



Digital Preservation of Artisanal Culture in the Fez Medina



Abigael
Kihu

Heather
McGlaufflin

Julia
Toplyn

Kyra
Tripp

Digital Preservation of the Fez Medina

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/Arts

by
Abigael Kihu
Heather McGlaufflin
Julia Toplyn
Kyra Tripp

Date:
6 May 2022

Rabat, Morocco Project CenterReport

Submitted to:

Ali El Mokri
Ewa Potocka
Tourat Mdinty

Professors Mohammed El Hamzaoui and
Joseph Doiron
Worcester Polytechnic Institute



This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its web site without editorial or peer review. For more information about the projects program at WPI, see <http://www.wpi.edu/Academics/Project>.

Abstract

The Fez Medina is a culturally rich center for artisanal crafts, but there is a lack of documentation of its history. We worked with Tourat Mdinty to further their goal of preserving the heritage of the Fez Medina by creating a digital preservation map. We collected photos, videos, and interviews around the medina to create an authentic representation of what we witnessed during our time there, capturing both the history of the medina and its current state. Our map, which integrates this visual media, serves as a tool to experience the Fez Medina without physically being there while also improving the tourist experience for those who do visit. Most importantly, our map preserves the culture of the medina in danger of being lost to time.

Executive Summary

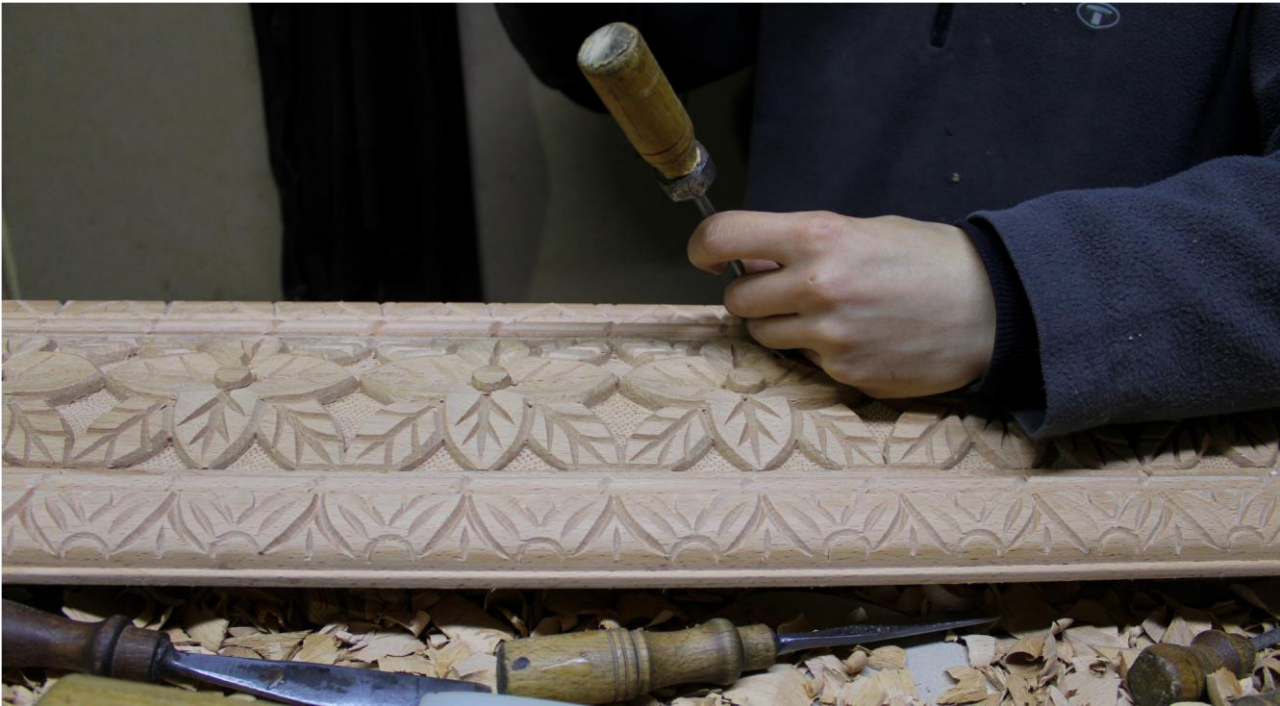


Figure E1. Woodworking Artisan Detailing Wood

Background

Similar to the goal of our project, the Fez City Game Project aims to preserve the culture of the medina using augmented reality to simulate life within Fez. We provided the Fez City Game Project with our map to advance their simulation as the final map outlines the current state of the medina with pictures, videos, and descriptions that can help them design their project. The map that was published and distributed is a copy of the original map, to preserve the medina during this current time period. Subsequent project teams may pick up the Fez City Game Project as they will be recording the updated culture of the medina from a lens that our current map does not include. The Fez Medina is a prominent UNESCO World Heritage Site and is often referred to as Morocco's spiritual and cultural capital. This culturally rich and diverse city is home to a plethora of ancient structures and significant monuments, specifically souqs, fondouqs, palaces, mosques, and fountains, some dating as early

as the 13th-14th centuries (UNESCO, n.d.). These locations house many artisans whose crafts contribute to the rich history of the Fez medina and the culture within it. Fassi artisans helped bring Fez to its popular status today and have significantly impacted its cultural identity through their dedication to their craft and commitment to tradition. Their stories, traditions, and heritage have gone undocumented and, as a result, are in danger of fading away and being lost to time (Ouaknine-Yekutieli, 2015). Digitization of the history of the Fez Medina facilitates preservation efforts to maintain the artisans' stories and traditions passed down for generations, along with the authenticity of the medina and the buildings within.

Although there is a lack of documentation of the Fez Medina, organizations are working to change this. Our sponsor, Tourat Mdinty, which directly translates to "heritage of my city," is an organization focused

on the preservation of the cultural identity of Fez through the establishment of programs to celebrate and educate the community and the world about the cultural and societal heritage of the Fez Medina.

Project Goal and Objectives

Our goal was to create a digital preservation map of the Fez Medina that incorporated its history and cultural significance, focusing on the long-term preservation of heritage. We achieved this goal by first cataloging key landmarks and infrastructures present in the medina as a foundation for our map. We collected spatial data at our chosen significant locations throughout the medina to authentically capture this culturally rich city. We conducted interviews to record the stories of the artisans within the Fez Medina to aid in the preservation of the city's heritage. We synthesized our collected data into a map that visualizes the medina and allows a broader audience to access the medina. Our digital preservation map educates the user about the culture through the platform's ability to let the user explore the medina virtually. Tourat Mdinty will utilize our digital preservation map to further their preservation efforts of the cultural identity of Fez.

Methods

To digitally map the Fez Medina for long-term preservation, we synthesized several data collection efforts into Google My Maps, our mapping platform of choice. The first step in creating our digital preservation map was to compile a location catalog that noted the coordinates of each culturally significant building, restaurant, cafe, hotel, and other

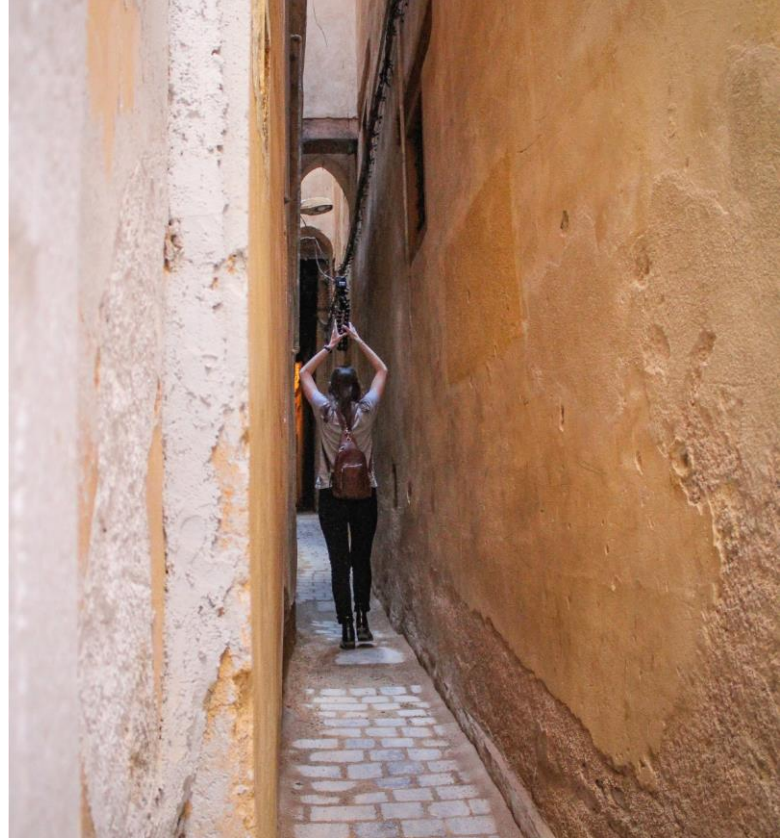


Figure E2. Recording of Fez Medina Alleyway

infrastructure and recorded authentic summative descriptions of each building.

After we located specific areas in the medina, we collected spatial data in the form of videos and pictures of these culturally significant locations to capture the structures in vivid detail and color, the local businesses and souqs in action, and the historical landmarks in their current state. To preserve the often undocumented stories of Fassi heritage, we conducted interviews in the interviewee's language of choice, which allowed them to speak comfortably and ensured we got the most authentic rendition of their stories. All the data we collected underwent a postproduction process in preparation for the mapping platform to ensure they accurately represented the medina. To finalize our deliverable, we compiled all the data we collected into My Maps.

Findings

The digital preservation map contains photos, videos, and interviews collected over three trips to Fez. We uploaded this data to My Maps after performing the postproduction processes. We had to reanalyze our uses for the technology we brought to Morocco to capture the medina's authenticity. After we collected the many types of data and began postproduction, we had to adjust our methods as we experimented with the editing and uploading process.

We coalesced all our collected data into an Excel sheet to organize our preproduction, production, and postproduction processes. We used this sheet to determine what form of data we would collect at each location (photos, videos, interviews, 360 videos, and 360 photos). We organized the sheet into the following categories: name, description, type of structure, latitude, longitude, and altitude, as these categories were most pertinent to our final deliverable.

During our trips to Fez, we focused on collecting as much data as possible.

We visited locations based on our own discretion or those suggested by our sponsors or guide. Once we arrived at a location, we recorded coordinates and summative observations. We then used our DSLR camera to capture photographs of the space and activities.

In most locations, we utilized the GoPro MAX to capture 360 media. We conducted interviews in some locations which we recorded using our iPhones and the GoPro Hero 7 when applicable. Our guide and translator, Ali El-Irari, conducted and translated these interviews from Darija to English on our behalf.

With this data, we had to experiment with many software to prepare them for My Maps. We determined that Adobe Lightroom was the best software for editing the images and capturing the authenticity of the medina. We edited the interviews in Adobe Premiere Pro to remove distractions from the artisans' stories and provide context through B-roll. After we edited all forms of spatial data and interviews, we saved the edited media to appropriate repositories.

We uploaded the data directly from the repositories to My Maps to create the digital preservation map.

Discussion

The size of the Fez Medina required us to be intentional about selecting locations we included on the map, for we could not include all of them in the time we had. Since the focus of our project was

Figure E3. Coppersmith in Sffarine Square



artisanal culture, we first chose locations that showed this. While these locations were sometimes more well-known, we prioritized shops and workspaces that were hidden away. We were also limited by the willingness of individuals to let us document their stories and spaces. In addition to artisan shops, we included locations unrelated to artisans to document the atmosphere of the Fez Medina accurately.

Through our project, we created a map that merges the view of a tourist and local. Our work highlights significant places in the medina that anyone visiting there may be interested in seeing. The map emphasizes locations that may otherwise be overlooked and provides a way to find them. Our project shows the Fez Medina authentically, rather than pushing the “in crisis” narrative we often read about in our background research. By documenting the medina in this moment in time, we created a standard to measure any change occurring in the future. Lastly, our map allows someone who may never visit the Fez Medina to experience it in detail while also serving as a guide for those who are fortunate enough to visit.

We provided our sponsor Tourat Mdinty with our map so they can either use it as a building block for a new project or utilize it with their already existing Fez City Game Project. For the continuation of the digital preservation map, the project could be replicated through the scope of food or architecture within the medina as we were unable to complete these areas due to Ramadan and lack of time.

Figure E4. Leather Goods in Fondouq



Acknowledgments

As a team, we would like to thank the following people for their assistance throughout our project:

- Professors Mohammed El Hamzaoui and Joseph Doiron of WPI for their guidance throughout the entire process, from ID 2050 to the end of IQP. Without their help, we could not have produced a project we feel so proud of.
- Ali El Mokri of Tourat Mdinty for his sponsorship of our project. His support and vision provided us with the outline needed for our digital preservation map.
- Professor Ewa Potocka of the Euromed University of Fez for her help in identifying locations on our map and people to interview for our project. Her suggestions enriched our final deliverable.
- Abdelali (Ali) El-Irani, our guide and translator in the Fez Medina. Teams often state in their acknowledgments that their project would not have been possible without the help of a particular contributor, but in the case of Ali, our team believes this could not be truer. We all feel that we would not have obtained nearly the same quality of locations, information, or interviews without Ali. We truly cannot thank him enough.



**Professor
Mohammed El
Hamzaoui**
WPI



**Professor Joseph
Doiron**
WPI



Abdelali (Ali) El-Irani
Guide & Translator



Ali El Mokri
Tourat Mdinty



Professor Ewa Potocka
Euromed University of Fez

Table of Contents

Abstract.....	2
Executive Summary	3
Background	3
Project Goal and Objectives.....	4
Methods	4
Findings	5
Discussion	5
Acknowledgments	7
Table of Contents	8
List of Figures	11
List of Tables	11
List of Equation(s).....	12
Meet the Team	13
Authorship of Report.....	14
Creation of the Map.....	15
Introduction.....	16
Background.....	17
1. The Historicity of Fez and the Fez Medina.....	18
2. The People of Fez	20
3. Tourist Influence and Interactions	22
4. Digitization of History and Heritage.....	23
5. Tourat Mdinty.....	25
6. Conclusion	25
Methodology	26
1. Creating a Location Catalog.....	28
1.1 Identification and Selection of Locations.....	28
1.2 Creating a Location Catalog	28
1.2.1 Physical Location	29
1.2.2 Documentation and Categorization of Landmarks.....	29
1.2.3 Summative Observations	29

2. Collecting Spatial Data	30
2.1 Using Pictures & Videos for Preservation of Intangible Cultural Heritage	30
2.2 Collecting Videos of the Streets	31
2.3 Collecting Pictures of the Interior of Buildings	31
3. Collecting Stories	31
3.1 Exploratory Interviews	32
3.2 Using Video to Capture Interviews	32
3.3 Collecting Video in the Interviewee's Language of Choice	32
3.4 Translation	33
4. Digital Preservation Map	33
4.1 Postproduction	33
4.1.1 Editing Visual Media	33
4.1.2 Editing Auditory Media	34
4.2 Integrating Synthesized Data in Digital Preservation Map	34
4.2.1 Selection of Mapping Software	34
4.2.2 Uploading Location Catalog	36
4.2.3 Map Visuals	36
5. Ethical Considerations	37
Findings	38
1. Pilot Trip to Fez	38
1.1 Exploration	38
1.2 Pilot Data Collection Process	39
1.3 Integrating Pilot Data into My Maps	42
1.3.1 Creating Location Catalog	42
1.3.2 GPS Coordinates	44
1.3.3 Icon Creation	45
1.3.4 Uploading Descriptions	45
1.3.5 Uploading Spatial Media	46
2. Data Collection Phase 1	46
2.1 Process of Finding Locations	47
2.2 Data Collection Process & Equipment Decisions	47
2.2.1 Location Type	47
2.2.2 Data Collection	51

2.2.3 Interview Process	53
3. Postproduction of Phase 1 Data.....	54
3.1 Organizing Raw Data.....	54
3.2 Editing and Uploading Media.....	54
3.2.1 Editing Photo Data	55
3.2.2 Editing 360 Media.....	56
3.2.3 Editing Interviews	57
3.2.4 Upload to Central Repositories	57
3.3 Creation of Map.....	58
3.3.1 GPS Coordinates	58
3.3.2 Icons	59
3.3.3 Location Descriptions.....	59
3.3.4 Uploading Visual Media to Map.....	60
4. Data Collection Phase 2	61
4.1 Ramadan	61
4.2 Collecting Data & Equipment Decisions	62
5. Postproduction of Phase 2 Data.....	62
5.1 Editing Media	62
5.2 Integrating Data into My Maps.....	63
6. Digital Preservation Map of the Fez Medina	63
Discussion.....	64
1. Selecting Locations.....	64
2. The Value of Our Project	66
Future Recommendations	68
Conclusion	69
References.....	71
Appendix A: Location Catalog	73
Appendix B: Step-By-Step Guide for Uploading Media.....	80
Appendix C: Map User Guide.....	87

List of Figures

Figure 1: Weaver Working	16
Figure 2: View of a Street in the Medina.....	17
Figure 3: Fez Divided by the Fez Wadi	18
Figure 4: Fez Under the Merinid Dynasty.....	18
Figure 5: Larger Divisions of Fez (circa de. 1900).....	19
Figure 6: Leather Tannery Worker.....	20
Figure 7: Example of Pottery.....	21
Figure 8: Overview of the Fez Medina	22
Figure 9: Example of Current Map of the Fez Medina	24
Figure 10: Courtyard of the El Mokri Palace	25
Figure 11: Example of Data Collection	26
Figure 12: Methods Overview	27
Figure 13: Location Catalog Creation Overview	28
Figure 14: Integrating Data into Map Flowchart.....	34
Figure 15: Map with all Layers Selected	36
Figure 16: Fondouqs and Artisan Shop Layers Selected	36
Figure 17: Local Posing for a Picture.....	38
Figure 18: GPS Coordinate Example	39
Figure 19: Using the GoPro MAX.....	40
Figure 20: Example of Camera Grid.....	41
Figure 21: GPS Conversion Overview	44
Figure 22: Example Hotel Location Marker.....	45
Figure 23: Description Editing in My Maps	45
Figure 24: "Add Photo" Feature in My Maps.....	46
Figure 25: Lalla Yeddouna Leather Shop Interview.....	48
Figure 26: Interior of Souq on Talaa Kebira	49
Figure 27: Example of Street Walkthrough View.....	50
Figure 28: Example of Using DSLR Camera	52
Figure 29: Capturing Interview.....	53
Figure 30: Example of Adobe Lightroom.....	55
Figure 31: Example of a Blurred Face	56
Figure 32: All Location Marker Icons	59
Figure 33: Example Cover Image.....	60
Figure 34: Original Cover Image.....	60
Figure 35: Example of Empty Street During Ramadan.....	61
Figure 36: Artisan Painting at Bab Guissa Fondouq	64
Figure 37: Artisan Working in Sffarine Square	65
Figure 38: Carpets in the Fez Medina	67
Figure 39: Team photo.....	70

List of Tables

Table 1: Summary of Data Collection Methods.....	29
Table 2: Example of Field Notes	30
Table 3: Goals for Postproduction	33
Table 4: Comparison of My Maps and Google Maps Features.....	35
Table 5: Basic Location Catalog Features	42

<i>Table 6: Reasons for Location Catalog Categories</i>	<i>43</i>
<i>Table 7: Cardinal Direction Signage.....</i>	<i>44</i>
<i>Table 8: Repository Locations and Associated Data Type.....</i>	<i>57</i>

List of Equation(s)

<i>Equation 1: DMS to DD Coordinate Conversion Equation.....</i>	<i>44</i>
--	-----------

Meet the Team



Abigael Kihu - Class of 2023 Management Engineering

Starting from a young age I have had a passion for art, and I have dabbled in a few forms such as drawing, welding sculptures, and my favorite - oil painting. I have a skincare line called Vizuri Skin where I make and sell all-natural self care products such as body butters and hair oils. I enjoy traveling and experiencing the unique cultures of the world, and of course taking pictures of every beautiful sight I come across.



