

**Art History in the
Virtual Reality Environment**

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Abstract

The objective of this project is to create a virtual reality environment for teaching art history in an interactive, collaborative way. The environment will make it possible for students to meet, interact with works of art and architecture, and work together on project-based art history assignments. The method for developing this project involved sourcing online teaching materials, and researching effective methods of assessment. Exploration of virtual reality platforms was necessary to find one accessible for most users, that could be developed for use as an art history classroom and galleries. A learning management system was chosen to organize information and materials, post feedback and grades, and be a repository for work done in the virtual environment. Research into online resources found that art museums offer a multitude of images, essays, and videos that are available for download or linking to, as well as online resources for downloading 3D architectural and sculpture models. FrameVR proves to be both the most accessible and user friendly VR environment for this project. The conclusion in the development of the project is that by providing an easily accessible VR environment, populating it with engaging and interactive art history resources, and offering collaborative, constructivist learning experiences with portfolio and project based assessment, a rich environment for the teaching and learning of art history is provided. This project also provides a template for future specialized topical courses in art history.

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Introduction

This capstone project is to create a curriculum for a college art history course which can be presented in a virtual reality environment. While taking the course Instructional Design for Online Learning Environments, I began to develop the framework for a pilot project involving VR. My concept has evolved with an opportunity that has been presented to develop and teach an online art history course in community college. The vision for this VR environment is as a virtual equivalent of a visually and socially engaging classroom, which could easily be transformed into a gallery/museum/lab space.

The purpose of the project is to offer experiential and collaborative learning about art and architecture, where students can take virtual museum field trips, curate art exhibitions, and meet with guest speakers. The scope of this project will be a pilot project for a one-semester Introduction to Art History course covering the Renaissance through contemporary art.

The longer term goal is to use this format to teach specialized topics in art history, as well as art and design workshops. The use of a virtual reality environment would allow for a cross-pollination of ideas, a model where students can learn from each other and visiting artists, and develop a sense of community that would not be possible in a more traditional online art history course format.

The technology to be used is FrameVR, a virtual reality platform that is free, can be used on several types of devices, and is easily accessible for most users. Frame is an environment that is suitable for a course based on constructivist and connectivist theory. It allows students to view and interact with images, 3D objects, video, and text,

as well as upload and share their own visual and text materials in a collaborative setting.

Audience

This project is designed for community college students who are taking an art history course for (perhaps) the first time. This audience includes students of traditional college age, as well as returning non-traditional students. Many of the students are working part-time or full-time, have family responsibilities, or other obligations outside of their studies. Some students live on campus, but many commute to school. There is no major in art history offered at this college, however this course will be required for those students with a concentration in graphic arts or architecture, and will be offered as an elective for any other interested student.

Since the course will primarily be taken by the graphic arts and architecture students, there is the presumption of at least a moderate level of digital nativism, as these students work with computer design apps and software in their other courses. For students taking the course as an elective, there will be instruction built in for using the VR platform. Students will have the opportunity to collaborate with and learn from each other.

This course will give students the opportunity to join remotely from home, or to join from a computer on campus. Using a virtual reality format will offer a “classroom” environment to meet in, promoting a sense of community that could otherwise be lacking in an online course. The VR environment can easily be adapted to be a gallery or museum, where students can visit historical works of art and architecture, as well as

add to the dialogue by posting images and descriptions of work they are interested in. I am hoping that by making this course interactive, that students will be engaged in a way that lectures and slides of images (the traditional format for art history) doesn't offer.

Supporting Research

In her essay, Cappello explores the possibility of bridging the online art survey courses offered by museums and the prospect of visiting iconic architecture through the use of virtual reality. She cites Google Cardboard VR as one way of transforming art history instruction from a 2D to a 3D experience. The results were that students felt that "history was really brought alive..." and "I felt like I was there."(Cappello, 2017) leading to increased engagement in the subject content.

