INNOVATIVE TECHNOLOGIES
INNOVATION CENTER
of ST. VRAIN VALLEY SCHOOLS

CASE STUDY
NOV2019-MAY2021

ENGAGED, VIRTUAL ENVIRONMENTS

HOW MIGHT WE make the Innovation Center more accessible to those interested in learning more about programming and facilities?

THE PARTNERS

FCI Constructors, Inc. (FCI) is an employee-owned corporation specializing in providing the best construction management, general contracting, and construction related services with the highest level of client satisfaction.

Founded in 1978 in Grand Junction, Colorado, our success was steadily built one satisfied client and successful project at a time. Today, FCI is noticed as one of the premier contractors in the Rocky Mountain region and southwestern United States.

AMD Architects is a 60-person design firm based in Denver, Colorado for more than 45 years. We have provided a full range of services including the planning, programming, and design of buildings for colleges, universities, schools, libraries, justice facilities, office buildings, cultural venues, and housing. We have been awarded the American Institute of Architects' Firm Award for "a distinguished body of work" three times and have received numerous local, regional and national design awards.

FCI Constructors, Inc.

AndersonMasonDale Architects

THE PROJECT

At the cross-over of creative arts and computing, the Creative Computing and Design Pathway of the Innovation Center (IC) provides students with opportunities to utilize augmented reality, virtual reality, and other modern technologies and bring their design ideas to life.

Between November 2019 and May 2021, students worked alongside professionals from FCI Constructor, Inc and AMD Architects to digitally reproduce the exterior and interior specifications of the IC. Students then developed an interactive tour -- including various media -- within the environment to showcase coursework and student-led projects.

Goals:

- Build skills in 360°, BIM, and CAD Modeling
- Discover ways to engage virtual 'guests' within a digital environment
- Increase understanding of architectural design, construction, and tech
- Share technology currently used in construction careers

Design Thinking

"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."

- Tim Brown, IDEO

Building Information Modeling (BIM)

BIM is a process of using the digital information about a building project to create a 3D model that can be used in planning, designing, and managing an infrastructure.

Computer Aided Design (CAD)

The use of computers to aid in the creation, modification, analysis, or optimization of a design.

"We thought we were just building a school, but we ended up **BUILDING SO MUCH MORE.**"

– Dale Hartman, FCI
Construction Superintendent

[NOVEMBER 2019]
Approached FCI about project and mentor needs

[DECEMBER 2019]
Training Sessions with FCI professionals

[FEBRUARY 2020]
VR Project Team created for VIM and 360 Modeling

[SPRING 2020]
FCI provided VIM files via 360 video recording sessions

[MAY 2021]
VR Project Team presented final product to FCI

[MARCH 2021]
FCI incorporates VR Project Team into marketing campaign

[DECEMBER 2020]
Students premiered their virtual tour with SVVSD and FCI

[FALL 2020]
Students toured Mead Elementary construction site to see design

THE PROCESS

Each division of the Innovation Center (IC) encompasses some level of design thinking.

During this project, our student designers walked through each phase – Empathy, Define, Ideate, Prototype, and Test – to develop a solution for the identified challenge – **How might we make the Innovation Center more accessible to those interested in learning more about programming and facilities?**

Before identifying a problem to tackle, teams engaged in the first phase of the design thinking process – **EMPATHY**.

Students designers held initial conversations with AMD architects and FCI construction managers to better understand schematics, blueprints, and the overall design/construction process. Students also visited the construction site of St. Vrain's newly constructed **Mead Elementary** to get an up-close perspective of architectural design, electrical infrastructure, as well as heating and cooling. Using space and layout would prove to be an important part of their project.

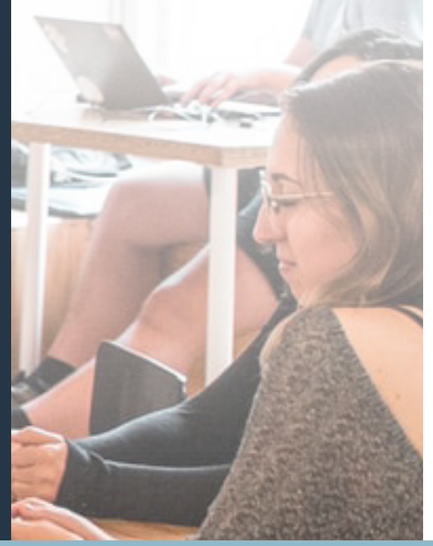
Students quickly **DEFINED** the challenge of accessibility. Over the course of any given school year, the Innovation Center connects with several students, parents, community members, and industry partners via on-site tours. If the team could create another layer of accessibility – beyond on-site tours – more stakeholders could learn what the IC has to offer and potentially engage with programming. The team then began to **IDEATE** how to create new touch points with the IC. Video came to mind, but the obvious choice was a combination of augmented and virtual reality.