Heather McGlaufflin - Class of 2023 Industrial Engineering

My family and I have always been avid travelers which has provided me with many cultural experiences over the years.

Some of my favorite locations have been Cuba, Prague, and Puerto Rico. My time in Morocco was an incredible opportunity to engage directly with the local culture and traditions.



Julia Toplyn - Class of 2023 Mechanical Engineering

I grew up in a small town outside of Boston in a family of many different cultural backgrounds. Being surrounded by different cultures has engendered a general curiosity and deep appreciation for the smaller parts of cultures. I am incredibly grateful to have been able to explore the culture of the Fez Medina through the lens of the artisans.



Kyra Tripp - Class of 2023 Chemistry

I am from a small town in northeast Massachusetts, and before coming to Morocco, I hadn't done much traveling. This project allowed me to experience a culture very different from my own, and our work in the Fez Medina taught me so much about both Morocco and myself. I am extremely appreciative of this opportunity.

Authorship of Report

Authors: Abigael Kihu (AK), Heather McGlaufflin (HM), Julia Toplyn (JT), Kyra Tripp (KT)

Section	Primary Author(s)	Primary Editor(s)
Abstract	KT	JT, KT
Executive Summary	HM	JT, KT
Background		
1. The Historicity of Fez and the Fez Medina	JT	KT, AK
2. The People of Fez	KT	JT, HM
3. Tourist Influence and Interactions	AK	JT, KT
4. Digitization of History and Heritage	HM, JT	AK, KT
5. Tourat Mdinty	JT	HM
6. Conclusion	KT	HM
Methodology		
1. Creating a Location Catalog	JT	JT, KT
2. Collecting Spatial Data	AK	JT, KT
3. Collecting Stories	KT	JT, KT
4. Digital Preservation Map	HM, JT	JT, KT
5. Ethical Considerations	KT	JT, KT
Findings		
1. Pilot Trip to Fez	JT, KT	JT, KT
2. Data Collection Phase 1	JT	JT, KT
3. Postproduction of Phase 1 Data	JT	JT, KT
4. Data Collection Phase 2	JT	JT, KT
5. Postproduction of Phase 2 Data	JT, KT	JT, KT
6. Digital Preservation Map of the Fez Medina	KT	JT, KT
Discussion		
1. Selecting Locations	KT	JT, KT
2. The Value of Our Project	KT	JT, KT
Future Recommendations	HM	JT, KT
Conclusion	KT	JT

Creation of the Map

Task	Primary Team Member(s)
Creating Location Catalog	JT, KT
Editing Photos	AK, HM
Editing Interviews	AK
Uploading Media	JT
Writing Descriptions	KT
Proofreading	HM

Introduction

Fez, an imbued city in history, recognized as a UNESCO World Heritage Site, is referred to as the cultural and spiritual capital of Morocco (UNESCO, n.d.). The local artisans contribute significantly to this history through their unique and traditional crafts. As the medina grows with the rest of the country, the traditional ways of life and craftsmanship also mirror these changes (Ouaknine-Yekutieli, 2015). The historic practices, arts, rituals, pursuit of knowledge, and ancestral artisanship, all recognized as Intangible Cultural Heritages (ICH), are at risk of being lost to time (Selmanović et al., 2020). With the growing concerns of losing the medina's cultural significance, digitization offers a route to preserve these unique traditions.

Tourat Mdinty, which translates to “heritage of my city,” is a non-profit organization that focuses their efforts on preserving the Fez Medina. The organization hosts many cultural exhibition programs, restorations of old landmarks, and workshops, and has established a local library (Tourat Mdinty, 2021). In a more recent effort, Tourat Mdinty has partnered with a local university and professor to begin a digital preservation effort. Our project

integrates into this effort by aiding in the progression and advancement of digitizing cultural heritage of the Fez Medina.

Our project created a digital preservation map of the Fez Medina that incorporates its history and cultural significance with the long-term goal of preserving the city's heritage. We created this map by conducting field work in Fez and postproduction work in Rabat. In the following sections we provide more information about our background research and the design process of creating the map. Specifically, we focus on the cultural heritage of Fez, Morocco and our process for digital preservation.



Figure 1: Weaver Working

Background

This chapter focuses on the Fez Medina and the impact of artisans on local culture to provide background for our project on virtually preserving the medina and its traditions (Figure 2). The beginning of this chapter highlights the rich cultural heritage in Fez, Morocco. We examine the historicity of Fez, focusing on the impactful relationship Fassi artisans maintain with the medina. The next topic reviews how the evolution of this diverse city is influenced by the growing tourism industry and the global interactions with local artisans to indulge in their unique goods and services. Finally, the digitization of the history and heritage of Fez addresses the preservation efforts to maintain the intricate architecture, specialized craft education, and the stories and traditions passed down from generation to generation. Our project aims to aid Tourat Mdinty in their efforts to preserve the cultural identity of Fez by collecting and digitizing the stories of Fassi artisans.



Figure 2: View of a Street in the Medina

1. The Historicity of Fez and the Fez Medina

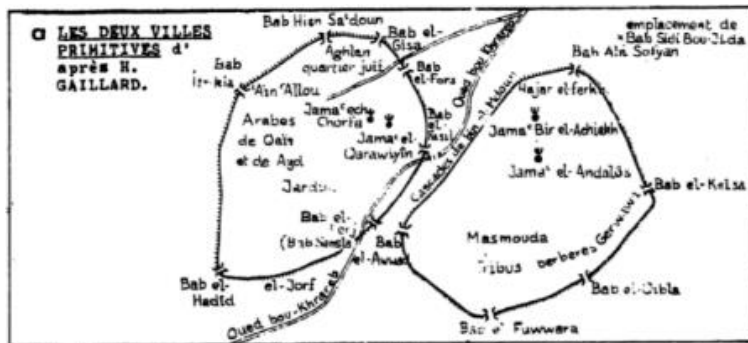


Figure 3: Fez Divided by the Fez Wadi

Note. From “Schéma directeur d'urbanisme de la ville de Fès,” by Délégation régionale de Fès. Atelier du schéma directeur, 1980, UNESDOC (<https://unesdoc.unesco.org/ark:/48223/pf0000039605?posInSet=17&queryId=N-EXPLORE-cad3fb24-479f-4d70-bac6-6a01dc836092>).

Fez, a growing and developing city since the 9th century, has established a complex and lengthy history and continues to be an integral part of Moroccan society. The Fez Medina, often referred to as the cultural and spiritual capital of Morocco, is a prominent World Heritage Site recognized by UNESCO.

Initially, a river known as Fez Wadi divided the town; however, united under the Almoravid dynasty in the 11th century, the city grew into Fez El-Bali by the 12th century (Figure 3). In the 13th century, the Merinid dynasty built Fez Jedid to the west of Fez El-Bali to accommodate more extensive architectural

exhibitions and an expanding population (Figure 4). In the 13th century, the city received recognition for its affluent trade, knowledge, and architectural feats, replacing Marrakech as the kingdom's capital. As the capital, Fez represented the diverse cultures present in the medina. This culturally rich and diverse city is home to a plethora of ancient structures and significant monuments, specifically madrasas, fondouqs, palaces, residences, mosques, and fountains. The architecture is a leading example of this intermingling of Andalusian, Oriental, and African styles. The medina's numerous religious, civil, and military buildings contributed to the cultural formation of the city and its people (UNESCO, n.d.).

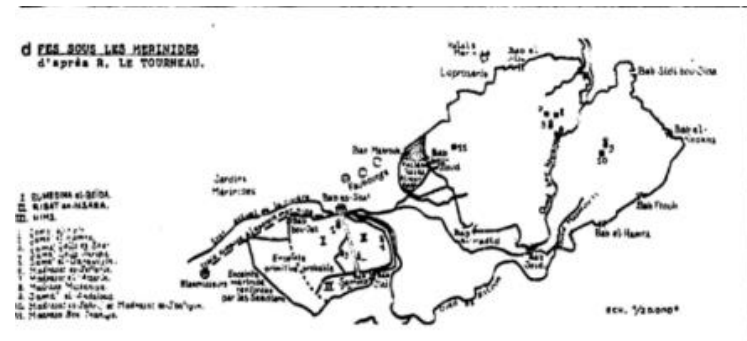


Figure 4: Fez Under the Merinid Dynasty

Note. From “Schéma directeur d'urbanisme de la ville de Fès,” by Délégation régionale de Fès. Atelier du schéma directeur, 1980, UNESDOC (<https://unesdoc.unesco.org/ark:/48223/pf0000039605?posInSet=17&queryId=N-EXPLORE-cad3fb24-479f-4d70-bac6-6a01dc836092>).



Figure 5: Larger Divisions of Fez (circa de. 1900)

Note. From “Schéma directeur d'urbanisme de la ville de Fès,” by Délégation régionale de Fès. Atelier du schéma directeur, 1980, UNESDOC
<https://unesdoc.unesco.org/ark:/48223/pf0000039605?posInSet=17&queryId=N-EXPLORE-cad3fb24-479f-4d70-bac6-6a01dc836092>.

The medina reflects the growing population, global influences, and geographical changes it has experienced throughout its history (Figure 5). Artisans embody the practices that made Fez such a booming city in the 13th century through their persistent use of historical practices. Locals today remain dedicated to commemorating and preserving the traditional practices of Fez. However, with global influence, specifically French Imperialism, there have been growing tensions amongst

artisans. Many artisans wish to preserve and continue their craft in the same way it was passed down to them - by passing it down to their children. However, other artisans modernize their production processes to meet growing consumer demand (Ouaknine-Yekutieli, 2015). Even in the face of modernization, the emphasis on preserving and sharing this imbued historicity emerges through Fassi artisans' crafts.

2. The People of Fez

The culture and traditions of the Fez Medina are heavily influenced by the approximately 50,000 artisans residing there, who produce a variety of goods ranging from shoes to furniture. Narratives from the 11th century describe Fassi artisans as possessing a status of intelligence. The public at this time saw artisans as “libraries of humanity” and “doctors of crafts,” and the community believed the mastery of artisans provided their intellectual property (Ouaknine-Yekutieli, 2015). With this level of status in society, the importance of Fassi artisans to the Fez Medina is evident.

Fassi artisans are intertwined in many of the principal values of the people in the medina. Craftspeople are lasting examples of moral values, including honesty in business and the dedication of the apprentice to the master. Artisans used the mastery of their craft and their morals to enhance the spirituality of the city of Fez. In addition to their moral and spiritual contributions, artisans were at times agents of social change. Artisans led the 1873 Tanners’ Revolt against tax collectors, the city governor, and the Sultan. While the tanners eventually surrendered, the public saw them as symbols of strength and perseverance

(Figure 6). Fifty years later, revolutions were still associated with tanners, butchers, and dyers (Ouaknine-Yekutieli, 2015).



Figure 6: Leather Tannery Worker

In more recent history, the medina contains a sense of change and loss of tradition. Medina residents explain the old traditions that are fading away, such as the connectedness of families. Families used to do everything together, and multiple families would live together, but now that way of life is changing. During the French Protectorate over Morocco, many narratives about Fassi artisans began to describe the artisans as “in crisis.” Although artisans in Fez currently feel the struggles of a difficult economic period, those in the medina still associate Fassi artisans with a sense of pride and reverence (Ouaknine-Yekutieli, 2015).

The community’s appreciation for artisans is unsurprising when considering the profound connection many artisans feel to their craft and their dedication to making quality products. Some artisans form such a deep attachment to their work that they view their crafts almost like their own children (Ranganathan, 2018). Fassi artisans produced high-quality work throughout the history of Fez, and this work helped to increase the fame of Fez around the world. Artisans in the Fez Medina sell their wide variety of goods to both local and tourist markets, thus playing a pivotal role in life in the medina (Figure 7). Since the beginning of

writing about the Fez Medina, artisans have created an important part of the public spheres there, and personal narratives tell the story of those who came before the present day (Ouaknine-Yekutieli, 2015).



Figure 7: Example of Pottery

Moroccan public storytellers could be considered artisans, producing the craft of entertaining and educational stories. Professional storytellers in Morocco earn their living performing in specific public places, such as the Bab Boujloud area of Fez. When storytellers begin their performances, the public gathers around them in a circle called a *halqa*. The storytellers, known as the *hlayqia* in Darija, use a drum called *ta'rija* for various purposes, such as encouraging people to gather, emphasizing

specific points in their stories, making their audience listen, and collecting money. Moroccan storytellers use more than simply their words to tell their stories; they purposefully use rhetoric and syntactic structures such as onomatopoeia, rhyme, rhythm, facial expressions, and gestures to make their stories easy to understand and as entertaining as possible. Public storytellers connect socially and emotionally to their audience, and people enjoy listening to them. Overall, storytellers play a crucial role in Moroccan society and educate the community on heritage and tradition through orality (Allen, 1996; Sehlaoui, 2009). Their stories create a foundation for future generations built on their cultural origins. In our project, we recorded the stories of artisans in the Fez Medina and used the power of stories in Morocco to preserve artisan narratives and share these collections with locals and people worldwide.

3. Tourist Influence and Interactions

The historic medina of Fez acquired a vast and rich cultural background over its thousand-year history. From the picturesque scenery to the diverse inhabitants within, it is no surprise that millions of tourists flock to the walled city annually to experience the wonders of this ancient site firsthand (Figure 8).

Through this influx of visitors, the tourism industry has cemented itself as a crucial part of the Moroccan economy.

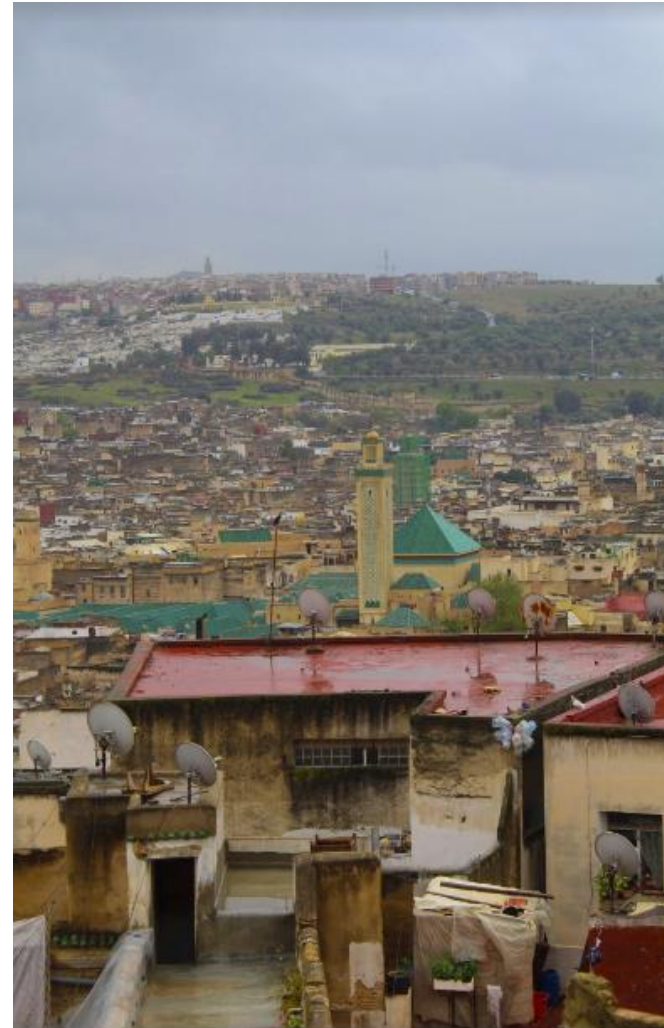


Figure 8: Overview of the Fez Medina

Despite the rapidly urbanizing cities of Morocco being the focal point for many innovative strides in the country, the most cherished cities remain the ones that hold the most valuable religious and secular monuments of the past- the medinas. These historic towns are the core of the country's national identity and represent the essence of Morocco. Due to their significance, the ancient medinas are key assets for tourism (as cited in Steenbruggen et al., n.d.).