Mezirow's theory of Transformative Learning which is based on students confronting a disorienting dilemma, examining and critically assessing beliefs, and carrying out a new learning plan with new experiences, (Western Governors University, 2022) is integral to the project. Miller, in her writing about transformative learning in the arts, references Larsen (2007) on the importance of art to adult learning writing that "...the use of clay and the discussion that followed allowed [adult students] to push past their everyday rational selves to experience something different. This shows the power of the arts to create disorienting dilemmas, which can then lead to transformation." (Miller, 2020, p. 341)

In his videos, Jim Carroll talks about disruptive innovations that are changing the future. Industry has developed self-driving vehicles, houses can be 3D printed in days,

cryptocurrencies change economics, and so much more. Carroll advises to “hold back the organizational sclerosis which is clogging your ability to pursue new ideas”. (Carroll, 2021) Skills including creativity, imagination, problem-solving, collaboration, and critical thinking are those that will be valued by employers. (Hanover Research, n.d.) The students of today will be the ones moving new ideas forward. It is essential to fulfill the promise of not only disruptive emerging technology, but of integrating disruptive methods if students are to be engaged in education.

One such example of disruption in the delivery of education is the Oikodomos Virtual Campus, a collaboration of several European architecture and urban design schools. The focus of this virtual collaboration is to study housing design solutions. (Oikodomos means “builder of the house”). According to the authors of the study, “Rather than being the surrogate of a university structure or the digital replica of an existing curriculum, the Oikodomos virtual campus is an innovative learning space within which the Oikodomos pedagogic model can be applied.” (Riddy & Madrazo, 2011, p. 323). The virtual campus allows for collaboration among students, teachers, visiting artists and art/architecture historians. Students can participate in blended learning, working together in the virtual art history galleries, and also getting together outside of VR, either through zoom meetings or in person. (Riddy & Madrazo).

Digital Tools and Technology

After using and considering several VR platforms, I am using Frame VR to design the environment. One of the main criteria is accessibility and ease of use. While I have worked extensively in Kitley, and like the options it offers, there are several reasons for

using Frame rather than Kately. Frame is a web-based application, so unlike Kately, it doesn't require downloading a viewer onto the hard drive. Frame is free to use, including the ability to create a free environment. So while I could use my own Kately island as a classroom, if a student wanted to create their own island, they must pay for it. With Frame, a student could, for example, create their own museum environment to present a project for free. Frame is somewhat easier than Kately to navigate in. The curriculum would include introductory lessons in using the app. The avatars are very basic in Frame, but it is easy to change all aspects of appearance so one feels comfortable with the avatar. The app offers a speech to text feature, a voice input language setting, a text language translation in the chat setting, and can be used on mobile devices. Preparation for using Frame, such as creating an account, log-in, and basic tools will be introduced through a Google Meet, and a Google Classroom will be available for communication and troubleshooting.

Theories

The constructivist learning theory fits well with the proposed project and learning environment. Constructivism emphasizes subjectivity in the gaining of knowledge, with personal experience and individual point of view playing a large role in learning. Some students will already have existing knowledge of art, architecture and design, and are ready to use that knowledge in new creative pathways. According to Bates, the social component is essential, as information and experience is shared among teachers, classmates, colleagues, and any other members of the learning community. Bates includes online communities as one example of a socially constructed institution in

which collaborative learning can take place. (Bates, 2015) Some students will be approaching this subject for the first time, and for those students a hybrid of constructivism and connectivism may be even more effective, as they interact and learn from others. Bates writes that “connectivism is really the first theoretical attempt to radically re-examine the implications for learning of the Internet and the explosion of new communications technologies.” He also notes that the role of the teacher in connectivist theory may be providing the environment to allow students to connect, to each other, and to various networks for learning. (Bates, 2015) This is supported with the study which showed that immersion in a group learning or community of practice environment resulted in development of a code of behavior, and promoted social connections through shared interests. (Freedman, et.al, 2013 p.112-14) This will be important to the cohesion of an online class, as we interact through avatars.

