF Virtual Exhibit

In order to provide an example of the potential for a virtual exhibit in the future as the UMACF evolves, a prototype draft of a virtual exhibit was created, formatted as a website page that includes multiple subpages. Due to the fact that the UMACF has yet to consult with source communities and the limitations of securing website licensing, the virtual exhibit is a prototype of a webpage and is hosted on Figma, a prototyping application that showcases a complete simulation of the website.[22] The virtual exhibit showcases, and provides information on, five baskets made by Native American people from the southwest region of the United States. This includes baskets from the Apache, Paiute, Navajo, Hopi, and Akimel O'odham (formally referred to as Pima). The virtual exhibit prototype draft also includes a brief history and explanation of what the UMACF is. The content of the website will be outlined first through a detailed history of the UMACF and an extensive analysis of the six baskets. Following that is a description of the features of the website and explanation of design choices. Lastly, an analysis of the opportunities for growth and improvement relating to the UMACF exhibit are covered.

UMACF History

The University of Montana Anthropological Curation Facility (UMACF) houses a large array of different types of artifacts–archaeological and ethnological. The UMACF is intended to be an educational facility and this mission has been represented throughout history. The University of Montana was formally opened in Missoula in 1895 and at this time courses in Anthropology were not offered. But, the university and the History Department began its museum collection in these early days. In "The Daily Missoulian" an article titled "University of

[22] https://www.figma.com/proto/YrCsiHWGiklGsFQkTtXPSO/Untitled?node-id=105-94&scaling=min-zoom&page-id=103%3A29&starting-point-node-id=105%3A95

Montana Is a Thriving Educational Institution," published on August 29, 1906, it is mentioned that "the museums and laboratories are all modern with the latest and best equipment" (2/4 General History 1906-1921). Included with this article is a picture with the caption "A Corner in The Museum" which shows glass cases housing various artifacts. This quote and picture show that as early as 1906, The University of Montana was collecting artifacts relating to natural history with the intent that the material culture would inform educational studies and provide students with a hands on learning experience. According to another article titled, "Events of Past, Northwest Pioneers' Records Preserved at MSU Museum" (at this time, the University of Montana was called Montana State University), this early museum was established by Professor Morton J Elrod and contained "historical items" (2/11 Museum). From 1895-1912 the university was collecting these historical items and using them in laboratories and museum displays to aid curriculum. These early items were then used to establish the university's official museum (The Montana State University Museum and Northwest Historical Collection) which was "started in 1912 with a miscellaneous collection of cowboy and old settler relics"(2/11 Museum). At this time, The Montana State University Museum and Northwest Historical Collection housed photographs, personal possessions, and clothing among other artifacts that related to Northwestern history. The museum originated with "the idea of collecting materials relating to the culture and home life of Indians of the Northwest, particularly of Montana, and of presenting souvenirs of the frontiersmen and early pioneers of this section of the country"(2/11 Museum).

After its official establishment in 1912, interest in the museum grew and the university began to accept museum donations that included art, furniture, and decorations. But, the majority of items that were donated were Native American clothes and cultural items, as well as other items relating to northwestern history. Paul C. Philips managed the museum and historical

collections starting at its conception in 1911 when he was first hired as a professor of history at the university. Philips oversaw the acquisition of both the Gibson and Lewis collections, two of the largest donations to the university, and was very active in donor relations. During Phillips' time managing the museum's collections, Philips was assisted by Mary Elrod Ferguson who had training in zoology and experience working in zoological museums (1/32 Northwest History Museum 1944-1950). Philips and Ferguson both worked hard in not only acquiring items for the collection, but also in accurately classifying objects and documenting any relevant information and historical background. Philips maintained this level of professionalism, guided by a clear collections management policy, from 1911-1937 and 1946-1954.

During the time Philips was on leave from the university (1937-1945), courses in Anthropology began to be offered under the Department of Sociology, Anthropology and Social Welfare. Dr. Harry Turney-High was the first professor of Anthropology, and he participated in managing the collections while Philips was on leave. As is common in museum collections management, Turney-High and Phillips did not share the same methods or collections policies. In a letter to the president of the university on December 4, 1944 Philips explained that Turney-High's reclassification of the museum objects was: "an example of learned anthropological investigation. He ignores or rejects the authoritative history of some of the specimens and sets up a theoretical history. This theoretical history is interesting but should append to the authoritative descriptions and comments" (1/32 Northwest History Museum 1944-1950). Although Philips emphatically opposed Turney-High's methods, Turney-High's observations and 'opinions' about numerous items' history and cultural affiliation is still on record to this day, and in some cases is the only documentation or historical background known about the item.

Throughout the 1940s and 1950s, the university continued to receive donations of Native American items and items relating to Northwest history. Dr. Carling Malouf was hired by the university in 1948 as a professor in the Anthropology department. Malouf and Philips developed a connection through their shared interest in the region and Malouf contributed significantly to the university's collections. Malouf's research interests included Native American tribes of Montana as well as archaeological sites in Montana, both of which resulted in contributions and donations of items to the collections. Malouf developed close relationships with many people from tribes in Montana and was involved in starting the Native American Studies program at the university as well as the Kyiyo Club for Native American students. Malouf's work and legacy were essential for the Anthropology department and the museum collections as he provided a perspective that was informed by Native Americans themselves more than before.

