COLORADO STATE UNIVERSITY EXTENSION

ARCHITECTURAL VIRTUAL LIBRARY: DEVELOPMENT OF EDUCATIONAL K—12 RESOURCES

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Location: Gilpin County

PROJECT INFORMATION

Once called the "Richest Square Mile on Earth," Central City is a historic mining town in north-central Colorado. Founded in 1859 after John S. Gregory's discovery of gold, Central City is one of the oldest towns in Colorado, predating Colorado's statehood in 1876. The entire city, along with its close neighbor, Black Hawk, is a National Historic District boasting over 300 historic buildings. Today, Central City is best known for casinos and gambling, but many have yet to discover the vast significance of this small town's history.

Central City currently has a population of just over 500 people, and its story lies in the residents and buildings. This project aims to capture digital images of nine historic buildings in Central City to create virtual tours in CSU's Architectural Virtual Library. I have embedded stories, historical references, architectural details, newspaper articles, and videos into these tours to add to the experience. I aim to provide learners – of all ages - increased access to the interiors and histories of these incredible buildings.

BACKGROUND

The global outbreak of novel coronavirus (COVID-19) caused school shutdowns worldwide. Unfortunately, most of the world was unprepared for the transition to virtual learning, and schools put experiential learning on hold. Field trips are an important student-centered learning experience providing the benefits of real-world experiences, improving relationships in student social structures, adding educational variety by getting out of the classroom, and increasing positivity toward the learning topic through shared experiences (Wolf et. al., 2021). Traditionally, virtual learning methods are a strictly two-dimensional experience and do not allow the user to properly understand place, a location with meaning (Klippel et. al., 2019). However, society saw an increase in museums utilizing scanning technology to capture their collections digitally make these scans available to a wider audience through virtual museum tours (Purbo, 2020).

Because COVID-19 has deterred students from visiting sites in person, the CSU-AVL webpage provides virtual tours of these historic buildings to promote architectural education to students in K—12 programs (though the website will be open to all). A virtual reality 360° camera captures the building footage. Additionally, the virtual tours include descriptions of each building and their history. CSU's Architectural Virtual Library (AVL) encourages community members to engage with the content through multifaceted approaches such as (a) middle and high school teachers developing lectures or assignments on historic architecture and (b) older adult organizations interested in virtual educational content experiences.

INTERNSHIP GOALS

1. Determine (with mentor guidance) which historic buildings to highlight on the Central City webpage.
2. Utilize 360 video camera capabilities to capture virtual tour content of buildings via Matterport.
3. Research historical building information and embed the research into tours via Mattertags.
4. Integrate inclusive website principles into all webpage content.
5. Present to community stakeholders.
6. Develop corresponding educational activities for students in K—12

METHODS

I divided this project into four main parts:

1. **Research and Community Outreach**
Co-selection with the community to determine which buildings to capture. Speaking with locals not only reveals which structures matter to the history of the town but also shows what the community values.

2. **Image Capturing**
The Matterport Pro2 3D Camera is a 360° camera that uses an infrared laser scanner to capture 3D images of the space. The camera then compiles a series of individual scans into a cohesive virtual tour. This tour is experienced through a smartphone, computer, or virtual reality headset (such as Oculus Quest Pro 2).

3. **Matterport Editing and Tagging**
In addition to the virtual tours, each experience includes Mattertags, pinned items within each scan that provide additional information about the space. Each tag is color coded: green for architectural materials and features, gold for pictures, orange for floor plans, gray for published articles, and blue for videos and culture.

4. **Curriculum Development**
The Mattertags provide the foundation for three educational activities based on grade level. The first is designed for 3rd through 5th grade, the second for 6th through 8th grade, and the third for 9th through 12th grade. The activities require students to tour the virtual buildings and search for answers in the Mattertags. These activities can be used as is or provide a jumping-off point for teachers to develop further.