Tourism is interlaced into the everyday affairs of the medinas in Morocco through a symbiotic relationship. Tourists are drawn to the flourishing communities within the medina, which benefit economically and culturally from the business tourism generates (Steenbruggen et al., n.d.). The Fez Medina is much more than a stationary physical structure or canvas of a place. Rather, it is engaged in the evolution of social and cultural life that is continuously influenced by many internal and external forces, one of which is the tourism industry (Steenbruggen et al., n.d.). With the increase of tourism, cultural and heritage attractions often advertise themselves as immutable and timeless. This image is persistently conserved to avoid a decline in popularity and income from the business that tourism generates for the local

businesses and artisans alike (as cited in Steenbruggen et al., n.d.). As a result, the locals of Fez cater to tourists' interests in the historical significance of the city (as cited in Steenbruggen et al., n.d.).

Although Fez is widely recognized for its deep-rooted traditions and ancient heritage, the present-day city is embarking on a path of modernization. Acknowledging that travel may not be possible for many individuals, Fez, like many Moroccan cities, is venturing into developing new and innovative alternatives to travel, using digitization to provide tourists with an interactive experience of the city. By integrating technology, the tourism industry now offers more opportunities to view historical sites without traveling. Innovative advances like these are just a glimpse into the emerging world of digitization that will transform how cities like Fez conduct their affairs with their locals and tourists alike.

4. Digitization of History and Heritage

Interactive mapping is a tool that represents complicated charts and data. The benefits of interactive maps derive from the user's interfacing with the data. These maps utilize layering techniques

that overlay multiple data types on a map; the user may then filter these categories to best suit their needs. This type of map offers more information than a traditional paper map and creates a comprehensive visual of the intersections of local concerns serving as educational material (Figure 9).

Education has become more accessible to many communities because of advancements in technology. Digital education encompasses many subjects, but there is still an opportunity to be culturally conscious and capture traditions not yet recorded (Jaimes et al., 2003). Aspects of culture like traditions or ancestry are sometimes only told through stories, possibly by professional storytellers, and rarely written down. Oral distribution of stories only reaches so far as storytellers currently share their knowledge of heritage in their tales. Storytellers could educate outside their local communities and spread their stories using digital education to reach broader audiences (Allen, 1996).

Incorporating digital education and cultural heritage helps digitize history by recreating authentic events, also known as virtual heritage. Virtual heritage creates a setting to educate and enhance an understanding of heritage within cultural sites to the

broader public (Ehtemami et al., 2021). Although the intricate architecture and elaborately built monuments within Fez have outlived generations, this is not the case for the ICH that has been lost. The oral traditions and expressions, dances and performing arts, social practices, knowledge, and ancestral craftsmanship are all ICH at risk of being lost due to a lack of preservation and inheritance from one generation to the next (Selmanović et al., 2020). Digitization of history preserves both the culture and the traditions within it. Virtual heritage focuses on recording stories and aids in accessing them. Our sponsor is interested in increasing the accessibility of these stories and the associated benefits for both the Fassi artisans and the Fez Medina.



Figure 9: Example of Current Map of the Fez Medina

5. Tourat Mdinty

Our sponsor, Tourat Mdinty, is a non-profit organization in Fez, Morocco (Figure 10). They work towards establishing programs to restore, celebrate and educate the community and the world about the cultural and societal heritage of Fez. Tourat Mdinty partners with local authorities and associations to facilitate rehabilitation, preservation, and education of important landmarks in the medina. They continue to “advocate the principles of universal reason, freedom, and autonomy” and “participate effectively in the dynamic of cultural development” of Fez and Morocco through their efforts. Tourat Mdinty incorporates their goals in their Fez City Game Project, an interactive game focused on the culture of the Fez Medina (Tourat Mdinty, 2021). Through our involvement with the Fez City Game Project, we assisted our sponsors in furthering their goals by providing a new way to participate in preserving Fassi culture.

6. Conclusion

Fassi artisans are integral to the culture of Fez through the creation of their high-quality crafts. They play vital roles in morals, social change, economics, and tourism and have stories

to tell and record. Through our research on Fez, Fassi artisans, the tourism industry, and possible avenues to digitize artisans’ stories and experiences, we informed ourselves on how we could aid our sponsors to progress the Fez City Game Project further. We explain our methodology to document and compile artisan spaces and histories following this chapter.



Figure 10: Courtyard of the El Mokri Palace

Methodology

This chapter explains the methodology we used to digitally map the medina of Fez, incorporating pictures and videos that highlight the history and heritage for long-term preservation efforts. First, we created a catalog of locations in the medina, which we accomplished with a detailed Microsoft Excel sheet. Second, we collected spatial data in the medina by taking pictures and videos of the streets and shops, including 360-degree photos and videos (Figure 11). Third, we took videos of the interviews we conducted with people living and working in the medina. We worked with our guide, Ali El-Irari, to conduct and translate interviews.

Last, we compiled all the data we collected into a digital preservation map, consisting of an interactive map embedded with the photos and videos we acquired. This interactive map was the final piece of our project and the deliverable we made accessible for the Fez City Game Project. The flow chart on the next page summarizes the methods and objectives to reach our goal (Figure 12). Current and future generations will access this map to allow the preservation and continuation of the culture that is a foundation of Moroccan society. The following chapter describes each objective and the methods to achieve them, concluding with ethical considerations.



Figure 11: Example of Data Collection

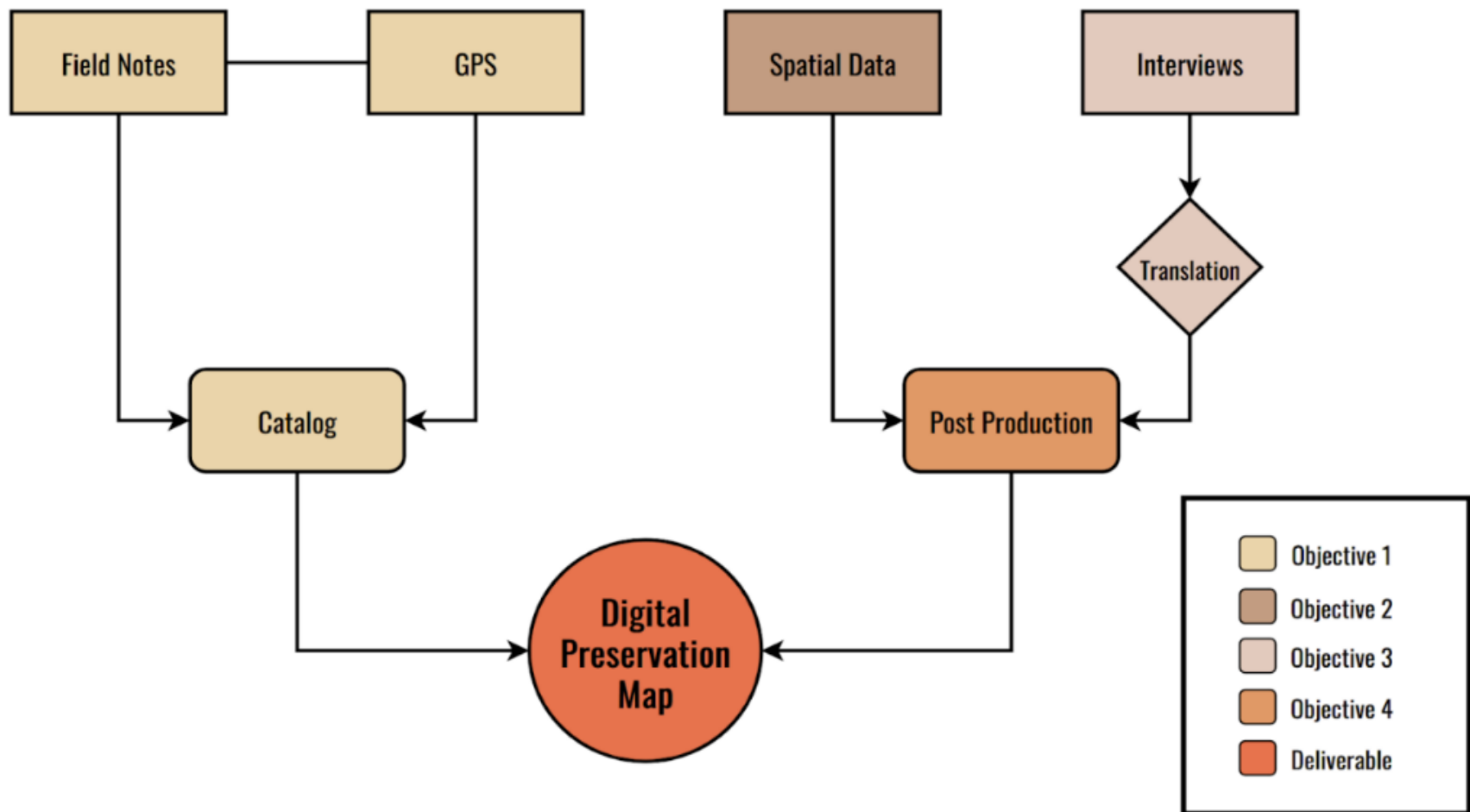


Figure 12: Methods Overview

1. Creating a Location Catalog

To produce a digital preservation map, we required a solid foundation in the form of a catalog. The foundation for our map consisted of key landmarks and infrastructures present in the medina. According to our sponsors, locals are leaving the medina, taking their cultural history with them. Thus, it was even more critical to preserve this imbued history of the medina. The following section focuses on the methods of data collection we used to create our location catalog: we noted the coordinates of each building, restaurant, cafe, hotel, and other infrastructures and recorded summative descriptions of each location. Figure 13 below outlines the process of creating the location catalog.

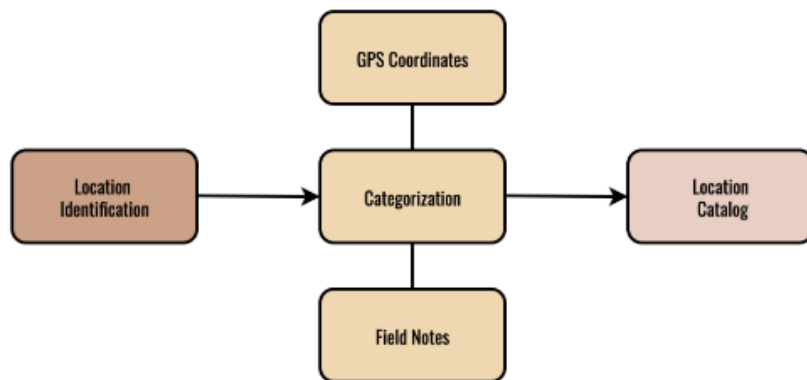


Figure 13: Location Catalog Creation Overview

1.1 Identification and Selection of Locations

We found experts in the Fez Medina to determine locations to visit during our trips there. We relied on three people for this; Ali, our guide and translator; Ali El Mokri, our sponsor at Tourat Mdinty; and Ewa Potocka, our sponsor from the Euromed University of Fez. Our experts identified key locations of both historical and cultural significance. During our exploration of the medina, our group identified locations we were interested in to catalog and integrate into our map later.

1.2 Creating a Location Catalog

We began our digitization efforts by visiting the locations we planned to preserve digitally. It was beneficial to document our findings in a Microsoft Excel sheet. We noted which types of spatial data we wanted to collect of the areas in this catalog. We then divided the data required to create our digital map of the medina into the following sub-tasks: the physical location (i.e., latitude and longitude), categorization of buildings/landmarks, and a summative observation of the building/landmark. We compiled all the above information into the Microsoft Excel catalog.

Table 1 below summarizes the data collected and the methods for doing so.

Table 1: Summary of Data Collection Methods

Data Collected	Method
GPS Coordinates	Compass App on iPhones
Categorization	Photography by authors
Summative Observation	Field notes

1.2.1 Physical Location

The first type of data we collected for the location catalog was Global Positioning System (GPS) coordinates. We used latitudinal and longitudinal coordinates developed by The Department of Defense to produce a uniform measure of location (Mangold, 1996). This technology is widely accepted for its accuracy in marking geographical locations. The technology has since been improved upon but remains the most consistent and widely accepted measure of the geographical location of objects and buildings.

1.2.2 Documentation and Categorization of Landmarks

The second type of data we recorded for the location catalog was geographical data. We divided our locations into categories that described the structure of the location.

The third data type in our digital map was photographs and videos of the buildings and their surroundings. We prioritized symmetry and centering while photographing each landmark/building because these are two critical components for composing a photograph that relays the desired information. Symmetry is appealing in photographs and allowed us to maintain a sense of unity across our collection of photos (WPI Global Labs, 2022a).

1.2.3 Summative Observations

An essential part of the preservation process was including descriptive details about locations not captured in pictures and videos. We utilized field notes in Fez as the method to gather our observations of each location. Table 2 below provides examples of the types of information we recorded in our field notes. We relied on handwritten field notes while in the medina to document our observations and then analyze and integrate

them into My Maps once we were back in Rabat (Kawulich, 2005).

Table 2: Example of Field Notes

Examples of Information in Field Notes	
Atmosphere	
Menu	
Affiliations	
History	

We determined it was unnecessary to create strict criteria for each observation about any given building or landmark since we aimed to relay the authenticity of the medina and the buildings within. Thus, we kept our observations as natural and unscripted as possible and summarized our notes for each building, relaying as much information about the building as possible. After collecting data, we re-grouped and reviewed our observations, compiling them into a summative overview of the building. We then uploaded the summative description into our catalog under the “Description” column. Please refer to for the catalog.

2. Collecting Spatial Data

Once we located specific areas in the medina to observe further, we collected spatial data in the form of videos and pictures of the structures, shops, monuments, and culturally significant spaces. ICH, particularly unique dances, songs, stories, structures, and crafts that are transmitted from one generation to the next, have been effectively recorded through media data to preserve culture (Pistola et al., 2021). The aim of using video data was to collect and preserve pivotal aspects of the culture in Fez that formulate the distinctive Moroccan identity. The following subsections explain our choice of using pictures and videos in our preservation process.

2.1 Using Pictures & Videos for Preservation of Intangible Cultural Heritage

Historically, as described in our background chapter, ICH has mainly been recorded using descriptions and recollections of culturally significant events stored in the written word. However, with the advancement of technology and media users worldwide, videos have become a more popular form of data collection to capture these cultural occurrences live and in action. The reliability of videos to record every detail, motion,

and sound when adequately used is why we implemented this form of data collection into our project. Videos were the most effective tool to document the current state of Fez while providing a more engaging format of delivery for the viewer. These videos are crucial in our preservation efforts because preservation stems from delivering the experience and the feeling that accompanies intangible heritage (Selmanović et al., 2020). Videos added another layer of immersion into our digital map, which makes the map more likely to retain users (Wolf, 2006). We also gathered photographs to help supplement the videos we took to preserve ICH.

2.2 Collecting Videos of the Streets

Our primary concerns when recording the streets of Fez were capturing the structures in vivid detail and color, the local businesses and souqs in action, and the historical landmarks in their current state. The urban geography of the Fez Medina is densely populated with mosques, residencies, souqs, narrow roads, and alleyways that outline the city like a maze, meaning we had to be deliberate with our equipment choices. We used 360 videos to capture these aspects of the streets.

2.3 Collecting Pictures of the Interior of Buildings

Once we collected the videos and pictures of the streets to produce an immersive street view of the Fez Medina, we looked further into the individual structures and businesses to capture the physical aspects of these spaces and the atmosphere inside. Photo documentation of the conditions of the outside and inside of the shops, restaurants, and hotels allowed us to effectively capture the space for preservation purposes.

We took pictures or videos inside these local businesses of the products or services offered, the artisans creating their crafts, and shop owners interacting with their customers. The photos and videos exhibited the tangible and intangible cultural heritage we aimed to collect with our project and allowed us to share information about cultural heritage through digital storytelling (Selmanović et al., 2020).

3. Collecting Stories

A key aspect of our overarching goal was to preserve the heritage of the Fez Medina by recording the stories of the people who live and work there. These stories are often not documented and, as a result, are in danger of fading away and being lost to

time. This section outlines our methods for collecting these stories. We used audio and video to record semi-structured interviews of the people in the medina. With Ali's help, we conducted these interviews in the interviewee's language of choice. After we recorded the interviews, Ali translated them into English.

3.1 Exploratory Interviews

To properly preserve the oral histories of the medina, we conducted exploratory, unstructured interviews. We chose exploratory, unstructured interviews because we wanted to leave a lot of freedom for the interviewees to tell their stories comfortably. Structured interviews would not work for our purposes because they would restrict the answers interviewees could give (Rowley, 2012). While our interviews were largely unstructured, these are some examples of questions we used:

- Can you tell us about your profession?
- How long have you been in this profession?
- What does a regular day look like for you?
- How did you learn your profession?
- Are you willing to share the process of your craft? If so, can you tell us about it?

3.2 Using Video to Capture Interviews

Storytelling is an important cultural activity in Morocco, where storytelling itself can be a profession. Professional Moroccan storytellers often use gestures, posture, and facial expressions to tell their stories, making storytelling an oral and visual art (Sehlaoui, 2009). We decided to use video to record the interviews to capture this visual component of storytelling and keep the stories as authentic as possible. Recording visual media also allowed artisans to show us around their shops and demonstrate how they make their crafts, capturing more of the ICH mentioned earlier.

3.3 Collecting Video in the Interviewee's Language of Choice

When we collected the stories for our digital preservation map, we wanted to ensure we got the most authentic rendition. We achieved this by requesting that interviewees answer our questions in the language of their choice. Allowing interviewees to speak in whichever language they were most comfortable allowed them to tell their stories freely and unencumbered (Van Den Hout, 2013). We relied on Ali to conduct the interviews.