As it was, The Montana State University Museum and Northwest Historical Collection was officially closed in the 1960s. After the museum was closed, Malouf "took all the anthropology collection…under Paul Philips and… moved all the anthropological stuff to the Anthropology Department in the basement where [he] could lock it up and so forth" (Carling I Malouf Interview, OH 441-001). At this time, the items from the university's museum and northwest historical collection were divided between the anthropology department, the art department, and what would become the K. Ross Toole archives. Malouf is credited with starting the UMACF as it is known today. Malouf's intentions with this were to save these artifacts and cultural items to be used as an educational and training tool for anthropology students, continuing the intent from the university's original museum—material objects as an educational tool. This initial goal and intention in starting the anthropology collections is important to understand how the collections have been housed and taken care of from the 1960s until today.

The collections have never been open to the public—the items are used in various anthropology courses and student trainings, and sometimes are briefly displayed in academic buildings on campus but that is the extent of exposure to individuals outside of the anthropology department.

After Malouf retired, Dr. Gregory R. Campbell was hired in his place. When Dr. Campbell began teaching at the university in the fall of 1988, he also began working with and managing the UMACF. Prior to coming to the university, Dr. Campbell had experience working at two museum institutions in Oklahoma where he learned how to care for and conserve artifacts, develop effective exhibits, and learn the importance of research in managing museum collections. During an interview I conducted with Dr. Campbell in November of 2022, he stated that while he was working part-time in the collections during the 1990s and early 2000s he had three main goals to: stabilize the collection's materiality (proper storage and artifact care), sort out the accession numbering system and improve organization, and move the collection toward being useful. Campbell cites some challenges the UMACF has faced including a lack of funding which affects the ability to properly care for the artifacts—buy the correct storage supplies and tools to properly conserve the various materials the artifacts are made of. The other main challenge is the lack of, and need of, a full-time collections manager. The management of the collections is a full-time job that deserves proper attention and having someone who represents a continuity of labor would help in achieving better organization and more thorough research into objects and their history. Continuity of labor is a common challenge for museum collections because although there are some standards within collections care, there is a lot of room for interpretation and each person may have their own idea of how to best organize and document changes within the collections. The more often different people with different systems of operating cycle through caring for a collection, the less stable progress is, and often times more

work is created as each successor struggles to understand the previous person's processes. The best example of this within the UMACF is the multiple accession numbers individual objects have assigned to them—each item could have an accession number from Turney-High's method, the art department's method, the anthropology department's method in the 1990s, the anthropology catalog's method from 1983-85, and so on. This not only creates confusion but also inhibits efforts for better organization.

The continuity of labor issue is especially relevant for discussing the history of the UMACF over the last two decades. Campbell's involvement with the collections declined in the early 2000s and since then there have been a number of graduate students and other professionals who have briefly managed and worked with the collections. Bethany Campbell worked in the collections from 2008-2011 and during this time she worked on remedying the "curation crisis" that the UMACF faced. Bethany Campbell acknowledges this crisis is fueled in part by a lack of funding and she worked on "organizing and inventorying the UMACF's collections, creating and instituting a policy and procedure manual, and alerting the appropriate administrators to the crisis" (Campbell 2011, 1) Bethany Campbell's thesis also "includes a description of the UMACF environment, with the intent that this will serve as a―needs assessment report" Campbell 2011, 1). While Bethany Campbell's goals and intentions were to help the collections, she only had a few years to be able to complete her lofty project of fixing the curation crisis within the UMACF.

Sally Thompson started working for the University of Montana in 2011 as a Native American Graves Protection and Repatriation Act (NAGPRA) Specialist. Thompson was employed at the university until 2014 and once again, after the three years she worked within the collections, her project of documenting and organizing all NAGPRA related objects in the

UMACF was not completed—this project is something that is still in progress today. In 2014, Riley Auge was hired as a curator for the UMACF and she worked full-time managing the collections, improving organization and artifact care, and handling NAGPRA related issues. Auge held this position for a few years and the full-time curator role was something that the UMACF had needed for a long time and greatly benefited from. Since Auge left, Dr. Kelly Dixon, a professor in the anthropology department at the university, has picked up the curator role in addition to her other roles within the department. Dixon has spent the past several years improving relationships with tribal leaders and Tribal Historic Preservation Officers (THPOs) in Montana. Because of this she has made significant progress in terms of repatriation and work towards improving knowledge about the Native American artifacts in the UMACF. Dixon has devoted time, energy, and her own money to improve artifact care and work towards improving the UMACF as a whole.

Despite various challenges and complications that the Anthropology Department and the UMACF have faced, the collections still serve as a valuable resource for students and members of the university community. The UMACF virtual exhibit serves to continue the original mission and use material objects from the UMACF as an educational tool.

Basket Information

The UMACF has roughly 40 baskets from various regions and tribes in North America, and a select few from other continents. For the virtual exhibit, baskets that were made by peoples from the Southwestern Native American tribes of the United States were selected. The Southwest region covers areas in Colorado, Nevada, Arizona, Utah, and New Mexico. The baskets selected

for this virtual exhibit are made by the Navajo, Apache, Hopi, Pima, and Southern Paiute tribes.[23]

Map by Daniel G. Cole, National Museum of Natural History.

Fig. 1. Map of the Greater Southwest Native tribes (nations), including northern Mexico. The boundaries shown on the map match the depiction of tribal areas in *Handbook* volumes 9 and 10 (Ortiz 1979, 1983) and largely correspond to the 1880s, except for some aboriginal lands as determined by the Indian Claims Commission (e.g., for Yavapai, Western Apache, Hopi). The map represents generalized tribal territories as understood by anthropologists by the time volumes 9 and 10 were produced, with new Indigenous names added for many groups (see "Appendix 3," this vol.).