Images of Coeur d'Alene Mine
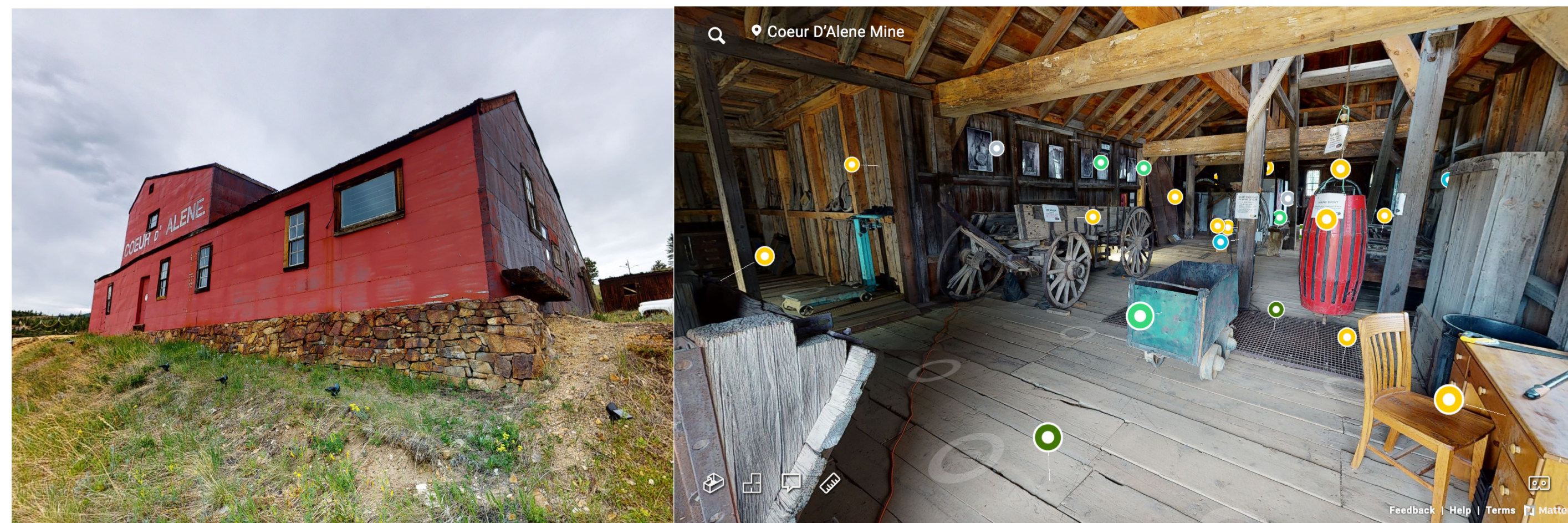
WHAT YOU LEARNED

I learned the following during my internship:

1. Historic information and context of Central City, Colorado buildings
2. How to use a Matterport Pro2 360° camera to capture virtual tours of buildings
3. How to embed my research into virtual tours using Mattertags in Matterport software
4. How to integrate inclusive website principles such as accessible PDFs into webpage content
5. How to engage with and present to community stakeholders in a meaningful way
6. How to integrate educational activities to use in conjunction with virtual tours

HOW DOES THIS APPLY TO YOUR EDUCATION

I am currently pursuing my bachelor's degree in Interior Architecture and Design with a minor in Construction Management at CSU. Gaining practical knowledge with the Matterport Pro2 Camera and Matterport software directly transfers to capturing 360° images of my future designs and surveying construction sites.

Beyond gaining practical skills, I also developed an appreciation for historic buildings and the knowledge that historic town residents hold. Spaces can transform the users who occupy them. Interior designers need to understand this concept to create impactful and practical designs. This externship taught me how to study a space deeply and intently, appreciating both its attributes and faults.

NEXT STEPS

The AVL is translatable to several applications beyond the documentation of historic buildings. Many new build projects focus on sustainability criteria set by the U.S. Green Building Council and the International WELL Building Standards. The use of a Matterport virtual tour in these spaces can help highlight Leadership in Energy and Environmental and WELL building innovations while also demonstrating how these features work and how they can be utilized in other buildings.

Renovation and restoration projects could benefit from before-and-after tours to demonstrate the transformation of space through time. If the restoration project relies on donations from the public, a virtual tour of the building can include Mattertags containing the history of the building, the new plans for that space, the cost of the new materials, and even the design inspiration for multiple areas. Envisioning what a space will become is incredibly difficult for most people, so a tool that addresses this disconnect should increase interest in and vitality of the project.

Universities can utilize Matterport virtual tours to increase interest in their campuses. Many students cannot visit the colleges they apply to prior to freshmen orientation. The ability to tour a campus virtually may help students make decisions about which college best suits their needs. AVL scanned nine CSU buildings in 2021 that are available for existing or prospective CSU students or employees to explore their interior spaces.

REFERENCES

Klippel, A., Zhao, J., Oprean, D., Wallgrün, J. O., & Chang, J. S. K. (2019). Research framework for immersive virtual field trips. In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)* (pp. 1612-1617). IEEE.

Purbo, O. W., & Darmajaya, I. (2020). Online teaching and experience art & culture during coronavirus and beyond. *Darmajaya: Informatics & Business Institute Darmajaya*.

Wolf, M., Wehking, F., Montag, M., & Söbke, H. (2021). 360°-based virtual field trips to waterworks in higher education. *Computers*, *10*(9), 118.

Scan QR code to access the CSU-AVL website.