In the Winter of 2020, students partnered with AMD and mentors in Dublin to collect and **PROTOTYPE** 360° and virtual information modeling (VIM) of the Innovation Center's exterior and interior space. With these resources, students developed interactive tours within the Engage VR platform. Each experience incorporated mixed media – student artwork, time lapse video, photos, and staff interviews.

Near the completion of the project, students were able to produce two drafts of virtual tours – one to serve the needs of the IC and another to serve as a promotional tool for FCI. To **TEST** their work, the student designers premiered their virtual tours with parents and a limited amount of FCI employees.

EMPATHY

- In large part, students came into this project with limited knowledge of construction practices
- Students had introductory conversations with AMD and FCI professionals to learn more about the design and construction of a facility
- Layout and use of space were strong components discussed
- Students participated in an on site tour of Mead Elementary to get an 'up close' perspective on construction sites
- Students worked with IC administration and staff to determine what content should be visualized within a virtual tour

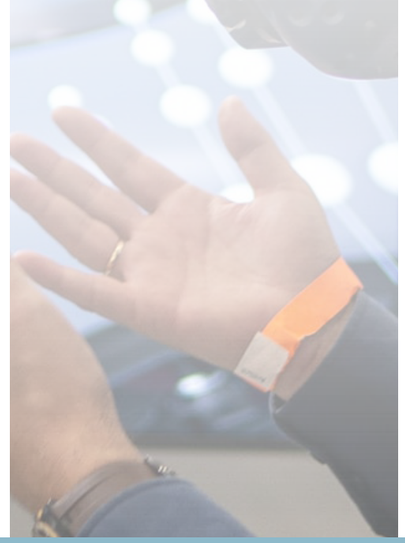


DEFINE

- The IC conducts roughly 50 on-site tours on an annual basis
- The IC has approximately 800 students enrolled with the IC
- SVVSD has over 11,000 high school-aged students that could potentially visit the IC or engage in coursework
- The number of potential stakeholders, compounded with disruptions caused by the pandemic, shed light on the need for more access to the IC's facility

IDEATE

- A virtual tour can impact stakeholders on a global scale
- Student designers utilized common space within the virtual environment to showcase other aspects of the Innovation Center; HVAC systems, eg.
- Videos of the IC's construction were showcased
- Staff interviews were planned to populate the virtual tour; these would be used to education prospective students, but also inform various community and industry stakeholders

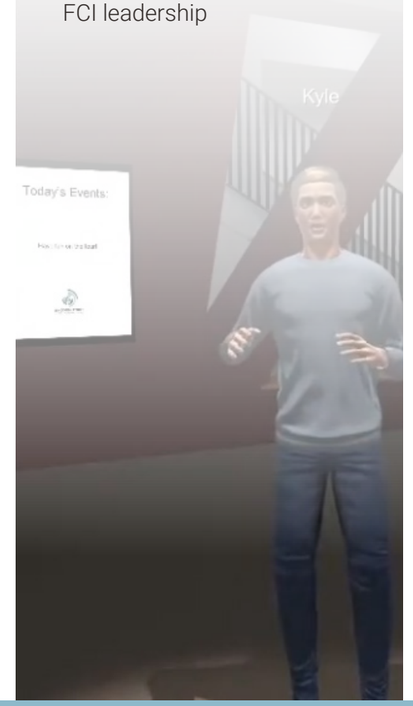


PROTOTYPE & TEST

- Students paired with mentors from FCI and Immersive VR Education
- The Design Team used several development resources:

  - Garmin Virb (360° Camera)
  - Oculus Quest 2 (VR Headsets)
  - Engage Platform
  - Unity (cross-platform engine)
  - Blender (3D Software)
  - Autodesk Revit (BIM software)

- Premiered with parents and limited FCI audience
- On May 2021, student presented the final product to FCI leadership



THE OUTCOMES

The project officially wrapped up in May of 2021, when the team delivered the final presentation to FCI's leadership team.

The application is currently being used by FCI at career fairs to demonstrate the capabilities of the Innovation Center. By emphasizing new technologies and use cases, the group hopes to bridge students who have interests in these studies with career paths more associated with construction and architecture.

Future Ideas for Collaboration

- Focus on placing students or visitors in other interactive learning environments
- Have students document the construction process from start to finish using various visuals captured throughout construction
- Continue to connect students with construction, design, and software development companies
- Develop programs that utilize specific software tools – Navisworks, Revit, BIM files, eg

Take the Tour

FCI Construction Tour – http://stvra.in/fcivrtour

Innovation Center Program Tour – http://stvra.in/icvrtour

innovation.svvsd.org

@ICSVVSD

2520
MINUTES
Virtual Tour Interaction

500+
HOURS
Paid Student Designer work

10+
MENTORS
FCI, AMD, Engage, and SVVSD

"New technology is SHAPING THIS SECTOR beyond the stereotypes of a 'hard labor industry'. VR APPLICATIONS ALLOW for reduced on-site visits, improved design, training, collaboration, safety, and more. "

– Marika Bacon
Assistant Marketing Manager
FCI Constructors, Inc.

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academic excellence by design