Figure 11: Map by Daniel G. Cole, National Museum of Natural History, The Handbook of North American Indians, Volume 1: Page 374

[23] The Southern Paiute tribe is not typically classified as being a part of the Southwest region, but rather the Great Basin region. The Southern Paiute people were in close contact with many tribes of the Southwest though, and inhabit land near the Hopi. Classifying Native American tribes into specific regions and groups is very much a Western process and therefore the boundaries and criteria separating tribes into specific regions are not definitive or black and white. Charles H. Lange explains that "on the eastern and northern Puebloan peripheries were various Apache bands and tribes… the Comanches, the Kiowas, the Utes and Southern Paiutes, and the Navajos. Assignment of at least some of these groups, if not all, to the Southwest, to the Plains, or to the Basin, depends very much on the time horizon under consideration" (Lange 1979, 201). Lange's assessment summarizes the role cultural diffusion and cultural change plays in cases of material culture–depending on when the object was created, the creator and their culture could be influenced, or not, by various other Native American tribes. Given this, the choice to include a Southern Paiute basket in the virtual exhibit hinges on the fact that the basket is designed like a Navajo ceremonial basket, but was likely weaved by a person from the Southern Paiute tribe due to circumstances at the time the basket was made.

The baskets were donated to the university by a few different donors: John E. Lewis, A.J. Gibson, the Harrison and Simpson families, and Harry Turney-High.

The John E. Lewis collection was donated to the University of Montana in 1936 after Mr. Lewis passed away. Prior to his death, Professor Paul C. Philips actively sought out correspondence with Mr. Lewis in order to inquire about Mr. Lewis' collection and whether he would donate it to the university. Philips was intent on expanding the university's northwest historical collection and he knew of Lewis' collection because of how well-known Lewis was in the area.[24] Lewis was born in 1865 in Greeley, Iowa and he stayed in Iowa through college. He graduated from the University of Iowa where he had played football and baseball. His journey to Montana was prompted by him coming to Helena in 1889 to be a professional baseball player. From then on, Lewis stayed in Montana and pursued various enterprises. An article from the Big Timber Pioneer on June 6, 1935 explains that "the stories of the opening of a new country, The Flathead, were interesting to Lewis. At that time the western portion of Montana was Missoula county and the Great Northern Railway had not yet reached the northwestern part of the state so, "Lewis went to Ravalli by train, took a stage coach across the flats south of Flathead lake to Poison and crossed the lake in an old wood-burning steamboat to Demersville, the forerunner of Kalispell" (Owings 1935). The area was sparsely populated at this time and most people were fur trappers and traders. Lewis began working at the Ramsdall store in Egan and "here he bought and sold furs and traded with the Indians" (Owings 1935). This is where his connection with Native Americans is said to have started and it is claimed that he "contacted almost every tribe of

[24] UMACF John E. Lewis Donor File Records

Indians in Montana" (Owings 1935). Lewis lived in Columbia Falls for a while practicing law while still buying and selling furs and trading with Native Americans. In 1903, Lewis moved back to Kalispell and around 1908 he bought land by Lake McDonald. After Glacier National Park was established in 1910, he built what is now the Lake McDonald Lodge. Through his enterprises in fur trapping and trading, he developed relationships with Native Americans in the region and then through his success with Lake McDonald lodge, he became well-known among most people of the region. These connections lead to a large collection of Native American artifacts as well as a large bird and big game taxidermy collection.

The Harrison and Simpson collection was donated to the university in 1956 by Col. James R. Simpson, Mrs. Simpson, and their sons Barley H. and Howard K. Simpson. This family inherited the collection from Col. James R. Simpson's sister, Bertha Harrison, and her husband, Dr. William Harvey Harrison. Dr. Harrison was born in 1870 in Indiana and after college he was employed by the United States Office of Indian Affairs as a physician. During the late 1800s, Dr. Harrison studied trachoma among Native Americans, spending time on various reservations in Minnesota, Montana, North Dakota, South Dakota, and the Southwest. During this time, Dr. Harrison collected basketry, clothing, and drums among other items from Native Americans (Thompson 2013). In *The Flathead Courier* on October 16, 1913 Page 5, news of his work was published:

> "Dr. W. H. Harrison…;eye specialist of the Indian department, spent several days in Polson last week. From here he went to St. Ignatius where he will remain for a time treating the eyes of the Indians…He talks interestingly of his work. He says that the government is ready and willing to care for their afflicted wards. But that it is difficult in many cases to get those who need treatment."

From 1914 to 1920, his services are listed in Montana newspapers: “Practice Limited to Diseases and Surgery of the Eye, Ear, Nose Throat, and the Fitting of Glasses/ Office Higgins Block/ Missoula, Mantana [sic][25]”. Harrison died in 1920 and then after his wife died, she left his collection to her brother.

The A.J. Gibson collection was donated to the university in 1928 after he passed away. Gibson was born in Ohio in 1862 and after his father passed away he moved to Butte, Montana in 1883. While in Butte, he practiced his carpentry trade and after a few years he moved to Missoula in 1889. He partnered with a few carpenters throughout his time in Missoula but mostly worked independently. Gibson was a prominent architect in the Missoula area–he designed The Missoula County Courthouse and the first five buildings on the University of Montana campus (most notably what is today the University Hall). Gibson retired in his 40’s, in 1909, and bought one of the first automobiles in Missoula. Gibson and his wife Maud, road tripped throughout the West[26] After him and his wife were killed in an automobile accident, his nephews donated his collection to the university. The collection consisted of objects from the Plains and Southwest but unfortunately there was not much documentation or additional information that came with the collection.