The project is focused on adult learners, specifically post-secondary students, some of whom will be traditional college age, some returning students. Mezirow’s theory of transformative learning is applicable to adults. The first phase in transformative learning is presenting a disorienting dilemma, which “...can be uncomfortable or challenging for students, but is the key spark in starting a fire of transformational learning.” (Western Governors University, 2020). In practice, in this project, the disorienting dilemma offered is the virtual reality format, which will be a new experience for many students. Learning in this environment will allow students to re-examine any previous ideas they had about both the method of learning, and about the art history content, as they are able to move through the galleries at their own pace, re-visit the material, and draw knowledge from a variety of sources.

Design

There are two sets of objectives in this project. One set of objectives is to evaluate the success of using a VR environment as a classroom for remote learning, and the other set is for students to be able to study art history in an interactive and dynamic setting.

The specifics of the first objective include: Students navigate comfortably in a VR environment, students access links to content and materials within VR, Students create and contribute visual materials to the VR galleries, and students become part of a collaborative community of practice. The specifics of the second objective include: Students identify the development of major stylistic movements and artists from the Renaissance through the modern period, students use art historical vocabulary to analyze the way in which formal elements convey meaning in a work of art, students analyze the ways in which the style and content of art is an expression of its historical political, social, religious and cultural context, and students apply knowledge of objects and styles used in earlier periods in order to interpret objects and styles of art of modern and contemporary art.

While my project is heavily influenced by the theories of constructivism and connectivism, as I design the project, backward design is also a guiding theory. I have a clear vision of the objectives, as stated above, and as I begin to design the VR classroom, and add materials to it, the design is driven by the desired outcomes. The acceptable evidence of learning (Bowen, 2017) will be in the form of an activity that will be completed before a student moves to the next “gallery”, or unit of study. Each gallery will represent a unit of study on an historical art movement. The objectives for

the art history content of the project are based on standards offered by the College Art Association for the practice of Art History, and supported by best practices from Art History Teaching Resources.

Assessment & Evaluation

The assessment activities for student learning to be completed will vary: written essays, group discussions, art criticism, video projects, slide shows, culminating with each student curating an exhibition based on a particular artist or movement. Students will start out in Google Classroom, where they will receive instruction on creating a FrameVR account and logging in. Once in the Frame Art History environment, students will visit the Module 1 conference room for orientation lessons in VR. They will be assessed on basic VR objectives: ability to use the navigation keys, ability to click on links to access material, ability to add assets to the environment, and ability to communicate with others in the environment. Module 1 also contains a Chat Cafe, where students can ask questions, and where help will be available. Module 1 functions as a classroom area for synchronous meetings.

Then as each student is ready, they will move to a module gallery room to learn about the particular art movement featured there. Each module consists of four gallery rooms, with an assignment for each based on the content of the gallery. There will be a project-based assessment at the conclusion of each module visit. The 16 galleries are set up to follow the historical timeline of art history from Renaissance to Contemporary. The last room to visit is the Module 6, where students will be able to post visual

assignments related to each gallery visit, and curate a collaborative exhibition based on a subject of interest.

O'Connor and Domingo give guidelines for assessment in the virtual environment. They recommend finding ways to observe and document participation and performance as would occur in an actual classroom. (O'Connor and Domingo, 2017, p.21) This could include students submitting snapshots or videos of activities, or observation and interaction at times that the entire class is present in the VR environment. Each of these methods would work well for formative assessment.

For summative assessments at the end of modules, each will be designed to be portfolio or project-based, as this will be assessing a higher level of knowledge (Reynolds, et. al, 2017, p.207). At least one assignment within each module will be collaborative. Each module will have a formative assessment in the first three galleries, and a summative assessment in the fourth gallery, before moving on to the next module of galleries. The summative assessment for each module will be portfolio based, each employing a different medium or technology, reflecting the period of art being studied. Examples may be creating a salon exhibition for the Impressionism module, staging a happening for the Conceptual module, or using video and sound for a Contemporary project.