3.4 Translation

Ali translated the interviews into English so we could understand them. Once he completed the translations, we reviewed them to clarify and make edits we deemed necessary. We included the translation as a transcription for the video interviews, but the interviews remained in their original language. This allowed us to reach a broader audience with the video interviews while retaining their authenticity.

4. Digital Preservation Map

When forming the digital preservation map, we synthesized the data discussed into one platform. We used digital preservation methods to visualize the Fez Medina into a platform incorporating historical landmarks, artisan shops, and other infrastructures. Our platform allows a broader audience to access the medina, which previously was not well documented. The map contains information to educate the user about the culture through the platform's interactive aspects. This section explains our editing process for the media and how we uploaded the data collected to form the digital preservation map.

4.1 Postproduction

As outlined in Sections 2 and 3, the visual and audio files we collected provided us with the media that contributed to the interactive ability of the map. Before we imported this data into the final software, we refined and polished it using various postproduction programs. Table 3 below outlines the goals of editing the media. We describe specifics of the software we used in the following sections.

Table 3: Goals for Postproduction

Media	Postproduction
Photos and Videos	Visual Appeal Ethical Considerations
Audio	Removal of Background Noise

4.1.1 Editing Visual Media

The visual data we collected is crucial to our preservation efforts of the Fez Medina, as our goal was to use these videos and pictures in our map so users could experience the area visually. In preparing this data for the platform, we reviewed and edited our images to make them more visually appealing while also

taking ethical considerations into account (i.e., blurring faces). There were many photo-editing software available to us, such as Photoshop, Canva, Adobe Premiere, and Adobe Lightroom. We decided which program to use based on ease of use and our pictures taken on site. When editing videos, we used Adobe Premiere Pro. To prepare the team to work with these programs, we worked with WPI's Global Lab and brought the necessary software to the project site on team personal computers.

4.1.2 Editing Auditory Media

To incorporate the history of the medina within the digital map, we recorded interviews of artisan narratives. In its raw form, this audio incorporated background noise of the medina, which resulted in distractions from the artisans' stories. We reduced the background noise by editing our audial media and focused solely on the interviewees' responses.

4.2 Integrating Synthesized Data in Digital Preservation Map

Once we applied the postproduction processes to our data we implemented the final part of our methodology and began forming our digital preservation map. We sorted each location into the appropriate layer, and then we uploaded each location's

latitude and longitude into My Maps. We next assigned each location the appropriate marker. After inputting the locations, we uploaded our photographs, videos, and observations of each building and location. Figure 14 below visualizes this process.

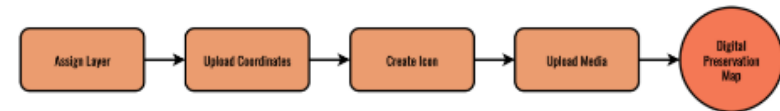


Figure 14: Integrating Data into Map Flowchart

4.2.1 Selection of Mapping Software

Our project required a program that could facilitate our digitization efforts due to our extensive data collection. Many options were available to us, such as BingMaps, Google Maps, MapQuest, Wikimapia, and Here; however, our lack of coding knowledge greatly hindered which software was realistic for us to pursue further. We determined that Google My Maps was the best program to facilitate our mapping project.

Initially, we thought Google Maps would be the best fit for our use case. The program allows the user to take an aerial view of

an area, add markers and pop-up boxes, and ultimately integrate a static map into something more dynamic like Google Earth. However, to access all these features of Google Maps, we would need extensive coding knowledge and eventually pay for certain features (*Pricing Plans and API Costs*, n.d.). While Google Maps does have a developer page that outlines sample codes for common use cases and functions, the verbiage still assumes coding knowledge, which our group does not have (Google, n.d.). Therefore, due to both the paywall and the significant amount of coding knowledge needed to utilize Google Maps for our purpose, we decided this was not a viable program for us to use.

We researched My Maps next. My Maps is a subset of Google Maps and is a simplified and more user-friendly version of Google Maps. The program retains many customizable functions, such as markers/tags, pop-up description windows, and the ability to add layers to a map. However, unlike Google Maps, all functions are integrated into the program. Any function a user wishes to use is a small button that generates the required code; thus, there is no need for the user to input code to create a digital map (*My Maps - About - Google Maps*, n.d.).

While My Maps does not incorporate every function of Google Maps and often limits how many of any one item the user may incorporate into the map, we do not see our map exceeding these limitations. The features of My Maps compared to Google Maps are outlined in Table 4.

Table 4: Comparison of My Maps and Google Maps Features

My Maps	Google Maps
Up to 10,000 lines, shapes, and or locations per map	Unlimited shapes, lines, and locations
A Layer may have 2,000 lines, shapes, and or locations	Unlimited elements per layer
Maximum of 10 layers per map	Unlimited Layers

Note. All data sourced from *Google My Maps Help Page* by Google, n.d. (<https://support.google.com/mymaps/?hl=en#topic=3188329>) and the *Google Maps Developer Page* by Google, n.d. (<https://support.google.com/maps/?hl=en#topic=3092425>).

Due to the simplified interface and the retention of key features, we felt that My Maps would best facilitate our digital mapping efforts for this objective. We utilized many tutorials and community forums to help us learn the program.



Figure 15: Map with all Layers Selected

4.2.2 Uploading Location Catalog

We created the foundation for our digital preservation map by uploading the location catalog from Section 1.2 to My Maps. This process uploaded the column headers from our location catalog: name, description, type of structure, data to be collected, latitude, longitude, altitude, and status. Once downloaded to the platform, we selected what the user viewed on the public map. This provided us with the ability to adjust any of the data that may have been imported incorrectly. The location catalog served as the basis for our map, creating markers for each location once uploaded to My Maps. These markers were generated by the latitude and longitude columns of the catalog.



Figure 16: Fondouqs and Artisan Shop Layers Selected

4.2.3 Map Visuals

We assigned each location a marker to record their position and building type on the map. These markers are customizable in My Maps, so the user may choose the color and icon of any marker. There is also the option to create custom markers if the user desires.

Each building type received its own layer on the map, meaning all fondouqs are on one layer, all shops are on another, and so forth. The user may display all layers on the map at once (Figure 15), or view only some layer(s), say, fondouqs and artisan shops only (Figure 16). These categorized infrastructures offer a personalized experience to our digital map. The user may choose how they wish to interact with the map. Personalized maps

generally facilitate more engagement from users (Ballatore & Bertolotto, 2015). Our goal was to preserve the area physically and culturally; having a high retention rate of our users was crucial to the map's effectiveness in sharing Fassi culture.

Once we collected and edited all the visual media, we uploaded it into My Maps. We stored the visual media in repositories that allowed the data to be easily integrated into My Maps.

5. Ethical Considerations

We started all interactions with locals by introducing ourselves as students and explaining our project goal. We then asked for their consent in the following areas: photographing and/or filming their space, photographing and/or filming their products and craft, and recording their responses to interviews with audio and video. Our paramount responsibility was to make the interviewee feel comfortable enough to speak freely with us. We informed the interviewee that they had the option to keep their identities anonymous if they wished to do so and that they were not obligated to participate in an interview. Every interview we conducted was well organized and prepared ahead of time to establish a pleasant and uninterrupted experience for each

interviewee. Our questions were unbiased and straightforward, leaving no room for leading questions or deception. We worded each question in a way that was easy to comprehend and answer. The interviewee had the option to answer any question in the language that they were most comfortable in so that they felt confident and spoke freely. We consciously avoided portraying the interviewees in a negative or hurtful light by avoiding biased language in our reports. We conducted our interviews wherever the interviewees were most comfortable.

There is no expectation of privacy in public spaces, so we did not blur faces in most of our photos and videos. However, there were some spaces where we deemed blurring faces to be appropriate, such as in restaurants or mosques. We also blurred personal information when it was requested of us, such as license plate numbers. We also respected the wishes of any bystanders who did not want to be photographed.

Findings

The following section describes our design process for creating our map. Each section describes a different aspect of these processes. We work through our process chronologically. We note areas of our process that did not work and what we ultimately determined were the best methods for creating our map. In phase 2 we focus on the changes we made to our process, and it can be assumed that unless otherwise explicitly stated, we used a previously established method. For a step-by-step guide of how we created our map, please see Appendix B: Step-By-Step Guide for Uploading Media.

1. Pilot Trip to Fez

By planning a pilot trip to Fez, we familiarized ourselves with the locations and people we would be working with throughout our time collecting data. We established a principle understanding of our surroundings and colleagues, which was incredibly beneficial to our comfort in the medina. We explored the medina, noted locations that interested us, practiced using our equipment, and overall situated ourselves in our new surroundings (Figure 17).

1.1 Exploration

First, we prioritized exploring the medina on our own as we wanted to experience the medina in the most authentic way we could; by simply walking around.



Figure 17: Local Posing for a Picture

During our exploration, we found many artisans and shops that specialized in the crafts that we read about in our research. We asked these artisans to photograph their goods and the process of making their craft. We were surprised to find how receptive the artisans were to us and our equipment.

Overall, exploring the medina without the intention of collecting data allowed us to develop a deeper understanding of the environment and climate in which our project was situated. We became more familiar with the types of crafts we documented and the types of streets and spaces we digitally preserved.

1.2 Pilot Data Collection Process

After we felt that we had acclimated to the spaces where we would be working, we deemed it necessary to test our equipment. We followed our methods outlined in the previous section using the riad (a traditional Moroccan home) we stayed in as a pilot location. The riad offered privacy from the busy medina streets; thus, we had the freedom to experiment and revise our methods in a more relaxed environment, as it was enclosed and more private than the busy streets of the medina.



Figure 18: GPS Coordinate Example

We began the data collection process by noting the GPS coordinates of the riad. We used the compass app on an iPhone to determine the GPS coordinates. We then took a screenshot of the compass screen, as shown in Figure 18, and captioned it with the riad's name as a caption in iPhotos. We determined that this

system of screenshotting and captioning the GPS coordinates was the fastest process given the equipment we had. We determined that it would be crucial for us to follow this process consistently and diligently so that we could easily create location markers on the map in the future.



Figure 19: Using the GoPro MAX

Next, we ensured that the GoPro MAX and the GoPro Hero 7 were connected to our mobile devices so that we could control the devices from a distance. The GoPro Quik app allowed us to control our devices remotely. We followed the instructions provided within the mobile application to connect our iPhone to the devices. Once connected, we tested the remote capture feature by setting the GoPro MAX down in the center of a room in the riad and walking about 50 meters away (Figure 19). We then opened the app and navigated to the remote capture feature,

ensuring that the correct device was connected. We then configured the settings to capture a 360 photo and toggled the capture. We wanted to ensure that the remote capture worked as expected, so we viewed the media using the Quik app to confirm that the 360 photos were taken. We followed the same process for connecting the GoPro Hero 7.

We experimented with video collection once we confirmed that the Quik app was connected and captured data. We followed the same steps as stated previously; however, we configured the settings to capture 360 videos. We set the camera and tripod down in a room, walked away, and remote captured the video. We recorded for 15 seconds before ending the capture and reviewing the media. Similarly, we also captured video with the tripod above our heads. Both methods yielded quality videos with little distortion and were suitable for our needs.



Figure 20: Example of Camera Grid

After experimenting with the 360 media, we worked with the DSLR. Three hundred sixty-degree photos capture everything in a space, so there was little need to pick areas we felt highlighted the space's ambiance as the 360 photos would capture the surrounding details. However, using a standard DSLR camera,

we had to be more critical of what we captured; we had to determine what aspects of the location we felt best narrated the space. We relied heavily on the techniques we learned from WPI's Global Lab training (WPI Global Labs, 2022a). Specifically, we practiced framing different architectural features of the riad, centering key features, and experimenting with lighting (Figure 20). We could not always prioritize these aspects during this process as the space did not facilitate an environment where we could. For example, we tried to photograph a seating area within the riad. However, we could not create enough space between us and the subject to frame the shot properly. We did our best to account for this; however, due to our limited time in Fez, we did not focus on perfecting these aspects in each photograph. Overall, this process allowed us to understand some of the challenges to anticipate when documenting spaces using the DSLR camera.

Lastly, we experimented with collecting walkthrough videos of the streets of the medina. As outlined in our methods, we planned to use 360 videos for these; however, we wanted to experiment with settings and video formats to ensure that 360 videos were the best way of documenting the feeling of the

medina. We recorded a walkthrough of the street leading up to the riad using the GoPro MAX for 360 videos and the GoPro Hero 7 for 180 videos. We used three different angles on the 180 videos: regular, wide, and hyper wide. After reviewing our data, we determined that 360 videos captured the most authentic rendition of the streets with the least amount of distortion and offered the highest amount of interactivity. The wide view provided a comparable view of the streets but with less interactivity than the 360 videos. We concluded that we would prioritize 360 videos for all walkthroughs we collected.

1.3 Integrating Pilot Data into My Maps

After we collected the pilot data using our camera equipment, we moved on to familiarizing ourselves with the integration process into My Maps. Our goal with our pilot data was to create a complete location marker for the riad, which entailed: a summative description of the location, photo data, video data, and 360 data.

1.3.1 Creating Location Catalog

As mentioned in our methods, we determined a detailed Excel Sheet was the best way to house all written components of the

data we collected. Table 5 outlines the basic features we determined essential for our location catalog after collecting our pilot data.

Table 5: Basic Location Catalog Features

Production Schedule	Data
Preproduction	Types of Data to be Collected
Production	Name, Description, Type of Structure, Latitude, Longitude, and Altitude.
Postproduction	Status and Map Status

We created the location catalog to help organize our preproduction, production, and postproduction processes for each location where we collected data. For organizing our preproduction process, we noted what types of data (photos, videos, interviews, 360 videos, 360 photos) we wished to collect at each location. However, we remained flexible in this as we wanted to collect data that best captured the spaces and areas, which, in most cases, ended up being something we decided once we were on site. For organizing the data collected at each location during the production process, we noted the following categories: name, description, type of structure, latitude, longitude, and altitude. Table 6 outlines our reasoning for

including these categories and their greater purpose in our project.

Table 6: Reasons for Location Catalog Categories

Category	Reason
Name	This column allows us to recall the areas we have been in and directly integrates the name into MyMaps.
Description	We transferred our scribed notes about the location into a digital format, such that the summative description directly integrates into MyMaps.
Type of Structure	This allowed us to view the variety of the locations we are preserving. The column also allowed us to assign a unique location marker to each type of structure in MyMaps.
Latitude	We decided on using GPS coordinates to mark each location/area we collect data at (we outline our decision for this type of coordinate system in our methodology chapter). This column stored all the latitude coordinates for our locations.
Longitude	Similarly, this column holds all longitude data collected for our locations.
Altitude	We also decided to mark the altitude of each location to document how the city's elevation decreases as one progresses further into the medina.

Lastly, the location catalog organized our postproduction categories. There are two categories for our postproduction organization: status and map status. The "status" column allowed us to track what data was collected at any given location and mark any possible follow-up data collection we felt we needed to pursue. It was beneficial to have a way to compare the types of data we had hoped to collect and the data we collected.

Furthermore, we determined noting any secondary or follow-up data in one location made scheduling time in Fez easier for our team. For example, if we had a cluster of sites missing 360 photos, we could communicate this with our guide and allocate time to retrieve this data. Similarly, the "map status" category allowed the team to document what data we had integrated into My Maps and what data still needed to be uploaded. We applied color codes to this column. Red indicated locations with no data, yellow indicated locations where we integrated some but not all the data, and green indicated that the location had all associated data uploaded into My Maps. The color coding made it very easy for us to communicate the work that we still needed to do throughout our postproduction process.

Overall, the location catalog served as a crucial organizational and functional tool. We created this catalog to help us import media into My Maps. The catalog allowed our team to reduce the amount of time dedicated to transferring data and allowed us to have an organized and formattable representation of our data.

1.3.2 GPS Coordinates

After uploading the location catalog into My Maps, we checked the accuracy of the information uploaded. We discovered that My Maps uses Decimal Degree (DD) coordinates, whereas the digital compass we used recorded the coordinates in Decimal Minutes Seconds (DMS). Figure 21 depicts the overall conversion process.



Figure 21: GPS Conversion Overview

We decided the most time-efficient process was to convert the coordinates from DMS to DD using Excel rather than finding a new way of gathering GPS coordinates. Equation 1 converted our collected coordinates. This equation converts both latitude and longitude from DMS to DD coordinates.

Equation 1: DMS to DD Coordinate Conversion Equation

DMS to DD Conversion Equation

$$DD = \text{Degrees} + ((\text{minutes}/60) + (\text{seconds}/3600))$$

When converting the coordinates, the cardinal direction in DMS changed to a negative or positive value in DD coordinates. For example, a north coordinate in DMS has a positive value in DD, whereas a South coordinate has a negative value. Table 7 displays all associated cardinal direction values.

Table 7: Cardinal Direction Signage

Cardinal Direction	Data
North	+
South	-
East	+
West	-

We implemented the above conversions into our location catalog and re-uploaded the file to My Maps. Our equations correctly converted the GPS coordinates.

1.3.3 Icon Creation

Hotel Icon



Figure 22:
Example Hotel
Location Marker

With the corrected GPS coordinates for each location marker, we began choosing an icon for the riad. We felt that each “type of structure” should have its own respective icon. Unique icons allowed users to interact easily with the map and find locations that interested them. For the riad icon, we determined that the icon should depict that this location is a place to rest. Figure 22 shows the icon we felt best portrayed the riad as a visual representation. We chose the color of this icon based solely on aesthetic appearance and it doesn’t have any other significance.

1.3.4 Uploading Descriptions

After we solidified the GPS coordinates and icons, we moved on to writing and uploading the summative descriptions of each location. We wrote the descriptions based on the field notes and visual data we took at the locations. Our goal was to keep

the descriptions brief because we wanted to provide some information while keeping the audience engaged. We aimed for two to five sentences for each location; however, some were shorter than that. The descriptions also highlighted the media available to view at each location and explicitly mentioned if an interview was included in the location. For ease, we wrote all the descriptions in one document first, then moved them to My Maps. We uploaded each description to its appropriate location by selecting the pencil icon highlighted in Figure 23.