Lastly, one of the baskets included in this project was acquired by Professor Harry Turney-High in 1931. Turney-High was the first professor of Anthropology at the University of Montana, he was employed by the university from 1929-1942, when he was drafted to serve in World War II. During his time in Montana, Turney-High conducted research on the Kootenai people and published “Ethnography of the Kutenai” in 1941. There are no records that indicate how Turney-High acquired any of the materials that he donated to the university which included

[25] http://montananewspapers.org/lccn/sn86075296/1915-03-11/ed-1/seq-5/#
[26] https://archive.umt.edu/montanan/f08/monumental.php

clothing and pots in addition to baskets, but he likely obtained some of these items through his work with and research of Native Americans.

Table 1 below outlines the basic details of the baskets that are included in the virtual gallery. A basket's accession number will be used to reference each basket throughout this paper.

Table 1:

ID Number	**Cultural Affiliation**	**Donor**	**Photo**
5670	Akimel O'odham (Pima)	Gibson	
4877	Dine (Navajo)/ Paiute		

5692 (basket) 5764 (strap)	Apache	Lewis	
XXX-56	Apache		
5784	Third Mesa Hopi	Harry Turney-High	

4880	Second Mesa Hopi	Harrison & Simpson	

Basket 5670 was a part of the Gibson donation that the university received in 1928. Although little information about the basket or how it was obtained by Gibson was provided at the time of the donation, the basket is likely from the Akimel O'odham (River People), or Pima, due to the design, the weaving technique, and the materials used. Prior to European invasion, the Akimel O'odham lived along the Santa Cruz, Gila, and Salt rivers and had many small villages where the people mostly farmed, gathered, and hunted. They would route water from the rivers to their farms and had an extensive irrigation system. After the Gadson Purchase in 1853, contact with settlers increased and the living conditions and treatment of the Akimel O'odham deteriorated. Now, the Akimel O'odham primarily live in the Gila River Community or the Salt River Pima-Maricopa Indian Community, both in Arizona (Ezell 1983, 149-160).

The basket is 10.5 inches in length and is light tan with black designs. The basket was made with the close coiling technique, which is the best known type of basketry from the Akimel O'odham people. This style "is the most substantial basket technic of these people, serving in places where great strength and durability are required…as in the…preparation of foods [and] the transportation of fine grains and seeds" (Kissell 1916, 190). The main material used to make the basket is cat-tail and the black designs, base, and edge are made from Devil's Claw. Devil's

Claw is the most durable material of the region and so it is commonly used to make the base of the basket and areas where the basket would be the most strained. As the government and white settlers moved into the Akimel O'odham peoples' lands and established markets and trading posts, they used baskets less for the collection and transportation of materials like before, and instead began to use them more as a household tool. (Kissell 1916) The basket's pattern of stepped zigzags does not have any reported meaning or significance apart from being a traditional pattern that has been continuously passed down/copied. (Bahr 1983,184-185; Kissell 1916).

Basket 4877 does not have much background information on it–it was not recorded when the university received the basket or who donated it. But, due to the design and materials used it is likely a ceremonial Diné (or Navajo) style basket made by Ute weavers. In the 18th century, the Diné people are described as being semi sedentary as they planted crops and engaged in agriculture, but would also travel for hunting and trading. The Diné inhabited areas near the Pueblo peoples who had a large cultural influence among the Diné, with the Diné adopting many similar pottery designs, clothing, and housing structures (Brugge 1983, 489-501). Diné women were responsible for collecting necessary materials and making baskets which was used primarily for daily activities and as a general tool up until the mid 19th century when trade with European settlers began and baskets were not used as a tool as often. Into the 20th century, the baskets were used almost exclusively in ceremonies and rituals so they developed a new role and significance that came with specific rules and practices (Tschopik 1938). Harry Tschopik Jr. reported that the specific rules, or taboos as he refers to it, included things like: "A woman must always work on the concave surface of a basket…while a woman is working on a basket, she may not sleep with her husband…if she neglected to put the doorway in the basket design, she

would lose her mind or else go blind" (Tschopik 1938, 259). These specific restrictions made basketry especially difficult and time consuming for Diné women and the Ute and Paiutes recognized this, and the opportunity they had before them. Since the Ute and Paiutes were not restricted by the same rules, they could make baskets in the Diné style more efficiently and sell these baskets to both tourists and the Diné themselves (Edison 2006; Stewart 1938, 758-759). Basket 4877 is a ceremonial Ts'aa basket which is traditionally used in ceremonies such as weddings. It is made with sumac and willow with the pattern design being made of Devil's Claw. The pattern has an opening/gap that leads from the center of the basket to the outer edge. This represents the pathway of light that always exists for one to follow, no matter how much darkness they encounter. During ceremonial use, this opening/gap in the pattern will always be positioned to the east (Tschopik 1940, 444-462).

Basket 5692 (strap 5764) was donated to the university as a part of the Lewis collection in 1936. The original donor records indicate that Lewis received the basket from E.S. Paxson who was an artist Lewis was close friends with. Paxson is famous for his paintings which were typically about the west, Native Americans, and Montana. The basket is a burden basket and is likely from the Western Apache people. The Apache people (there are seven recognized Apachean speaking tribes) historically occupied parts of Arizona, New Mexico, Colorado, Oklahoma, and Texas. The Apache people typically would live in separate dwellings from their family, but all the family's dwellings would be close in proximity and would form a type of work unit wherein all members would contribute to social and economic practices. Women were typically in charge of gathering food and supplies and also were the ones who typically weaved the baskets. The burden basket was a common basket style that was used to transport and carry goods. The basket would typically be adorned with a leather carrying strap that women would