Proposed assessments within each module will be:

- a. Formative: Constructed response: Essential Questions
- b. Formative: Project based partner activity
- c. Formative: Constructed response: Written with visual elements

- d. Summative: Portfolio based: Employ a variety of media and technology(Individual and/or collaborative)

Final course assessment will be a collaborative, project-based assessment involving research, written material, visual material, and media presentation.

Using portfolio-based assessment will also allow the student to monitor their own progress, and become engaged in the learning process. (Reynolds, et.al., p.245) The criteria for the assessments will be clearly stated, with numerical rubrics used for grading.

In addition to creating student assessments, there will be assessments for the success of the project. Students who participate will be asked to evaluate several aspects of the course beginning with the use of VR as a learning environment. They will be given a survey to rate the environment in terms of use regarding privacy, safety, technical challenges, inclusiveness, and accessibility, all of which must be considered when designing an immersive VR experience (Dick, E., 2021) Students will also be asked to evaluate the content of the course, including the ease of following the sequence of topics. Frequent check-in with students will be needed to ensure that they are able to access all course materials.



Top: Fig. 1 Proto-Renaissance Gallery Bottom: Fig. 2 Post-Impressionist Gallery



Concluding Reflections

As I moved through my studies in the MALET program, it became apparent to me early on that virtual reality was my special interest. Attending MALET events on Marian Island in Kitley were seminal in engaging me in online studies. The creativity and skill involved in building a virtual environment appealed to me as a teacher of architecture, art, and design. This seemed like a way to build engagement, collaboration, and community of practice into remote teaching.

Inspired by O'Connor's VR work in Marian Island, (O'Connor & Domingo) by the Oikodomos project (Riddy & Madrazo), and informed by the writings of Dick on inclusiveness in VR (Dick), the outline of this project began to take shape.

An opportunity to teach an online community college art history course gave a focus to the project. The website Art History Teaching Resources provided a framework for setting up curriculum. Research led me to rich, interactive sources of art history materials, through sites like the Metropolitan Museum of Art, the Museum of Modern Art, and many others. The work of Reynolds, et. al guided my writing of project and portfolio based formative and summative assessments (Reynolds, et. al). Design trials in several VR platforms led me to choose FrameVR, because of its ease of use, accessibility features, design aesthetic, and cost factors.

Potential challenges in the creation and implementation of this project include the following: generating institutional support to fund an upgraded version of Frame which will accommodate more than eight users, re-designing a traditional art history curriculum to be more inclusive in terms of gender and race, and the probability of needing to move the learning management platform from Google Classroom to Brightspace. The ongoing evaluation and development of content and assessment will be crucial, and guided by student feedback on the experience.

The objectives going forward are for students to be able to study art history in an interactive, collaborative and dynamic setting that will bring the subject alive for them, and to evaluate the challenges and successes of using a VR environment as a classroom for remote learning, with a goal of developing future courses to be delivered in this format.

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Project: Visual Resources

The Art Institute of Chicago arctic.edu

The Art Story theartstory.org

The Brooklyn Museum brooklynmuseum.org

Chicago Architecture Center architecture.org

Everson Museum of Art everson.org

The Frick Pittsburgh thefrickpittsburgh.org

Google Arts & Culture artsandculture.google.com

Guerrilla Girls guerrillagirls.com

The Guggenheim Museums and Foundation guggenheim.org

Hood Museum hoodmuseum.dartmouth.edu

Jeu de Paume jeudepaume.org

Metropolitan Museum of Art themetmuseum.org

Museo Frida Kahlo museofridakahlo.org.mx

Museum of Modern Art moma.org

San Francisco Museum of Modern Art sfmoma.org

Tate Modern tate.org.uk

Victoria & Albert Museum vam.ac.uk

Whitney Museum of American Art whitney.org

Widewalls widewalls.ch

YouTube youtube.com

Project Links

Art History in the VR Learning Environment: Renaissance to Contemporary
<https://classroom.google.com/c/NTk3OTQ3NjU1MDQ5?cjc=qsmhfdc>

FrameVR:

<https://framevr.io/art-history>