Figure 23: Description Editing in My Maps

1.3.5 Uploading Spatial Media

Once we had uploaded the summative descriptions of the location, we began uploading the spatial data we collected. We used the “Add photo” feature within the location to upload the data we collected (Figure 24).

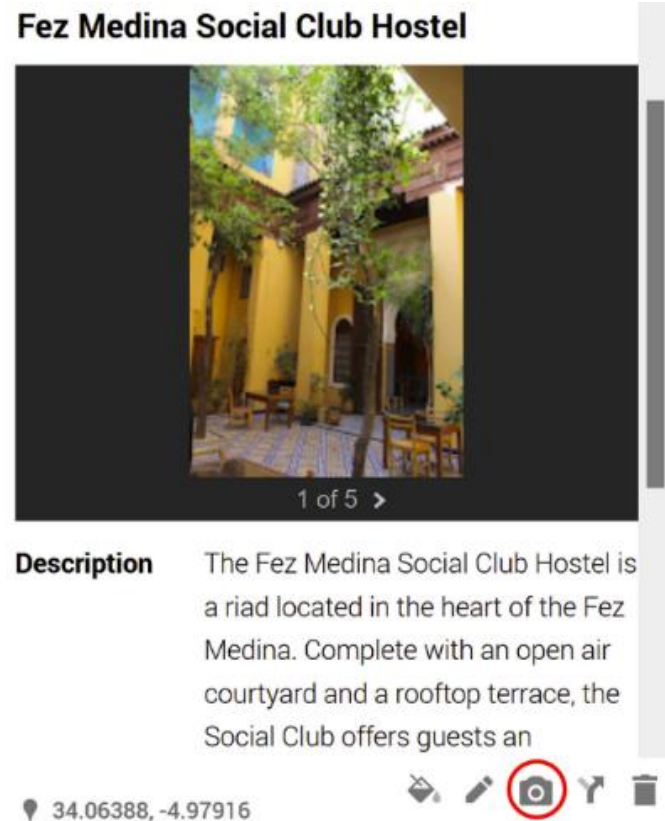


Figure 24: "Add Photo" Feature in My Maps

Google Drive was the easiest location for us to upload our photos to, as they could be shared with the entire group rather than storing all the data on one device. We uploaded our photo data to Google Drive and uploaded it to My Maps using the “Upload from Drive” feature. We could only add one photo to the location at a time and we could not reorder the photos after we uploaded them. Thus, we determined that we would choose the order we wanted the photos to be in before uploading them to My Maps. Numbering the files within Google Drive was the most efficient way of ordering the photos.

2. Data Collection Phase 1

During Phase 1 of the data collection process, we visited forty-two locations making up ten location categories and recorded three interviews. During this time, we relied on our guide and sponsors to help us identify and select locations to include on our map. We made decisions during this trip regarding what data we collected in specific locations and the optimal method for collecting this data. The following subsections provide details on these decisions and processes.

2.1 Process of Finding Locations

The various locations in our digital preservation map were selected through several processes. Ali El-Irari acted as our guide in Fez, bringing us to many places he knew pertained to our project's requirements. We encountered a snowball effect throughout our process of finding locations as some people suggested additional locations that would benefit our project. Occasionally, these individuals even directed us towards these locations. In some of these instances we had to tip the individual who guided us or pay for entry to the location.

We also gained information about appropriate locations from our sponsors, Ali El Mokri and Ewa Potocka. Ali El Mokri is a Fez native with lots of knowledge of the area. He suggested many of the sites we visited and incorporated into our map. Ewa Potocka, as someone who has lived in the medina for almost a decade, was also able to give us many locations to research.

2.2 Data Collection Process & Equipment Decisions

When we arrived at a location, we first decided what data to collect there. We broke locations into three categories to

determine the amount of data we wanted from each location. We made decisions about the best equipment to use for each data type during the data collection process, and we explain these decisions in the following subsections.

2.2.1 Location Type

Once we were in locations that we wanted to include on our map, we had to decide what data we wanted to collect there. As mentioned previously, we had multiple types of data we could collect; photos, videos, audio, 360 pictures, 360 videos, and interviews. It was not feasible to use all our equipment at every location, so some markers on our map have more information than others. We decided it was best to break locations down into the categories outlined below.



Figure 25: Lalla Yeddouna Leather Shop Interview

Category 1: Locations where we took photos, videos (mainly to be used as B roll), 360 pictures, and conducted interviews. These locations were the most involved and took the most amount of time to complete. Category 1 locations were larger artisan workspaces and shops because the focus of our project was to collect stories from artisans and document their work. An example of a Category 1 location is “Lalla Yeddouna Leather Shop.” Fez is known for its leather goods, so having a lot of

information about a leather shop was vital in preserving the heritage of the Fez Medina. Our decision to conduct an interview was also very dependent on our participants' willingness. We tried to identify individuals who exhibited willingness to be interviewed. In cases where the artisan told us a lot before we asked for an interview, they often agreed to us recording a formal interview with them (Figure 25).

Category 2: Locations where we took photos, 360 pictures, and sometimes videos. These locations were most often small artisan shops or open spaces. There was no one available to interview in the case of open spaces, so an interview could not be included.

Interviews were a time-consuming process; therefore, by not conducting them at every location we were able to include more of the culture of Fez in our map through photos. Interviews focused on the process of making goods, so it did not make sense to conduct interviews in locations where handicrafts were only sold, not made. We took videos in places where pictures did not fully capture everything, such as when an artisan played his horn made from bone for us. A Category 2 location is “Souq on Talaa Kebira.” They sold but did not make various goods here, so we documented this location with standard and 360 pictures (Figure 26).



Figure 26: Interior of Souq on Talaa Kebira

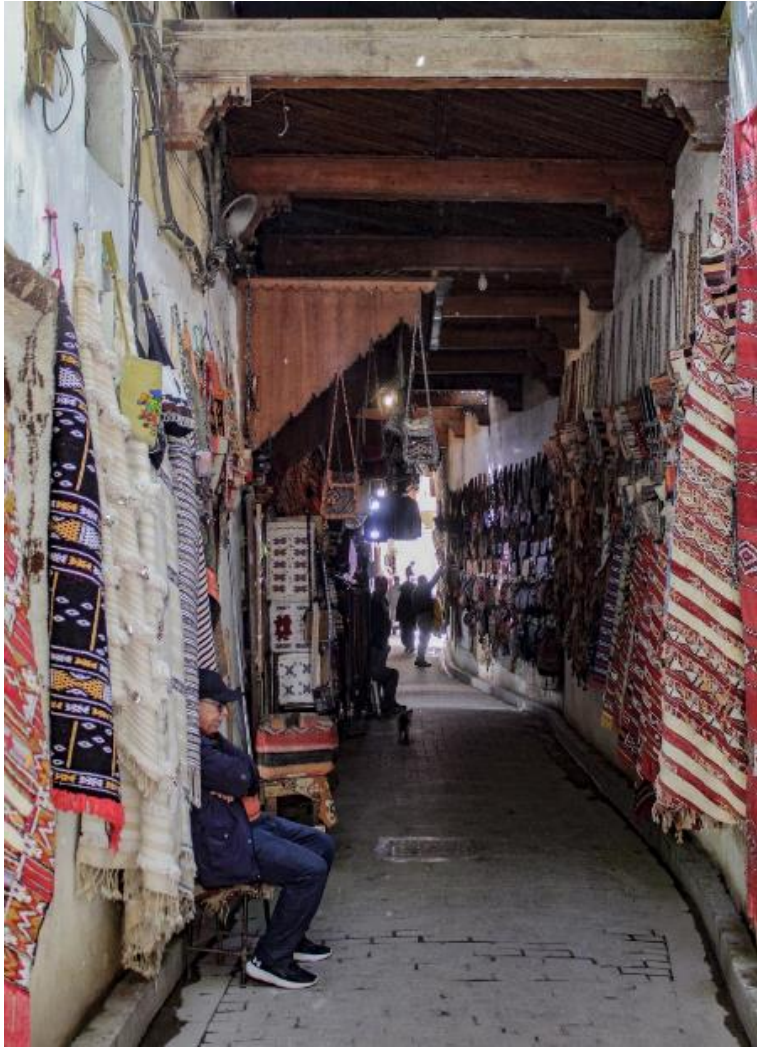


Figure 27: Example of Street Walkthrough View

Category 3: Locations where we only took 360 videos. These locations were mainly street walkthroughs. We usually did not take other pictures here because a map user could see everything on the street just by watching the 360 video walkthrough (Figure 27). It did not make sense to take interviews here because these locations did not have artisans for us to talk to. Category 3 locations are included on the map to aid the user in getting around the medina and are exclusively street walkthroughs.

In Category 1 and 2 locations, we sometimes recorded only audio using our TASCAM device. We used the TASCAM in artisan workshops where we thought it would add to the user experience to be able to hear the artisans' work. These include sounds like the sawing of wood, the whirling of a machine, or the hammering of a coppersmith. The TASCAM was occasionally used when an artisan told us helpful information, but we were not recording a video interview.

Many of the decisions regarding what types of data we collected had to be made in the moment. Our group discovered that it was best to feel out the location and determine what to do there once we were on-site rather than try to make these choices before we arrived.

2.2.2 Data Collection

In the open spaces that we encountered, which varied from fondouqs to school courtyards to gardens, we recorded 360 videos using the GoPro MAX mounted onto a small tripod and placed in the center of the space. We tried to move out of the camera's view when possible, to capture the space in a more authentic state.

In the open spaces, we took photographs using the DSLR camera with the intention of capturing the size of the area and the objects or businesses within. We used the “zoom” and “focus” functions to bring attention to specific details and equalize the lighting. To ensure straight and well-proportioned pictures, we implemented the grid setting on the camera for framing purposes.

In the main streets lined with souqs and narrow walkways we recorded 360-video walkthroughs using the GoPro MAX mounted on a small tripod and held above one's head. We recorded videos depending on the length of the street, walking at a steady pace to ensure camera stability. Using the DSLR camera, we framed the pictures to represent the narrowness or width of the space.

Inside these local businesses, if granted permission, we took videos of the products or services offered and the artisans creating their crafts. Within these establishments, we chose between taking videos with our iPhones, GoPro Hero 7, or both, depending on the size and condition of the space.

In every location that we encountered, we took digital photos of the surroundings and objects representing the location as we saw with our own eyes. We emphasized the lighting and framing of the photos as these are essential aspects that improve the appeal of photographs. We tried to capture markers that can be recognized as belonging to the location, such as signs or the prominent artisanal craftwork in the area. We aimed to focus on



Figure 28: Example of Using DSLR Camera

the space we were photographing; however, in most cases, it was

unrealistic or impossible to have empty spaces. Therefore, we did not attempt to wait until the area was less crowded.

We used the DSLR camera to take most of our pictures as it was the most reliable tool to capture the environment in every condition (Figure 28). When the lighting was poor, we could use night mode, and when an object was too far away, we zoomed in to see it more clearly. For most of the pictures, the camera was set to the “Scene Intelligent Auto” setting, which adapts the brightness, flash, and color tone according to the scene to ensure the best quality picture.

When it was not ideal to use the DSLR camera to take photographs, such as when it rained, we took pictures on iPhone cameras to avoid damaging the camera equipment. When taking pictures using the iPhone 11, 8, or XR, we maintained our priority of lighting and framing of the photos to keep uniformity in the quality of our pictures. Similarly, we captured videos using our iPhones as they allowed us to move around more freely and record artisans in action.

2.2.3 Interview Process

We conducted three interviews during phase 1 of our data collection process. Ali El-Irari, our Darija translator and guide, asked the interviewee for consent on our behalf for an interview of them discussing their handiwork. The interview was conducted in the language of choice of the interviewee. Ali led the interviews we conducted in Darija, and the interviews conducted in English were led by a member of our

team. With the help of Ali, the artisan was able to speak confidently about their work. We conducted exploratory, unstructured interviews with a loose framework of questions to capture the artisans' stories most authentically (Figure 29).

To set up these interviews, we attached the Saramonic Blink 500 Transmitter microphones to the interviewee and the interviewer. The Saramonic Blink 500 Transmitter receiver was connected to



Figure 29: Capturing Interview

the iPhone in the rig, which allowed for better sound in the interview recording. We used an iPhone 11 for this process because it was the most accommodating for both the Saramonic Blink 500 Transmitter microphones and the phone rig for stabilization. The iPhone was able to take our A-roll footage, and the GoPro Hero 7 was utilized for B-roll footage that was utilized in editing later.

3. Postproduction of Phase 1 Data

During the postproduction of phase 1 data, we implemented the processes we created during the pilot postproduction and made some changes and new discoveries. Our organization stayed largely the same, but in the following sections, we also outline our processes for editing the media we collected during phase 1. We also include more details on uploading media to repositories and some of the shortcomings we discovered here. Lastly, we describe updating the map with this data, a process that remained largely unchanged from the pilot.

3.1 Organizing Raw Data

Overall, our organization process of raw data remained the same as outlined in the pilot trip. We continued to update the location

catalog with new locations. However, this time we prioritized naming conventions both in the location catalog and with our collected data. Once we uploaded the name and associated data for a location, we created folders in Google Drive for photos, interviews, and 360 media for this new location. Each location from the location catalog has folders for associated spatial data; this way, we could navigate to the specific types of data more easily.

3.2 Editing and Uploading Media

This section outlines the steps in the design process that bridge the gap between collecting and organizing the data and integrating it into My Maps. We outline the editing process for our visual media here, as well as some of the challenges we faced in this phase of the process. Finally, we explain how our data was organized into central repositories for easy uploading into My Maps.



Figure 30: Example of Adobe Lightroom

3.2.1 Editing Photo Data

The first data set we edited was the photos we gathered at each location. We determined which photos we felt best preserved the location and separated these from the other photos. We focused our efforts on editing these selected photos.

We used Adobe Lightroom for editing our spatial data (Figure 30). Our goal with the postproduction process was to deliver the most realistic rendition of the locations we visited. We focused

on cropping, straightening, shadow correction, highlight correction, vibrance/color accuracy, and exposure. We used these tools to make the photos aesthetically pleasing and highlight the subject so that it relays the space and crafts within.

3.2.2 Editing 360 Media



Figure 31: Example of a Blurred Face

For blurring faces in 360 photos, we used the masking tool in Adobe Lightroom to manually blur each face. We created a new brush where sharpness and noise reduction were set to -100. We then traced the faces that we needed to blur using this brush. This process sometimes required multiple passes over some faces to sufficiently blur the faces (Figure 31). To blur faces in 360 videos, we used the Gaussian Blur effect in Adobe Premiere Pro. We selected the Gaussian Blur effect from the effect menu and created a new mask. We resized this mask to cover the individual's face we wished to blur. We applied a blurriness setting of 180 and a mask feather of 50. We then used the Track Selected Mask Forward function to have the blur effect stay with the individual as they move about the video.

The process of blurring faces, both in photos and videos, was time-consuming. Specifically, the blurring of faces in videos required significant processing power to trace the movement of the individual's face. Since the processing power of our laptops limited us, we opted for using 360 videos sparingly and prioritizing 360 photos whenever possible. However, it is important to note that we operated under the expectation of privacy principles. For example, in our 360 street walkthroughs,

we did not blur any of these faces as these individuals were in public spaces where they should not expect privacy. In some instances, individuals requested not to be captured on camera. We respected these wishes. In other instances, individuals asked for specific information not to be captured, like a license plate number; we blurred this in postproduction.

3.2.3 Editing Interviews

In tandem with editing photographs, we worked on the postproduction of our interviews. We divided the postproduction of our interviews into two distinct steps. We conducted our interviews in the language of choice for the artisan, which was most frequently Darija. However, we do not speak the language; therefore, the first postproduction process for interviews was translation. Once Ali translated the interviews into English, we began the second postproduction step; editing the interview itself. Our editing for the interviews involved lining up audio, selecting the video, integrating B-roll, and overall editing for comprehension.

After recording the interview, we uploaded the audio and video to a shared location point. We used Google Drive to store the

raw interview data. We then shared this folder with Ali so he could review the interview and transcribe the interviewees' responses into English. We asked Ali to transcribe these interviews so we could then review and attach the transcription to the interview via YouTube. We included subtitle/close captioning in English for the interviews as well as attaching a transcription document.

3.2.4 Upload to Central Repositories

After we completed all desired postproduction processes on the collected data, we focused on uploading the edited data to platforms that easily integrate into My Maps. Different data types required different platforms. Table 8 highlights the different software used to store each data type.

Table 8: Repository Locations and Associated Data Type

Data Type	Repository Location
Photo Data	Google Drive
Interviews	YouTube
360 Videos	YouTube
360 Photos	Google Photos

We opted to use Google Drive for all photo data as Google Drive can house this data format and easily integrates it into My Maps. For example, My Maps allows the user to choose to upload photos directly from Google Drive. This direct compatibility simplifies the upload process for our photo data.

We decided on YouTube to house all our video data, both 360 videos and interviews. YouTube supports traditional 180 video formats and 360 video formats which is crucial for maintaining the interactivity of our map. My Maps also allows the user to embed videos from YouTube into location markers. Because of the support for 360 video formats and ease of integration, YouTube was our video data repository.

Lastly, we used Google Photos as our 360 photo repository. We chose Google Photos due to the platform's ability to support 360 photos. However, My Maps does not allow the user to directly embed 360 photos, either stand-alone or through third-party software. Therefore, rather than embedding this data, we had to use a link in the description of the location.

3.3 Creation of Map

This section explains the last steps of creating the digital preservation map in My Maps. The following subsections detail how we uploaded GPS coordinates to create the locations, designed icons for each location category, wrote descriptions of each location, and finally uploaded the visual data to the appropriate place.