use to mount the basket on their bodies (Opler 1983, 368-392). The Apache would typically use willow and cottonwood for burden baskets, both of which would be collected in the springtime. The darker black parts of the design are made from devil's claw which would be gathered in the fall. The red parts of the design are likely dyed pieces of willow or cottonwood; the Apache used to use bark from the root of the yucca which has a red color, but increasingly would use dyes in the early 20th century. The bottom of the basket is buckskin which was used for both aesthetic purposes and to ensure more protection for the portion of the basket that would get the more wear. Basket 5692 also has four vertical bands of buckskin that span from the top to the bottom of the basket which was a very common style for burden baskets, once again for both aesthetics and to give extra strength since they would be placed where two inner rods would cross (Tanner 1982, 1-22). Apache burden baskets were made with the wicker, also called twined, technique which was carefully executed to ensure durability, but it was also important to basket makers to be able to be prideful of the aesthetics of the basket. It was common to use anywhere from one to six horizontal decorative bands on burden baskets, with red and black being the most commonly used colors. Apache people typically used a lot of lines and geometric shapes, such as basket 5692's design with triangles and diamonds. The repetition of the top band design on the bottom portion of the basket is also a typical practice where designs follow a repetitive pattern (Roberts 1931, 121-345; Tanner 1982, 22-88).

There is no record of when basket XXX-56 was acquired by the UMACF, or who donated it, but the basket is likely Apache due to the design and weaving technique. The basket is made of the same materials as basket 5692–cottonwood or willow and devil's claw–but it was made with the coil technique. The technique uses three rods of material to create the weave. The rim of the basket is also a three rod coil with devil's claw (the black portion) and cottonwood or

willow. Coiled baskets typically have a border that is either all, or part devil's claw, and never is the border just the same material as the main basket alone. The basket, although likely made for the tourist trade, would traditionally be used as a household tool to store or carry food and other goods/materials (Roberts 1931, 135-174; Tanner 1982). The basket's design has a few details that identify the basket as not only Apache, but likely Western Apache. The human figures and the whirling logs were both design elements not commonly used by Eastern Apache people (Tanner 1982, 59). The whirling logs are a symbol of well-being and the orderly nature of the universe as well as a representation of the spirit beings that inhabit the four directions, according to the Dine (Aigner 2018). The human figures on basket xxx56 follow the typical form of humans in Apache basket designs, little detail and all made of devil's claw. In terms of meaning behind the human figures, Roberts reports that "[a]t the present time (1918) human and animal figures are enjoying popularity due doubtless to the interest displayed by tourists and consequently by dealers" (Roberts 1931, 186). The red details on basket xxx56 also suggest that it was likely made for the tourist trade as traditionally coiled baskets that women would use in their households were not made with red, or any colored, details.

Basket 5784 was acquired by Professor Harry Turney-High in 1931; it is from the Third Mesa Hopi and most likely was made specifically for the tourist trade. Prior to European invasion, the Hopi had specialized agriculture and strong artistic talents with pottery and mural paintings. They used coal as fuel for cooking and used the ash for aesthetic purposes as well (Brew 1979, 514-523). Although the Hopi still faced many negative effects from European settlement in North America, they were one of the least contacted and visited tribes and there are not many records about them by Europeans up until the mid 19th century. During the end of the nineteenth century, the Hopi people faced turbulence and rapid changes that ultimately led to

fractionalization of the tribe. In 1906, the disagreements amongst the Hopi people about religion and the appropriate approach to the increase in European settlers reached a peak. After efforts to integrate the fractions better resulted in violent fighting, the "Hostile members" retreated and established their own settlement on the Third Mesa (Dockstader 1979, 524-532). Basket 5784 is a basket of the wicker technique which is predominately made by women on the Third Mesa. Wicker baskets are traditionally made with sumac and rabbit bush. Third Mesa women have used both natural methods for dying baskets as well as aniline dyes. Sometimes, both natural and aniline dyes are used in one basket– it can be very difficult to tell the difference between the dyes since the women are very skilled. If the dyes for basket 5784 were derived naturally, the blue would come from larkspur, the black from sunflower seeds, the red from alder bark or sumac berries, and the green from combining the light blue color with a yellow that was derived from the flowers of rabbit brush. The colorful design of basket 5784 is very characteristic of Third Mesa Hopi basketry which used a lot of color. Basket 5784's form is that of a deep basket which, as basket 5784 does, have a rim that is wider than the rest of the basket with a gradual slope to the base. The deep basket form was a style that was often sold or traded and not used as much, or with much importance, by the Hopi themselves (Tanner 1983, 63-69).

Basket 4880 was a part of the Harrison and Simpson donation that the university received in 1956. This basket was likely made by Hopi people from the Second Mesa since it is coiled, not woven, and coiled basketry was traditionally made only on the Second Mesa. The coil basket is started by "wrapping a very small bundle, quickly turning it against itself , and starting the sewing into this circle" (Tanner 1983, 51). The process of weaving coiled basketry is often referred to as sewing as it closely resembles the technique of overhand sewing. The coil technique uses a warp and a weft of different material because the warp is typically made of

sturdier plant material that ensures stability in the basket and then the weft is more flexible and used for sewing and creating designs on the basket. Second Mesa Hopi baskets are typically made with galleta grass (the warp) and yucca (the weft) and the black portions of the design in this basket are likely made from sumac, sunflower seed, or dyed yucca. In order to prepare this plant material for use, Hopi women split each yucca fiber splint to be as narrow as possible which can be very tedious and time consuming (Teiwess 1996). Another piece of this basket that is characteristically Second Mesa Hopi is that the basket's edge is made in the same design as the rest of the basket, with no difference in color or stitch. Basket 4880 is a basket tray which would traditionally be used for food storage, transportation, or serving (Tanner 1983, 50-63).

Exhibit Design

After analyzing the opportunities virtual exhibits can provide and critiquing different virtual museum formats, it was determined that the UMACF Southwest Basketry virtual exhibit would be formatted as a website featuring three main pages–the home page, the virtual exhibit page, and the help page. The website format was chosen so that different opportunities for interaction could be included as well as numerous forms of media–photos, videos, audio. The website is accessible via a computer with internet connection and it is relatively easy to open the website page.

When first visiting the website, visitors will be taken to the home page which has information about the UMACF and its history (Figure 12).

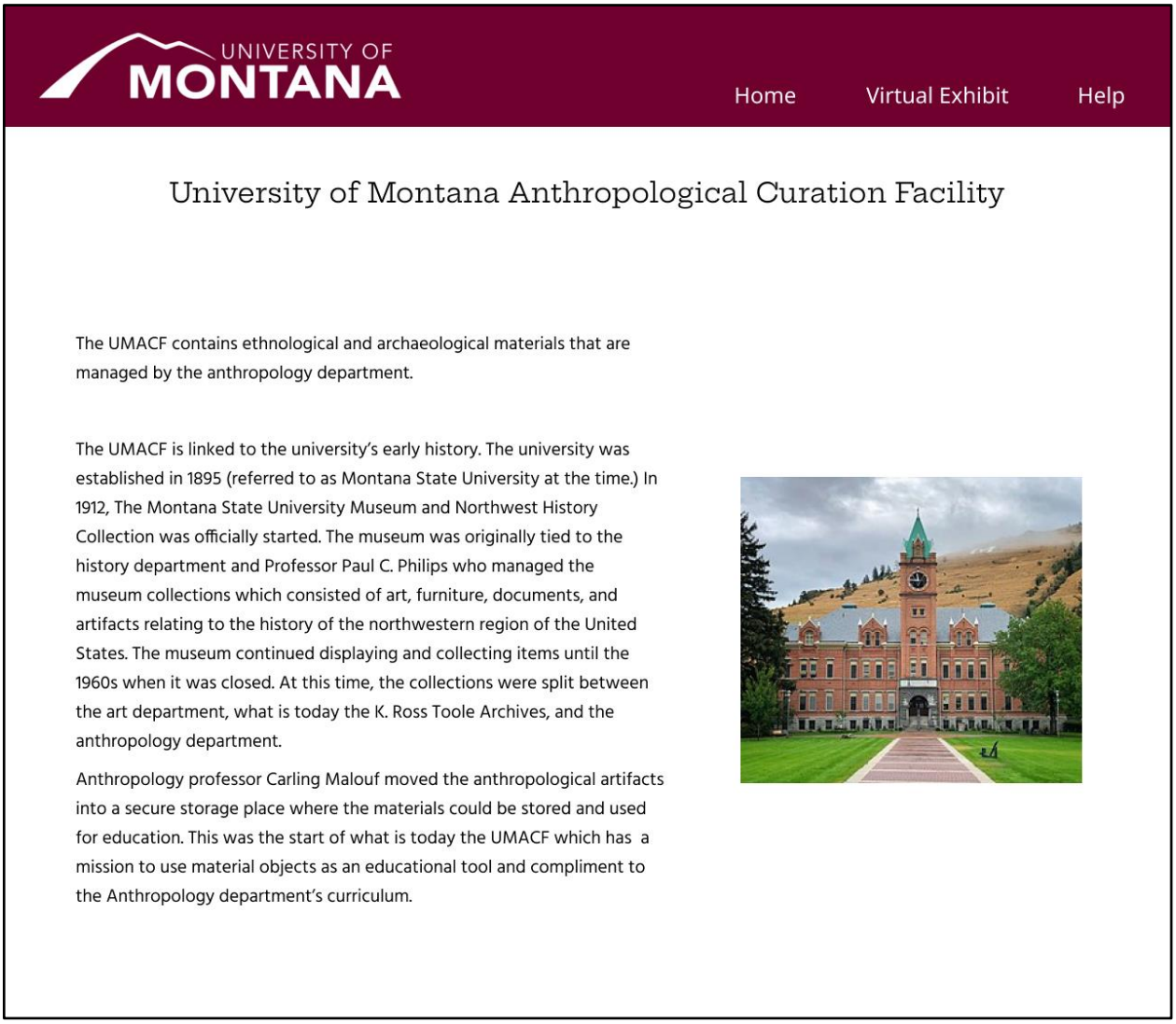


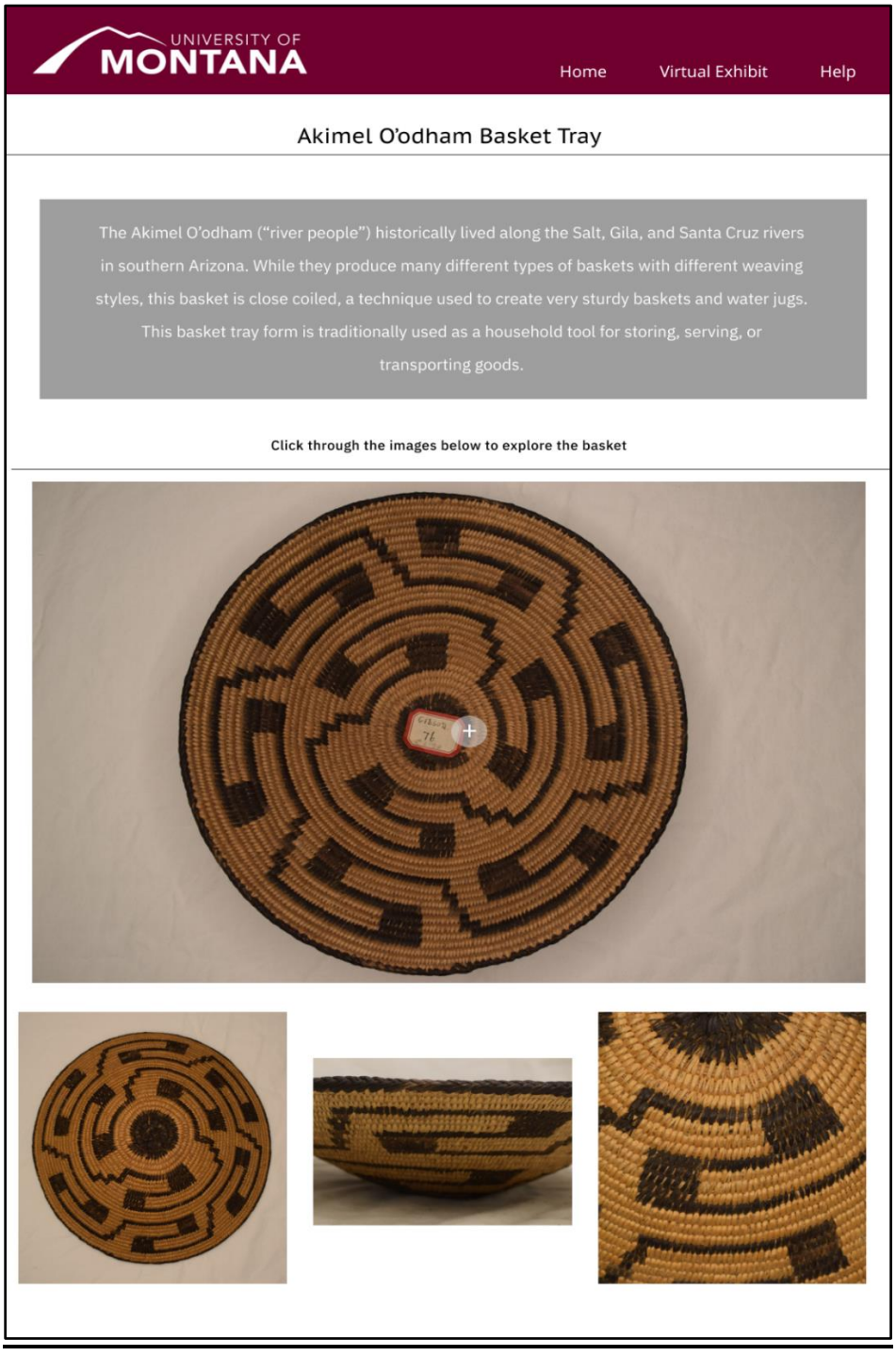
Figure 12