3.3.1 GPS Coordinates

We followed the same overall process of GPS coordinate conversion as outlined in the section “1.3.2 GPS Coordinates.” However, with the larger quantity of locations the coordinates were not incredibly accurate. For example, a few coordinates of shops were placed on the street rather than on the side of the street. We evaluated where this discrepancy could have derived from, and we determined that for clusters of locations, our digital compass could not differentiate such small changes, which resulted in less accurate GPS coordinates.

Therefore, after uploading the coordinates, we moved any markers that were misplaced by clicking and dragging the marker to a spot on the map more representative of its location.

We tried to place the marker in reference to other locations in these instances; for example, if there were two shops next to each other, we would try to replicate the order by dragging the location markers. We recognized that this reduced the accuracy of our map. However, we felt that a more accurate representation of the street was more valuable than exact coordinates.

3.3.2 Icons

The next step in our upload process, like with the pilot data, was implementing icons for each structure type. We now had more structure types than we had in our pilot data. Instead of having one icon to determine, we had ten icons for varying structures. Similar to choosing an icon for the riad, we wanted to relay the location in a visual way.

In creating this many icons, we had to be more deliberate with the colors of the icons. The colors we chose had to be distinct enough from one another to make it clear that the icons are separate and stand out on the backdrop of the map. Primary colors and more neutral colors were easier to see and distinguish on the map than pastel or lighter colors. Figure 32 depicts the icons we chose for our structure types.



Figure 32: All Location Marker Icons

3.3.3 Location Descriptions

The method for writing location descriptions did not change at this time. However, rather than including the link to 360 photos in the description, we created a new category in My Maps called 360 Photo Link. This included the 360 photos in a way that was more obvious for the user.

3.3.4 Uploading Visual Media to Map

As mentioned before, there is no way to reorder photos and other media once they are uploaded to My Maps, so we had to be deliberate in our choices as we worked to upload our media. The most important decision was that of the first photo in the slide deck because this photo was the one that appeared when a user selected a location. This photo should try to relay as much information about the location as possible but also be visually pleasing as a banner image. Because of the presets of My Maps, we needed to select a picture that would not be awkwardly cut off by the My Maps banner (Figure 33 and Figure 34). Landscape images with the subject centered in the photo worked best as the first photo.

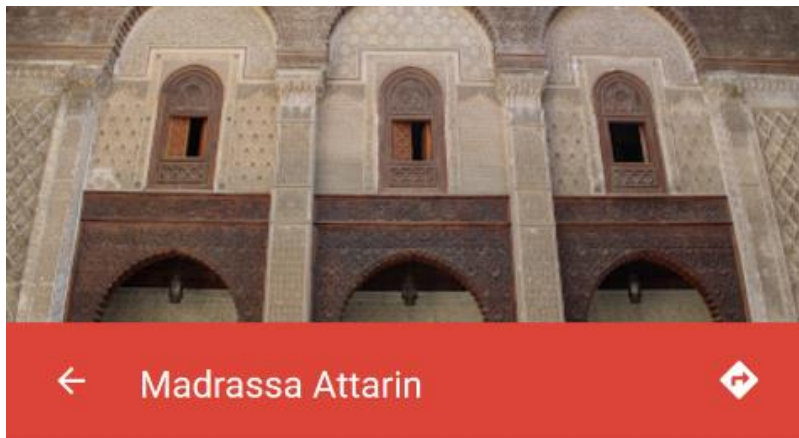


Figure 33: Example Cover Image

Once the first photo was selected, we ordered the photos based on their content. We placed photos that included subjects most significant to the location earliest in the slide deck. We also grouped similar photos together; for example, a series of photos showing an artisan progressing in their work was placed in order.

We used the embedded features of My Maps to upload the visual media to each location, as described in the pilot postproduction process.



Figure 34: Original Cover Image

4. Data Collection Phase 2

While our data collection process largely stayed the same during data collection phase 2, we observed notable changes due to Ramadan. We also changed our data collection methods based on findings made during the postproduction process of phase 1. The following sections explain these changes in detail.

4.1 Ramadan

Due to the changes during Ramadan, businesses opened later than usual in the mornings, around 10-11 am. Because we started collecting spatial data at 10:30 am, many shops and establishments were still closed or in the process of opening (Figure 35). The streets were not as busy or crowded in the mornings as compared to later in the afternoon. Businesses closed during Ramadan at around 5 pm, so this limited the period that we had to collect our videos and pictures. Although we could have still documented the medina before 10 am or after 5 pm, we opted to collect our data when businesses were open.



Figure 35: Example of Empty Street During Ramadan

4.2 Collecting Data & Equipment Decisions

A large area in which our data collection method deviated from phase 1 was the collection of 360 media. As discussed in “3.2.2 Editing 360 Media,” we opted to capture 360 photos whenever possible to reduce the postproduction time required for this media format. Like how we would set the GoPro MAX down in a location on a tripod and record video, we followed the same process, except we captured 360 photos rather than videos. We did gather a handful of 360 videos in the form of walkthroughs; however, the quantity is drastically smaller than what we gathered in phase 1.

5. Postproduction of Phase 2 Data

Our postproduction process largely stayed the same for phase 2 data. The organization and editing did not change, but some of the organization of My Maps did. During this phase of the project, we determined the necessary steps for organizing each location category onto its own layer on the map. This change allows the map user to select a single layer, for example, artisan shops, and when they do so, they will only see artisan shops on the map. The following sections outline our postproduction process for phase 2 data.

5.1 Editing Media

The process for editing 360 media changed to mirror the change in our collection process. As outlined in “4.2 Collecting Data & Equipment Decisions,” we prioritized 360 photos over 360 videos; thus, we adjusted our media editing to match. Three hundred sixty-degree photos, like 360 videos, required little editing. However, for the instances where we felt we were in private spaces and needed to blur faces, we blurred these faces by uploading the 360 photos into lightroom and followed the same blurring process as outlined in “3.2.2 Editing 360 Media.”

Due to the change in our 360 media, we had to find a new process for uploading the data to a repository. We determined that the simplest repository location was Google Photos. Google Photos can read the metadata of the 360 photos and integrate it into My Maps. We created albums for each location in the location catalog with 360 media associated with it. We then pulled the 360-photo data from the GoPro MAX’s SD card and stored it on a thumb drive. Next, we re-named the 360 photos to match the location names from the location catalog. Lastly, we uploaded the respective photos into the location’s album in Google Photos. From Google Photos, we were able to get a

shareable link that we then imported into the associated location in My Maps.

5.2 Integrating Data into My Maps

We integrated the location catalog into My Maps the same way we did for the pilot and phase 1. After doing so, we discovered that My Maps does not allow the creator to move locations between layers once they are already on the map. Because we wanted separate layers for each location type to improve the user experience, this proved to be a problem for us.

We solved this problem by reuploading the locations to the map using multiple Excel sheets. We made a layer on the map and labeled it with the appropriate location category. We then copied all the information on each location in this category into a new Excel sheet, which we then uploaded to the layer we had just created. We followed all the steps previously outlined for creating the map and repeated this process for every location category.

6. Digital Preservation Map of the Fez Medina

The findings detailed in the previous subsections describe our overall design process for creating our Digital Preservation

Map of the Fez Medina. In total, our map has fifty-seven locations, which make up ten locations categories. In four of these locations, there are video interviews with artisans. Each location includes the visual media we have described throughout this entire report and is represented authentically. Exploring our map allows the user to be immersed in the artisanal culture of the Fez Medina, regardless of whether they are able to physically visit.

We have also created a user guide for our map, which can be found in Appendix C: Map User Guide. This user guide describes how to explore our map, as well as some key vocabulary words in the map descriptions. Since the map does not have a designated location for a user to start, we included these vocabulary words in the user guide so one could familiarize themselves with vocabulary before they use the map, or as they come across it in the map. The user guide also includes a list of the locations that have interviews associated with them, so that someone interested in these interviews can easily find them. Lastly, the user guide contains a QR code for accessing the map, as well as the direct link to the map.

Discussion

The size of the Fez Medina kept us from including everything on our map; therefore, we had to create selection criteria for the locations we did include. The following section outlines these criteria in detail and explains the value in our project and how the map may be used in the future.

1. Selecting Locations

From looking at our map, it is clear that we did not include locations all over the Fez Medina. The Fez Medina is very large, with many shops and other locations. Therefore, because it was not realistic for us to include every location we found in the medina, we had to create criteria for selecting the locations on our map.

Our overall goal was to preserve artisan culture in the Fez Medina, so naturally, our priority was including locations where artisans were prevalent (Figure 36). On our map, these locations fall into the categories of artisan shops and fondouqs. Together, these categories sum to twenty-four locations and comprise forty percent of our map. Before we started our fieldwork, we knew we wanted to have at least one location for each of the most

prominent handicrafts in Fez; woodworking, metalworking, especially copperworking, weaving, leather crafts, and zellij. Even with this idea in mind, we had to narrow our scope further. There are countless locations in the medina performing many of these crafts, and there was no way for us to document them all in the time we had.



Figure 36: Artisan Painting at Bab Guissa Fondouq

This focus on artisanal goods leads to one of our criteria for selection: locations where people performed an activity integral

to the culture of the medina, in largely the same way it has been done for hundreds of years. This encompasses both large, popular locations such as the Large Leather Tannery and smaller, more hidden places, such as the Bab Guissa Fondouq. While very different, both locations house workers who perform extremely traditional jobs. Here, we found the culture our project worked to preserve. However, the difference in these locations brings up another one of our selection criteria.

We wanted to use our map to highlight locations that are harder to find as a tourist. These “off the beaten path” locations are the ones recorded the least, but hold a rich history and are in the most danger of being lost to time. These locations are the ones we prioritized recording over others. We often passed shops selling artisanal goods on Talaa Kebira, for example, and while we could have included these places in our map, we did not. Instead, we focused our time and effort on the locations a little off the main road, locations that were making these goods rather than just reselling them. Here we saw more of the process and got a more authentic feel of the medina. These locations helped our map feel like an accurate representation of the medina rather than a tool to see the polished side of the medina.

Naturally, another factor in choosing locations was the willingness of people to let us document their spaces and stories. We only used locations where the owners consented to be photographed, and while this was not a problem we encountered



Figure 37: Artisan Working in Sffarine Square

often, it did limit us some. In addition, artisans in Sffarine Square did not want to be interviewed but were willing to let us take videos of them working (Figure 37). This is an example of when we still included a location on the map, but it did not have as much media for it as some other similar locations.

Although artisanal culture is the focus of our map, we do have other types of locations. We chose these locations to document the atmosphere of the Fez Medina accurately. Clearly, we did not record every street we walked down; instead, we chose ones that showed the variety in the medina, from the extremely narrow alleyways to the bustling main arteries like Talaa Kebira. For open spaces, we selected locations that proved there was, in fact, open space, contrary to some ideas surrounding the medina. We selected cultural locations, mosques, gates, fountains, hotels, and palaces that exhibited significant landmarks one can find in and around the medina to show their importance to the Fez Medina. We also incorporated them based on how easy it was for us to gain access to them. These other location categories provided a full picture of the Fez Medina, which is why we included them on the map.

2. The Value of Our Project

Our project is not the only project like it. Other people have taken photos and videos of the Fez Medina; other maps even exist. There are resources for tourists to use as well. However, our project provides value that other projects do not. We merged a tourist's view of the medina with a local's view through our work with Ali. While we were not tourists, we approached the medina with fresh eyes, and everything we saw was new and exciting to us. Ali, who has known the Fez Medina his entire life, was able to help us narrow down what was truly significant and what was just catering to tourists. As we got more experience in the medina, we could do this for ourselves to a certain extent. From this work, we created a map that highlights extremely significant parts of the medina that tourists may still be interested in.

As mentioned in the previous section, our map highlights places that may otherwise be overlooked. This worked to record what would not be documented and shows these locations in an authentic way. Our background reading told us that artisans in the Fez Medina are often portrayed as “in crisis,” but this is not an accurate representation. Much of the value in our project

comes from the fact that we showed the medina as we truly saw it- a beautiful space made up of artisans creating crafts in the same way their ancestors did (Figure 38).

Our map also captures the medina as it was in the moment in time we were there. Although the medina is not “in crisis,” we do know there is a trend of artisans turning away from their crafts, as mentioned in our background chapter. Our project created a standard to measure the change in the Fez Medina. If another group continues our project in the future, they may be able to visit locations we included on our map and record how they have changed. In some cases, they may find that a location no longer exists, or find a new location that was not there during our group’s time in the medina.

The map of the medina will have value for our sponsor as a starting point for bigger projects. It will be integrated into the overall plan of the Fez City Game Project and will hopefully be a valuable tool in this journey.

Lastly, our map creates value in the experiences it allows the user to have. Someone who may never go to Fez can see all the medina has to offer just by navigating our map. Those who are fortunate enough to visit in person can use our map to guide them to the locations we included. If those who use our map get to experience even a small fraction of what our group did during our project, our map will have lived up to its value.



Figure 38: Carpets in the Fez Medina

Future Recommendations

The main scope of our project was artisanal work within the Fez medina and the traditions and heritage surrounding their craftsmanship. For the continuation of our project and ultimately the growth of our map, future teams could delve into culinary and architectural aspects within the Fez medina. Most of our data collection occurred during Ramadan, which resulted in a shortage of food culture. Many of the culinary practices and the cuisine within Morocco supports strong traditions, such as eating couscous on Fridays. This Moroccan food culture holds much history to be preserved with the extension of our project. Due to the time constraint, we did not record the architectural history within the Fez medina. However, the various influences on Moroccan architecture formed many unique buildings that create an opportunity for additional visual preservation within our map. The Fez medina has such a diverse cultural identity and our project scope focused mainly on the heritage of Fassi artisans. There are still many traditions for future teams to explore within the medina to expand on the digital preservation map. When another team takes on this preservation project, our email alias will be linked to all the data

we collected. This alias will provide the new team with background on our processes and methods. The map that was published and distributed is a copy of the original map. Our team kept the original map for our own records to preserve the work that we did. The published map can be changed by future researchers.

Similar to the goal of our project, the Fez City Game Project aims to preserve the culture of the medina using augmented reality to simulate life within Fez. We are providing the Fez City Game Project with our map to advance their simulation as the final map outlines the current state of the medina with pictures, videos, and descriptions that can help them design their project. Subsequent project teams may work with the Fez City Game Project as they will be recording the updated culture of the medina from a lens that our current map does not include.

Conclusion

Through our project, we created a digital preservation map of the Fez Medina. This map focuses on artisans and captures the stories and spaces of the medina in an interactive way. We made the map by realizing our four objectives: creating a location catalog, collecting spatial data, collecting stories of artisans, and coalescing all the information together in My Maps. These objectives allowed us to reach our overall goal: long-term digital preservation of the Fez Medina.

To create our location catalog, we used a detailed Microsoft Excel sheet. This Excel sheet included all the necessary information to place the locations on our map. We collected spatial data in the form of photographs, videos, 360 photos, and 360 video walkthroughs of streets. We recorded interviews with artisans using audio and video to document their stories as authentically as possible. To get the data we collected ready for our map, we performed extensive postproduction processes, including organizing, editing, and uploading our data.

The bulk of our paper focused on our design process for arriving at the final map. We included three stages in our design process: pilot, phase 1, and phase 2. In the pilot, we took our first trip to

Fez, where we familiarized ourselves with the area and ensured our equipment was working properly. At this time, we collected pilot data of the riad we stayed at. Once we had collected this data, we began experimenting with the postproduction methods. In this phase, we mainly learned about the nuances of My Maps, and planned for the rest of our project. During phase 1, we took a second trip to Fez, where we collected data from forty-two locations and conducted two interviews. We ironed out our postproduction processes upon returning to Rabat, deciding on Adobe Lightroom for photo editing and Adobe Premiere Pro for interview editing. We also decided to house all our data in repositories; Google Drive for photos, Google Photos for 360 photos, and YouTube for videos and interviews. Storing our data in these locations allowed us to integrate our information into My Maps easily. We did not make many changes to our process during phase 2 but used this time to finalize our map with additional locations and improve the user experience by creating layers.

The size of the Fez Medina limited our project. We could not include every location in the medina on our map because of how

large the medina is and the limited amount of time we had for our project. Therefore, we were deliberate in the locations we did choose to include on the map. We focused on locations that housed artisans at work or sold the goods they made. While some of our map locations are well known, we also made an effort to include places that are more hidden away but still extremely significant to the artisanal culture. We also included locations unrelated to artisans to provide a full picture of the medina.

Our map merges the view of a tourist and a local because it includes locations we found significant and locations suggested to us by our guide and sponsors. We portray the medina authentically, showing it as we actually saw it and preserving its heritage. Our map also records the medina as it was at the time we were there; this allows future researchers to use it to measure the change occurring. Lastly, our map allows people who may never go to the Fez Medina to experience it while also providing a guide for those fortunate enough to visit.

The map we made prioritized artisanal culture, but in the future another team could follow our selection process and make their own map with a different focus (i.e., food or architecture). Our

sponsor, Tourat Mdinty, can use our project to assist with the existing Fez City Game Project or to start a new preservation project.

Our map is only a start to digitally preserving the Fez Medina, but it provides a foundation for the future while capturing stories that exist there now. If those who use our map get to experience even a small amount of what our group did in the Fez Medina, our map has served its purpose.