This page is included to give context about where the baskets have been stored; and, the history of the UMACF explains how and why the baskets were acquired by the university. The UMACF has historically been used as an educational tool and is intended to benefit the curriculum of the anthropology department, so an explanation of that history also helps give context to the intent behind the virtual exhibit. This page is less engaging and interactive since it mainly just recites

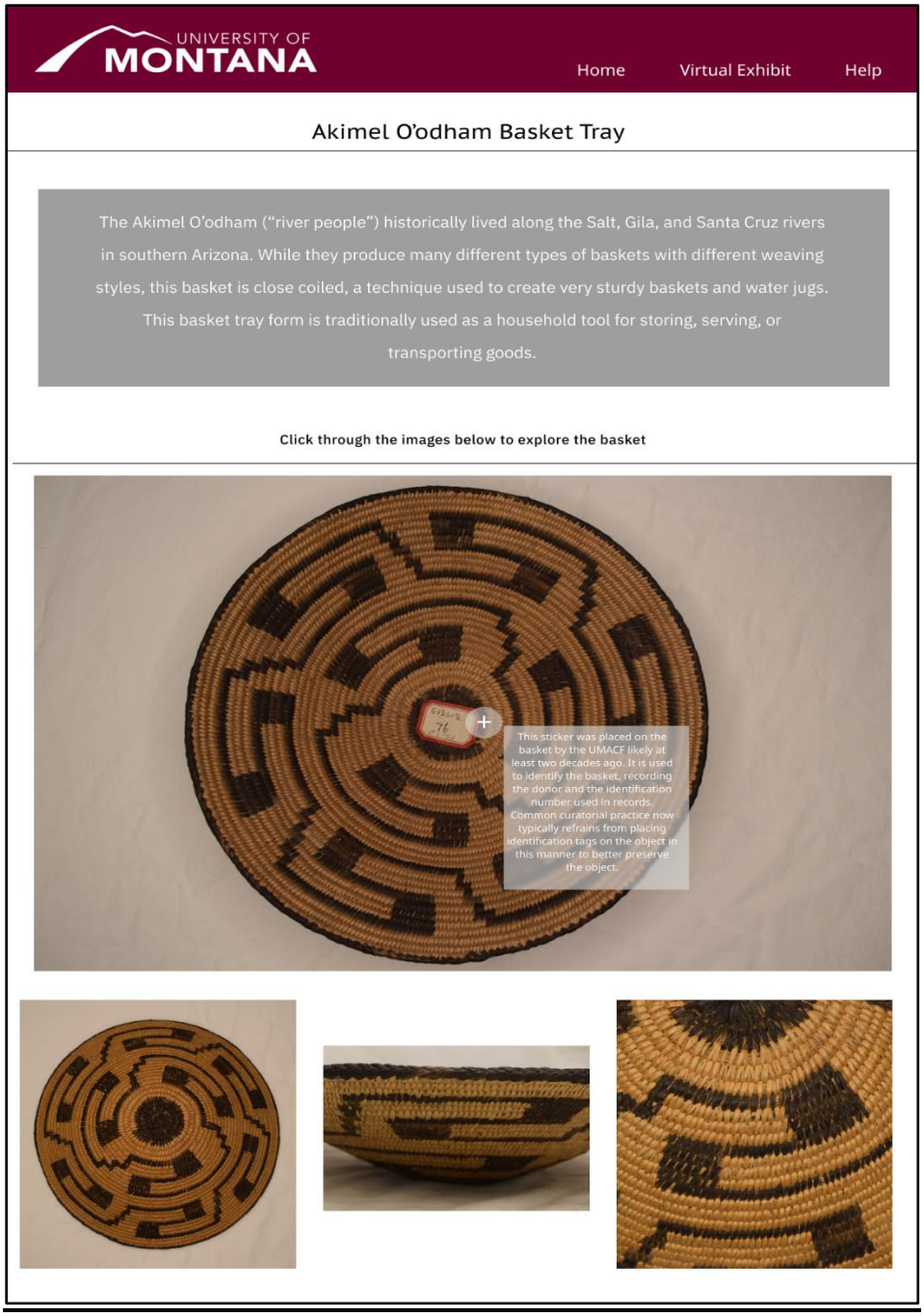
main components of the UMACF history to provide context but there are links to visit a different page that has information about the donors who donated the featured baskets to the UMACF. The next main page is the virtual exhibit page which introduces the topic/content of the exhibit and gives some background information about indigenous peoples from the southwestern United States (Figure 13).

Figure 13

The virtual exhibit portion of the webpage is broken up by the main introduction page and then five separate pages for each basket. The individual basket pages include a short paragraph which introduces the Indigenous group the basket comes from and gives a short description of the basket (Figure 14).



Below that text box are pictures of the basket. The visitor is able to click through the images to get a view of the top, bottom, and sides of the basket as well as close-up images that show the weaving style and details of the basket. While exploring the photographs of the basket, the visitor can click on plus sign icons to open up a text box that explains a portion of the basket further (Figure 15).



The option to click on parts of the basket for more information works to engage the visitor and give them the opportunity to control their experience and engagement. At the bottom of each individual basket page are links to additional sources and information about the Indigenous culture and/or basket referenced on the page.

The last main page, the help page, serves to offer tips and solutions to issues visitors might have while trying to navigate the exhibit. This page is intended to make the exhibit more accessible to people who may not be as comfortable with technology and virtual formats. The help page will hopefully answer questions visitors might have regarding the exhibit.

Future Recommendations

The UMACF Southwest Basketry virtual exhibit has areas of weakness which could be improved in later iterations of this exhibit, or could be noted to inform best practices for any future virtual exhibits. Most notably, input and guidance from Hopi, Dine, Apache, and Akimel O'odham peoples would be crucial. In order to turn this prototype draft into an established virtual exhibit, the process would be carried out in partnership with appropriate tribal cultural heritage stewards and the UM Heritage Collections Board. Getting input about how to respectfully plan for the future of these objects will not only serve the collections and communities via respect and cultural competense, but will also help showcase the baskets and discuss techniques and cultural affiliations in ways that honor Indigenous perspectives. While virtual museums provide the opportunity for source communities and cultures to engage and share information upon viewing the exhibits, it would be best to establish a connection before publicly sharing virtual museums containing cultural materials. The virtual exhibit could also be

improved by adding in more features for accessibility such as the option to listen to the written text, or have the website structured in accordance with screen-reading software. More videos and varying multimedia components could strengthen the reach of the content and work to engage more visitors. Adding a feature that provides visitors with an option to share information or thoughts/comments on the exhibit would work to improve the exchange of information and offer ideas/opportunities for the exhibit to change and grow. This feature could be difficult and time-consuming to moderate if it is formatted in a chat-forum so providing visitors with the option to send an email describing their thoughts/comments could work as well.

Conclusion

This paper aimed to explore virtual museums in a theoretical and practical sense. Analyzing the current literature on virtual museums led to an informed perspective on the challenges and issues that virtual museums face in 2023. Acknowledging these issues is essential in order to grasp what virtual museums can actually achieve, and how they can do so. Despite some challenges, virtual museums are largely an effective avenue for museums and institutions to explore. The virtual sphere can improve accessibility by putting museum collections and information on a platform that can be accessed by anyone, anywhere. Along with this, the virtual sphere offers more options for creating information exchange that can be communicated to visually impaired individuals or individuals who are hard of hearing. In a similar sense, being able to utilize varying multimedia formats in one exhibit can increase the efficacy of information exchange–offering a learning experience that can appeal to a wider range of individuals. Not only can information be communicated in a multitude of ways, but the virtual experience can drastically improve interaction and engagement amongst visitors and the knowledge being displayed. Opening up institutional information to a network of communication can also lead to opportunities for further research and improved information that is informed not only by institutions, but also by source communities and other individuals.

The analysis of four different virtual exhibits allowed for a practical view of virtual museums and an exploration of existing formats. Acknowledging that the biggest strengths of virtual museums are the opportunities they provide for better interaction and engagement, the UMACF prototype draft exhibit on southwestern basketry used the website format. This allowed for the opportunity to include information in varying formats with elements that draw the visitor into the experience more, putting them in the driver's seat of their experience. The UMACF

virtual exhibit will hopefully serve as a bridge to connect UMACF collections with source communities throughout the American West. Such partnerships in turn are expected to guide the management of heritage collections in the future so these materials can serve as points of respect for those communities as well as an educational resource for students, members of the Missoula community, and the wider public. All of which offers a new arena for the UMACF and the anthropology department at the University of Montana to stay relevant as conveyors of information and as a means of cultivating trust and shared collections management policies with tribal communities.

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