Figure 39: Team photo

References

- Allen, J. S. (1996). The Storytellers of Marrakech. *The Sewanee Review*, 104(4), 497–520.
- Ballatore, A., & Bertolotto, M. (2015). Personalizing maps. *Communications of the ACM*, 58(12), 68–74. <https://doi.org/10.1145/2756546>
- Ehtemami, A., Park, S. B., Bernadin, S., Lescop, L., & Chin, A. (2021). Overview of visualizing historical architectural knowledge through virtual reality. *SoutheastCon 2021*, 1–6. <https://doi.org/10.1109/SoutheastCon45413.2021.9401850>
- Google. (n.d.). *Google maps platform*. Google Developers. Retrieved February 15, 2022, from <https://developers.google.com/maps>
- Jaimes, A., Kinshuk, & Sow, D. (2003). Technology for education in developing countries-a forward. *International Conference on Information Technology: Research and Education, 2003. Proceedings. ITRE2003.*, 473–474. <https://doi.org/10.1109/ITRE.2003.1270662>
- Kawulich, B. (2005). Participant observation as a data collection method. *Forum: Qualitative Social Research*, 6(2). <https://doi.org/10.17169/fqs-6.2.466>
- Mangold, G. (1996). How does global positioning really work? *Successful Farming, Iowa Edition*, 94(2), 14.
- My Maps—About—Google Maps*. (n.d.). Retrieved February 15, 2022, from <https://www.google.com/maps/about/mymaps/>
- Ouaknine-Yekutieli, O. (2015). Narrating a pending calamity: Artisanal crisis in the medina of Fes, Morocco. *International Journal of Middle East Studies*, 47(1), 109–129.
- Pistola, T., Diplaris, S., Stentoumis, C., Stathopoulos, E. A., Loupas, G., Mandilaras, T., Kalantzis, G., Kalisperakis, I., Tellios, A., Zavraka, D., Koulali, P., Kriezi, V., Vraha, V., Venieri, F., Bacalis, S., Vrochidis, S., & Kompatsiaris, I. (2021). Creating immersive experiences based on intangible cultural heritage. *2021 IEEE International Conference on Intelligent Reality (ICIR)*, 17–24. <https://doi.org/10.1109/ICIR51845.2021.00012>

- Pricing Plans and API Costs*. (n.d.). Google Maps Platform. Retrieved February 15, 2022, from <https://mapsplatform.google.com/pricing/>
- Ranganathan, A. (2018). The artisan and his audience: Identification with work and price setting in a handicraft cluster in Southern India. *Administrative Science Quarterly*, 63(3), 637–667.
- Rowley, J. (2012). Conducting research interviews. *Management Research Review*, 35(3/4), 260–271. <https://doi.org/10.1108/01409171211210154>
- Sehlaoui, A. S. (2009a). Moroccan professional public storytellers: An endangered species. *Storytelling, Self, Society*, 5(3), 193–217.
- Selmanović, E., Rizvic, S., Harvey, C., Boskovic, D., Hulusic, V., Chahin, M., & Sljivo, S. (2020). Improving accessibility to intangible cultural heritage preservation using virtual reality. *Journal on Computing and Cultural Heritage*, 13(2), 1–19. <https://doi.org/10.1145/3377143>
- Steenbruggen, J., Kazakopoulos, P., & Nizami, I. (n.d.). *Urban tourism and cultural heritage: The ancient multi-layered medina's in Morocco*. 35.
- Tourat Mdinty. (2021). *Actualités*. El Mokri. <https://boussoufa23.wixsite.com/elmokri/actualit%C3%A9s?lang=en>
- UNESCO. (n.d.). *Medina of Fez*. UNESCO World Heritage Centre. Retrieved January 30, 2022, from <https://whc.unesco.org/en/list/170/>
- Van Den Hout, C. E. (2013). Arabic or French? The politics of parole at a psychiatric hospital in Morocco. In D. Crawford & R. Newcomb (Eds.), *Encountering Morocco: Fieldwork and Cultural Understanding* (pp. 16–39). Indiana University Press. <https://www.jstor.org/stable/j.ctt16gh8g5>
- Wolf, M. J. P. (2006). Assessing Interactivity in Video Game Design. *Mechademia*, 1, 78–85.
- WPI Global Labs. (2022a, February 14). *Introduction to Photography*. https://canvas.wpi.edu/courses/13957/files/2613761?module_item_id=396020

Appendix A: Location Catalog

Name	Description	Type of Structure	Data to be Collected	Status	Map Status	360 Photo Link	Review Status
Fez Medina Social Club Hostel	Trial Hotel	Hotel	Photos 360 Photos and Videos Interview with Owner	Collected 360 video of street, 360 photo of rooms. Could not receive interview	Done		
El Mokri Palace	Palace	Sponsor Location	Photos 360 Photos and Videos Interview with Ali	Need 360 video	Done	https://photos.app.gal/9jmrZjWEfh4yyhVN6	
03/29 - 03/31							
Small Tannery (Dar Dbegh ain Azlitan)	Small tannery that processed leather to be used in goods	Artisan Shop	Photos 360 Photos and Videos Interview with owner	Lots of pictures, interview, could go back for 360 video	Done		
School Courtyard	Recess area for school	Open Space	Photos 360 Photos and Videos	Done	Done		
Woodworking Shops	Small shop making crafts made of wood	Artisan Shop	Photos 360 video	Could go back for 360 video	Done		
View of the Medina	High point where you could see the entire medina	Open Space	Photos 360 video	Could go back for 360 video	Done		
View of Ruins	High point where you could view the ruins overlooking the city	Open Space	Photos 360 video	Could go back for 360 video	Done		
Bab Guissa	Entry to the medina	Gate to the Medina	Photos	Done	Done		
Squaya Bab Guissa	Fountain	Fountain	Photos	Done	Done		
Bab Guissa Mosque	Mosque near the Bab Guissa gate	Mosque	Photos	Done	Done		
Street Walkthrough 1	Street view	Street	Video Walkthrough	Done	Done		
Lattice Woodworking Shop	Small shop making wooden crafts	Artisan Shop	Photos	Done	Done		
Street Walkthrough 2	Street view leading up to first fonduk	Street	360 video	Done	Done		
Bab Guissa Fonduk (Fondouq Jmal)	Fonduk including shoes, copper, ropes, woodworking, painting	Fondouq	Photos Videos 360 video Interview	Need 360 video	Done		
L'art Du Menuiserie General	Woodworking shop	Artisan Shop	Photos	Done	Done		
Bone Crafts Shop	Small workshop making crafts out of bones	Artisan Shop	Photos + Videos	Done	Done		
Food Square 1	Street with lots of street food options	Open Space	Photos 360 video	Need 360 video			
Wedding Furniture Shop	Shop selling furniture used at wedding	Artisan Shop	Photos 360 video	Possibly photos	Done	https://photos.app.gal/Xk5xVZ6hryJjUJbt6	

Food Square 2	Area sellings food items	Open Space	Photos 360 video	Need 360 video	Done		
Cascade de Lumiere	Lamp shop	Artisan Shop	Photos 360 video	Need 360 video	Done		
Perfumery	Shop selling perfume, argan oil, soap, incense	Artisan Shop	Photos 360 video Videos Audio	Need 360 video	Done		
Fondation Mohammed Karim Lamrani pour L'Ensemble Nejjarine Musée Nejjarine des Arts et Metiers du Bois	First university in the world	Cultural Location	Photos 360 Video	Done	Done	https://photos.app.goo.gl/kcNxFEa7YAJIykef7	
Fondouk on Rue Talaa Kebira	Fondouk including shoes, pottery, leather goods, drums	Fondouk	Photos 360 Video Audio	Done	Done		
Arbi Merrakchi	Loomery	Artisan Shop	Photos 360 Video Video Audio Interview	Done	Done		
Rue Talaa Kebira Walkthrough	Street view	Street	Video Walkthrough	Done	Done		
Water Clock	Water clock	Cultural Location	Photos	Done	Done		
Bouanania Mosque	Mosque on Rue Talaa Kebira	Mosque	Photos 360 Video	Done	Done		
Cafe Clock	Well know cafe	Cultural Location	Photos 360 Video	Done	Done		
Souk on Rue Talaa Kebira	Collection of shops selling artisans goods	Artisan Shop	Photos 360 Video	Done	Done		
Blue Gate Square	Sweet shop	Open Space	Photos 360 Video	Done	Done		
Blue Gate	Entrance to medina	Gate to the Medina	Photos	Done	Done		
Blue Gate Mosque	Mosque outside the Blue Gate	Mosque	Photos	Done	Done		
Sahat Elfna	Square outside the Blue Gate	Open Space	Photos 360 Video	Done	Done		
Parc Jnane Sbil A Fes	Large park outside the medina	Open Space	Photos 360 Video	Done	Done		
Walled in Square	Square near the park	Open Space	Photos 360 Video	Done	Done	https://photos.app.goo.gl/sRuhX6tLa6SbNHQC8	

04/12 – 04/14							
Madrassa Attarin	School, gets its name from perfume souk	Cultural Location	Photos 360 Pictures	Done	Done	https://photos.app.gal/11npRqzBQFtr8qTM7	
Qaraouiyyine Mosque	Large, historic mosque in the Fez Medina	Mosque	Photos	Done	Done		
Sffarine Square	Metal working square	Artisan Shop	Photos Videos Audio 360 Pictures	Done	Done	https://photos.app.gal/Fsn1ZkPZ7q3Fo4Pj6	
Bibliotheque de la Qaraouiyyine	Library near the Qaraouiyyine Mosque	Cultural Location	Photos	Done	Done		
Metal Working Shops around Sffarine Square	Street of shops leading up to Sffarine Square	Artisan Shop	Photos	Done	Done		
Currency Museum	Museum of currency	Cultural Location	Photos	Done	Done		
Fondouq Barka	Fondouq	Fondouq	Photos 360 Pictures	Done	Done	https://photos.app.gal/mAD9HkXiyZJGfMJh7	
Street Walkthrough 3	Street Walkthrough	Street	360 Video	Done	Done		
Furniture Foundouq	Fondouq	Fondouq	Photos 360 Pictures	Done	Done	https://photos.app.gal/dJHd8bMs9VqUXPyy7	
Metal Goods Shop	Large shop selling variety of mostly metal goods	Artisan Shop	Photos 360 Pictures	Done	Done	https://photos.app.gal/Y59stgqQCxJC9W2J6	
Souq Najjarine	Woodworking souq	Artisan Shop	Photos	Done	Done		
Place Sagha	Open Space	Open Space	Photos 360 Pictures	Done	Done	https://photos.app.gal/Nb7JoWrVeZK8SWJ3A	
Fabric Souq	Souq to buy fabric from rolls	Artisan Shop	Photos	Done	Done		
Madrassa Misbahiya	School	Cultural Location	Photos	Done	Done		
Fondouq Staounyine	Fondouq	Fondouq	Photos 360 Pictures	Done	Done	https://photos.app.gal/9S7ReYzL4RQgNERHA	
Leather Souk	Souq for artisans to buy leather from	Artisan Shop	Photos	Done			
Jnane El Caftan	Shop selling jlabas and caftans	Artisan Shop	Photos 360 Pictures	Done	Done	https://photos.app.gal/mxakcQd7M68ZMieL8	
Place Lalla Yeddouna	Open square surrounded by stores selling a variety of handmade goods	Open Space	Photos 360 Pictures	Done	Done	https://photos.app.gal/6HmikKAZKtGfWG5M8	

Lalla Yeddouna Leather Shop	Leather shop	Artisan Shop	Photos 360 Pictures	Done	Done	https://photos.app.galaxy.me/ihkwCgWwzKXaaAoQ7	
Street Walkthrough 4	Street walkthrough	Street	360 Video	Done	Done		
Large Leather Tannery	Oldest and largest leather tannery in North Africa	Artisan Shop	Photos 360 Pictures	Done	Done	https://photos.app.galaxy.me/vPVENGa7Gf3S4h3m7	
Jewish Quarter	Jewish quarter outside the medina	Cultural Location	Photos	Done	Done		
Synagogue Al Fassiyine	Synagogue	Cultural Location	Photos 360 Pictures	Done	Done	https://photos.app.galaxy.me/iaN4usskLgtEpy8n8	
The King's Palace	The King's palace	Palace	Photos	Done	Done		

	Lat.						Long						Elevation	
	Degree	Minute	Second	Direction	DD		Degree	Minute	Second	Direction	DD		Ft.	m
Fez Medina Social Club	34	3	50	N	34.0639		4	58	45	W	-4.9792		1100	335.28
Imperial Hotel	34	1	14	N	34.0206		6	49	45	W	-6.8292		110	33.528
El Mokri Palace	34	3	31	N	34.0586		4	58	31	W	-4.9753		1060	323.088
03/29 - 03/31														
Street Walkthrough 1	34	3	53	N	34.0647		4	58	45	W	-4.9792		1090	332.232
Street Walkthrough 2	34	3	55	N	34.0653		4	58	43	W	-4.9786		1060	323.088
Street Walkthrough 3 (tannery)	34	3	56	N	34.0656		4	58	44	W	-4.9789		1060	323.088
Small Tannery	34	3	57	N	34.0658		4	58	46	W	-4.9794		1060	323.088
School Courtyard	34	3	59	N	34.0664		4	58	42	W	-4.9783		1050	320.04
Street Walkthrough 4	34	4	2	N	34.0672		4	58	36	W	-4.9767		1040	316.992
Street Walkthrough 5	34	4	3	N	34.0675		4	58	35	W	-4.9764		1070	326.136
Woodworking Shop 1	34	4	3	N	34.0675		4	58	35	W	-4.9764		1040	316.992
Woodworking Shop 2	34	4	3	N	34.0675		4	58	35	W	-4.9764		1100	335.28
View of the Medina	34	4	5	N	34.0681		4	58	52	W	-4.9811		1100	335.28
View of Ruins	34	4	7	N	34.0686		4	58	47	W	-4.9797		1240	377.952
Bab Guissa	34	4	12	N	34.07		4	58	29	W	-4.9747		1050	320.04
Squaya Bab Guissa	34	4	7	N	34.0686		4	58	32	W	-4.9756		1050	320.04
Bab Guissa Mosque	34	4	8	N	34.0689		4	58	32	W	-4.9756		1060	323.088
Street Walkthrough 6	34	4	6	N	34.0683		4	58	33	W	-4.9758		1050	320.04
Lattice Woodworking Shop	34	4	6	N	34.0683		4	58	32	W	-4.9756		1050	320.04
Street Walkthrough 7	34	4	4	N	34.0678		4	58	32	W	-4.9756		1030	313.944
Bab Guissa Fonduk	34	4	3	N	34.0675		4	58	33	W	-4.9758		1030	313.944
L'art Du Menuiserie General	34	4	6	N	34.0683		4	58	30	W	-4.975		1010	307.848
Bone Crafts Shop	34	4	2	N	34.0672		4	58	30	W	-4.975		1010	307.848
Food Square 1	34	3	60	N	34.0667		4	58	30	W	-4.975		980	298.704

Wedding Furniture Shop	34	3	50	N	34.0639		4	58	26	W	-4.9739		990	301.752
Food Square 2	34	3	53	N	34.0647		4	58	27	W	-4.9742		990	301.752
Street Walkthrough 8	34	3	54	N	34.065		4	58	28	W	-4.9744		990	301.752
Cascade de Lumiere	34	3	53	N	34.0647		4	58	31	W	-4.9753		1000	304.8
Perfumery	34	3	51	N	34.0642		4	58	31	W	-4.9753		1010	307.848
Fondation Mohammed Karim Lamrani pour L'Ensemble Nejjarine Musee Nejjarine des Arts et Metiers du Bois	34	3	53	N	34.0647		4	58	33	W	-4.9758		1000	304.8
Fonduk on Rue Talaa Kebira	34	3	53	N	34.0647		4	58	49	W	-4.9803		1100	335.28
Arbi Merrakchi	34	3	48	N	34.0633		4	58	48	W	-4.98		1120	341.376
Rue Talaa Kebira Walkthrough	34	3	44	N	34.0622		4	58	58	W	-4.9828		1200	365.76
Water Clock	34	3	44	N	34.0622		4	58	59	W	-4.9831		1200	365.76
Bouanania Mosque	34	3	44	N	34.0622		4	58	58	W	-4.9828		1200	365.76
Cafe Clock	34	3	44	N	34.0622		4	58	60	W	-4.9833		1210	368.808
Souk on Rue Talaa Kebira	34	3	43	N	34.0619		4	59	1	W	-4.9836		1210	368.808
Blue Gate Square	34	3	42	N	34.0617		4	59	0	W	-4.9833		1210	368.808
Blue Gate	34	3	42	N	34.0617		4	59	3	W	-4.9842		1220	371.856
Blue Gate Mosque	34	3	42	N	34.0617		4	59	3	W	-4.9842		1210	368.808
Sahat Elfna	34	3	42	N	34.0617		4	59	6	W	-4.985		1240	377.952
Parc Jnane Sbil A Fes	34	3	35	N	34.0597		4	59	19	W	-4.9886		1210	368.808
Walled in Square	34	3	35	N	34.0597		4	59	24	W	-4.99		1260	384.048
04/12 - 04/14														
Madrassa Attarin	34	3	55	N	34.0653		4	58	25	W	-4.9736		990	301.752
Qaraouiyyine Mosque	34	3	53	N	34.0647		4	58	26	W	-4.9739		990	301.752
Sffarine Square	34	3	51	N	34.0642		4	58	22	W	-4.9728		960	292.608
Bibliotheque de la Qaraouiyyine	34	3	51	N	34.0642		4	58	22	W	-4.9728		960	292.608

Metal Working Shops around Sffarine Square	34	3	50	N	34.0639		4	58	23	W	-4.9731		950	289.56
Currency Museum	34	3	52	N	34.0644		4	58	28	W	-4.9744		990	301.752
Fondouq Barka	34	3	51	N	34.0642		4	58	29	W	-4.9747		1000	304.8
Street Walkthrough 9	34	3	52	N	34.0644		4	58	28	W	-4.9744		1000	304.8
Foundouq 1 (add more once on map)	34	3	50	N	34.0639		4	58	28	W	-4.9744		1010	307.848
Metal Goods Shop	34	3	50	N	34.0639		4	58	32	W	-4.9756		1010	307.848
Souq Najjarine	34	3	54	N	34.065		4	58	33	W	-4.9758		1000	304.8
Place Sagha	34	3	59	N	34.0664		4	58	29	W	-4.9747		990	301.752
Fabric Souq	34	3	57	N	34.0658		4	58	25	W	-4.9736		840	256.032
Madrassa Misbahiya	34	3	54	N	34.065		4	58	24	W	-4.9733		990	301.752
Fondouq Staounyine	34	3	54	N	34.065		4	58	24	W	-4.9733		980	298.704
Leather Souk	34	3	50	N	34.0639		4	58	23	W	-4.9731		970	295.656
Inane El Caftan	34	3	52	N	34.0644		4	58	17	W	-4.9714		930	283.464
Place Lalla Yeddouna	34	3	53	N	34.0647		4	58	15	W	-4.9708		930	283.464
Lalla Yeddouna Leather Shop	34	3	52	N	34.0644		4	58	15	W	-4.9708		930	283.464
Street Walkthrough 10	34	3	58	N	34.0661		4	58	20	W	-4.9722		930	283.464
Large Leather Tannery	34	3	59	N	34.0664		4	58	15	W	-4.9708		930	283.464
Jewish Quarter	34	3	13	N	34.0536		4	59	27	W	-4.9908		1250	381
Synagogue Al Fassiyine	34	3	12	N	34.0533		4	59	26	W	-4.9906		1240	377.952
The King's Palace	34	3	11	N	34.0531		4	59	36	W	-4.9933		1260	384.048

Appendix B: Step-By-Step Guide for Uploading Media

The following guide outlines the steps we took to upload a 360-photo taken on a GoPro MAX camera to Google MyMaps software. It should be noted that the devices used in this manual were an iPhone 11 and a Windows laptop, and the software may not be available on all devices.

Required Software:

GoPro Quik
(Mobile app)



Google Street View
(Mobile app)



Google Drive
(App & Web client)



Google Photos
(Web client)



Capture 360 Picture using GoPro MAX

1. Open *GoPro Quik* App on a mobile device
2. Navigate to the "GoPro" Tab.
 - a. Tap "Control your GoPro"
 - i. Join the GoPro device's Wi-Fi
 - b. Once connected, initiate photo capture.
3. Ensure that you are in the 360-photo capture settings.
4. Tap the circle button to begin the capture.
 - a. The device will then capture the photo starting after the allocated timer amount (i.e., the capture will be taken 3 seconds after pressing the capture button for a 3s timer effect)

Transfer Photo from GoPro MAX to a mobile device

1. Navigate to the "GoPro" Tab within the GoPro Quik app
 - a. Tap view media
2. Tap the "Select Files" button from the upper-right corner of the viewer

- a. Select the desired photo file(s) from the media gallery
3. Tap the "Download" button in the middle right of the blue menu bar
4. Once the file(s) have completed downloading, navigate the "Media" Tab of the GoPro Quick app
5. Open the desired photo in the media gallery of the GoPro Quick app
 - a. Share the photo file(s) using the share button in the upper-right corner
 - b. Save the 360 Photo to "Photos"

Uploading 360 Photo from a mobile device to Google Street View

1. Open Google Street View on a mobile device
2. Tap the "Upload" button in the lower-right corner.
 - a. Choose the "Import 360 Photo" option from the pop-up bar
3. Choose to import a 360 photo from "Camera Roll"
 - a. Select the desired 360 photo(s) from the gallery
 - b. Tap "Import" in the upper-right hand corner
4. Tap the imported 360 photo
 - a. Street View stores photos in albums by day and month. So, if you do not see the image right away, navigate to the associated month's album and locate the photo(s) from the list
5. With the desired photo selected, tap the "share" button in the lower-right
 - a. Tap the "Share Privately" button
 - b. Select "Google Drive" as the export location
 - i. This step requires the user to have the Google Drive app downloaded onto their mobile device.
 - ii. Select the desired location to save the 360 photos within your Google Drive
 1. You may rename the files to match any naming convention you may have on this screen
 - iii. Tap the Upload Button
6. Repeat the above steps for any remaining photos

Transferring the 360 Photo from Google Drive to Google Photos

1. Login to Google Drive on any supported web browser
2. Locate the 360 Photo within Google Drive
3. Download the .jpg file to your laptop or computer
 - a. Street View also exports a .txt file. This file is not necessary for this process.
4. Open Google photos in any supported web browser
5. Navigate to the albums tab in the left-hand toolbar
 - a. Create an Album
 - b. Add photos to the album using the "Add Photos" Button
 - c. Then choose the "Select from Computer Option"
 - i. Select the .jpg file downloaded from Google Drive in the previous steps
6. Add the desired 360 photos to the album
7. Repeat the above steps for any remaining photos

Uploading 360 Photo Albums from Google Photos to MyMaps

*The following section assumes that the user has followed all step outlined in creating a map within MyMaps and have markers associated with GPS coordinates.

1. Open Google Photos in any supported web browser
2. Navigate to the albums section using the toolbar on the left
 - a. Select the desired album
3. Click on the icon second from right
 - a. From the new pop up window, select the "Create Link" Option
4. Open MyMaps in any supported web browser
5. Click on the desired location marker
6. Click on the pencil icon in the location marker pop-up window
 - a. In the description of the location, paste the link copied from Google photos
7. Click "Save"
8. Repeat the above steps for any remaining 360 photos.

The following guide outlines the steps we took to upload 360 videos taken on a GoPro MAX camera to Google MyMaps software. It should be noted that the devices used in this manual were an iPhone 11 and a Windows laptop, and the software may not be available on all devices.

Required Software:

GoPro Quick

(Mobile app)



GoPro Player

(Desktop App)



YouTube

(Web Client)



Capture 360 Video Using GoPro MAX

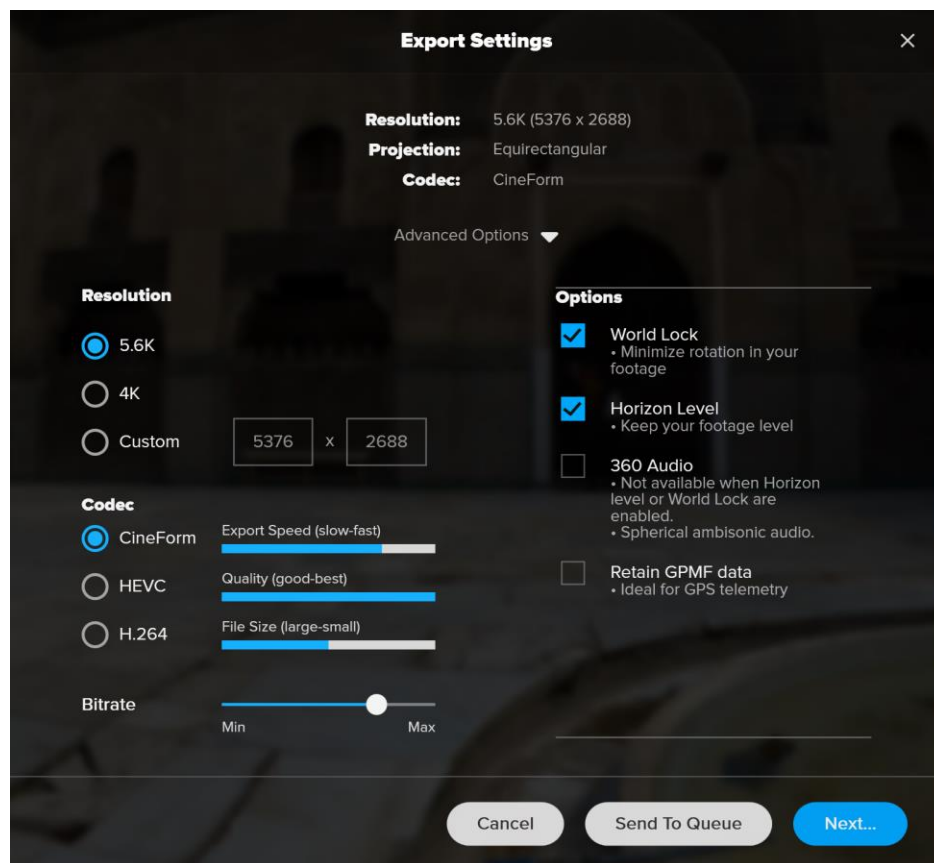
1. Open the GoPro Quik App on a mobile device
2. Navigate to the “GoPro” Tab.
 - a. Tap “Control Your GoPro.”
 - i. Join the GoPro MAX’s Wi-Fi
 - b. Once connected to the GoPro, initiate a capture
 - c. Ensure that you are on the “360-Video capture screen”
 - i. Capture settings are dictated in the lower icon bar of the preview window. 360 Video capture is depicted using a video camera icon.
 - d. Tap the circle button to begin the capture

Transfer Video from GoPro Max to Laptop

1. Open the GoPro MAX and retrieve the SD Card
2. Insert SD Card into laptop/PC
3. Transfer all .360 files from SD Card onto the device
 - a. .360 files are the file type that is read by GoProPlayer

Converting .360 Video to .mov File

1. Open GoPro Player desktop application
2. Click “Open Media”
3. Select the desired .360 video file
 - a. The GoPro Player application may open .MP4 files. However, these file types do not encode the metadata required to produce 360 videos.
4. In the upper lefthand corner, click on “File”
 - a. Click on “Export”
5. Select the desired export settings. The below figure depicts the export settings we used throughout our project:



6. Click the “Next” Button
7. Select the desired file location to save the new video file
8. Click “Save” in the new pop-up window

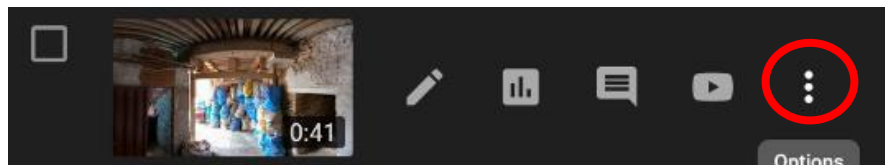
- a. This will save the 360 videos as a .mov file, preserving the metadata required to produce an interactive 360 experience by supported software.

Uploading .mov File to YouTube

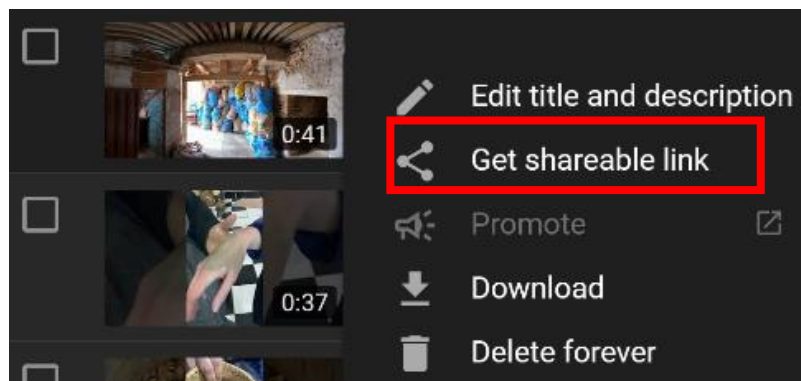
1. Open YouTube in any supported Web Browser
2. Navigate to “Your Channel”
 - a. Please make one now if your Google Account does not have a YouTube channel linked to it.
3. From the Channel Viewer, click on “Manage Videos”
4. Click on the “Create” button in the upper-right hand corner of the Channel Viewer
 - a. Select the “Upload Videos” option from the drop-down list
5. Select the .mov file from the previous section
6. Continue through the pop-up windows selecting the desired settings for the video upload

Integrating YouTube Video into MyMaps

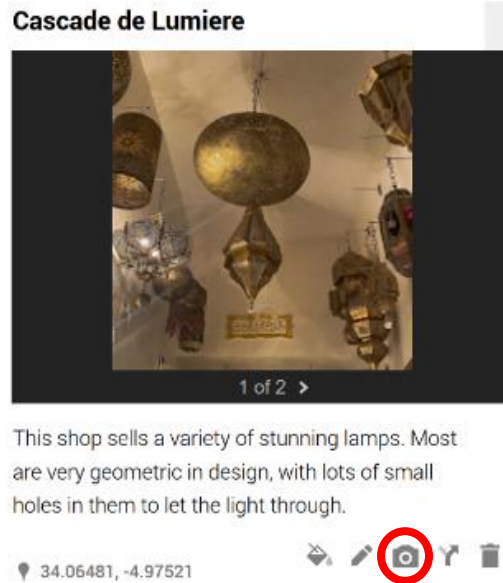
1. Open YouTube in any supported Web Browser
2. Navigate to “Your Channel” → “Manage Videos”
3. Find the desired video and click on the three dots to the right of the thumbnail. See the below figure for reference.



4. Select the “Shareable Link” option from the drop-down list. See the below figure for an example.



5. Open MyMaps in any supported Web Browser
6. Click on the desired location marker
7. In the pop-up window, click on the camera icon. See the below figure for an example



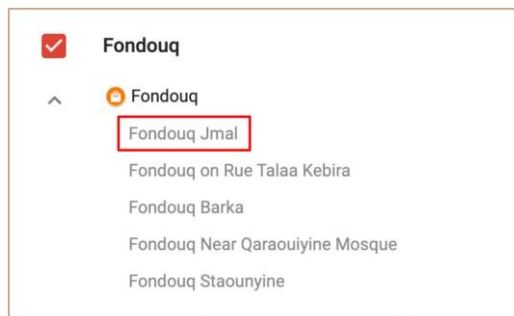
8. Click on the "YouTube URL"
- a. Paste the link copied to the clipboard from step 4.
9. Click "Select" in the lower-left corner.

Appendix C- Digital Preservation Map of the Fez Medina: A User Guide

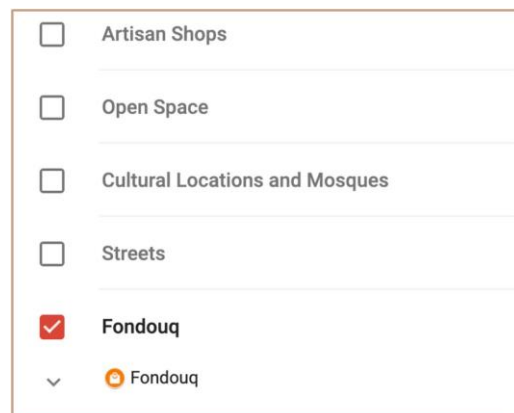


Exploring the Map

Option 1: Select a location by clicking on its icon on the map. This is a good way to explore the map if you do not have a destination in mind.

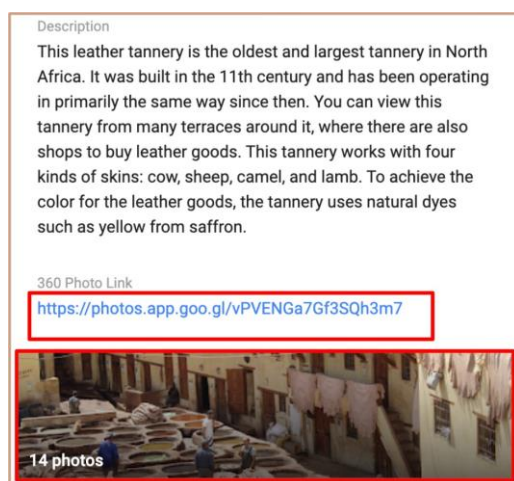


Option 2: View the drop-down menu for each location type by clicking the down arrows in the menu on the left-hand side. This shows a list of all locations on the map, and by clicking on the name, you can select the one you want to view. This is a good way to explore the map if you are looking for a specific place.



Using Layers

Another feature in the map is the layers. When you first open the map, all layers will be selected; this means you can see all locations on the map. However, you may only be interested in a certain location category, for example, fondouqs. You can click the checkbox next to the layers you don't want to see, causing them to be hidden. This feature allows you to see a smaller number of locations at once.



Interactive Features

360 Photos: Locations with 360 photos include a link that will bring you to a Google Photo album, where you can then explore these photos.

Pictures and videos: The slide show at the bottom of the menu allows you to browse through any photos and videos, including interviews, that are associated with the location.

Key Vocabulary

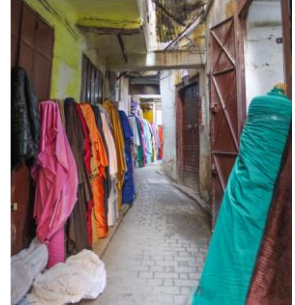
While navigating the map, you may come across some terms you are unfamiliar with. This part of the user guide aims to improve your experience by providing definitions for some of these words.



Medina: The “old city,” which is walled in and the original part of the city. Many Moroccan cities have medinas



Fondouq: A collective where many artisans work creating a variety of goods. Artisans also sell their goods here.



Souq: Marketplace where a variety of goods can be sold.



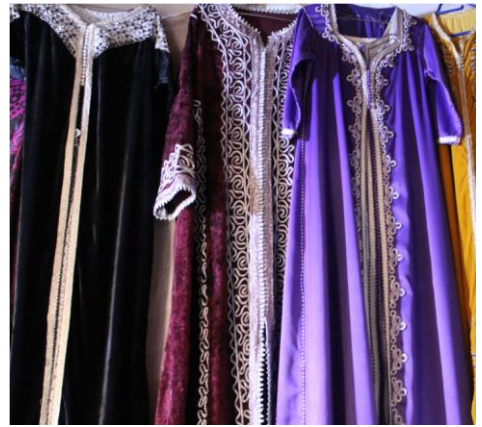
Bab: Door in Darija (Morrocan colloquial Arabic).



Madrassa: A specialized school (i.e. wood crafts)



Jelaba: A traditional hooded robe



Caftan: A more decorative traditional robe made up of three layers.

Locations with Interviews

- **Dar Dbegh ain Azlitan**
- **Fondouq Jmal**
- **Arbi Merrakchi**
- **Lalla Yeddouna Leather Shop**

Explore our Map



<https://bit.ly/3kIB5AI>