



VR Museum: Can VR be a better  
alternative to educate you on a  
singular artist from history?

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# Introduction/Proposal

This paper aims to answer whether Virtual Reality (VR) is a viable tool to educate a user on a singular artist from history. After going through a brief definition of VR, its history and its current usage within education, we will present how a singular artist museum differs from a regular art museum. All concepts given; we will show the advantages of a Virtual museum as opposed to the physical museum. This paper will point out how VR has already been used in museum, introduce the new idea of VR museum and identifying different problems students and art lovers may face when trying, in traditional ways, to fully experience an artist and their work.

Finally, we will present the prototype and its proposal that have been formulated by use of Wireframes of the application, Flow chart of features and the process that a user will follow when using the artefact.

## What is Virtual Reality?(Jae)

Virtual Reality is a computer created world or environment which will allow the user to interact with a different entire world (Bowman, 2007).” Much of the excitement centred on immersive VR— complex technologies that replaced real-world sensory information with synthetic stimuli such as 3D visual imagery, spatialized sound, and force or tactile feedback. The goal of immersive virtual environments (VEs) was to let the user experience a computer-generated world as if it were real producing a sense of presence, or “being there,” in the user’s mind.”

This is done with the headset and the controllers. the user will wear the headset, and this will give the wearer the impression they are within that virtual reality. The player will hold the controllers with their hands and these controllers will move in the virtual reality in accordance with the position of the players hands. The controllers can be either joysticks with a similar set up like a common gaming controller with joysticks to move and buttons to interact with the virtual world. And the other way of interaction in virtual reality is the gloves. These gloves offer a much more real feel to virtual reality.

Today Virtual Reality is used for quite a few things the most heard about is Entertainment where video games have been made in VR to change the way the player plays the game. (Bowman 2007)

Another current use for VR is education for example medicine and the military. In medicine VR is used, for example, VR can be used to train a surgeon to perform his surgical operations without putting anyone's life at risk and will still gain the knowledge (Bowman 2007).

In the case of the military use they use it to train their soldiers and air force in simulated combat to prepare them for the real thing. "Military training provided one of the first applications of immersive VR for example, the military can train infantry in urban combat tactics by moving them through a virtual city filled with computer-generated enemies and friendly troops." (Bowen, 2007).

Other uses for VR are treating psychological problems such as PTSD to everyday phobias. In the case of PTSD (Post Traumatic Stress Disorder) the use of VR is making the patient relive their experience so medical professionals can proceed in treating their Patients. "the concept of VR phobia therapy is simple. If a therapist can successfully treat a patient with excessive fear by exposing that individual to the fearful situation in the real world, perhaps virtual exposure will also work." (Bowen, 2007).

## Virtual Reality History (Shea)

Virtual Reality (VR) although seemingly new has been around since the nineteen sixties with the creation of the Sensorama by the cinematographer Morton Heilig. This creation was an innovation at the time, it created a multi-sensory experience that was filmed in colour and stereo that was supplemented by binaural sound, scent, wind and vibration experiences (Boa, 2013). This machine was known as the first approach of a virtual reality system and perhaps had awarded Morton with the title of the father of VR even though due to funding issues that left the project abandoned.

Throughout the following years various attempts were also made to create a more immersive technology until in 1961 Philco's invention of the Head-Mounted-Display (HMD) that enabled the tracking of the user's head. Which was then honed seven years later by the inventor Ivan Sutherland with the creation of the Binocular Omni Orientation Monitor (BOOM). It tracked the position of the user and their eyes and updating the position of the image in correlation with their position which within present day would be the closest in relation to the VR technologies we are currently using such as the Oculus and PlayStation VR, aside from of course the large headsets that required being mounted to the roof like it had been with Ivan's "Sword of Damocles" (Boa, 2013).

## VR & Education (Shea)

If you have had the chance to experience VR you may commonly think about virtual reality as an entertainment tool but when you begin to realise the capabilities of a completely immersive experience you can see how effective it may be within an educational environment. For example, this kind of experience for the user can only be done using VR and the situations although are only a representation of real-life, by utilizing certain features can provide authentic and relevant scenarios that make use of pressure situations that tap

the user's emotions. Prompting them to act that presents the user with a sense of uncontrolled options that can be retested (Pantelidis, 2010), which is an incredibly useful tool within educational environments.

When thinking of VR within the current education sector perhaps your first thought would be of use within computer science fields, but the use of VR can be and is currently used within many sectors of education. Such examples according to a literature review conducted on the papers promoting the advantages of immersive VR within education found that not only was VR advantageous within computer science at 60% of studies found but also 26.6% within engineering, 24.7% within social sciences, 11.8% in medicine and a range of others in much smaller quantities (Freina, 2015) but as the capabilities of VR increase as will its educational versatility proving that in fact VR is useful in multiple facets within the academic sector.

So, when thinking in relation to whether virtual reality is a viable tool within education, from the evidence found within the selected literature it is widely advantageous. Yet the biggest hurdle seen within most studies was the costs, although due to rapid improvements within the technologies sectors the use of VR within education institutions is becoming quite feasible. Possibly even one day an integral instrument in education, for example the typical use of VR is of supplying the user with the tools to create and explore a virtual world that they have created but as time passes using VR as an explicit tool to develop realitys based purely for pedagogical principles is becoming invaluable especially in fields such as medicine where practicing certain procedures multiple times can only be done within VR (Ota, 1995).

## Art Museum VS Single Artist Museum (Felipe)

The study of Art history is the study of historical development and stylist context that an object or artist is inserted in. Usually it is studied in chronological order and divided into periods of time, for example Medieval Art and Renaissance Art ("Art history," 2011). Within these periods they study the artists that belonged to it. The traditional methods of teaching these artists are going through their life, feelings and inspirations to understand what they wanted to express in their work. Usually work is presented in a monotonous way, follow the conventional way of showing small pictures in the book or, when trying to use technology, showing these images in slides, what for many students can be tedious, mainly when it is taught in high school. An alternative way that teachers and lecturers use to create interaction between the student and the artists' work, is taking the students to an Art museum to see a few or a single work of that artist.

A better way to show artists' work in full would be to take the students to a single artist museum, which intensify focus on artist's collection and the events that granted them to that status (Marks, 2015). However, these single artist museums are spread around the world, for example, if you want to see Van Gogh, Picasso and Salvador Dali museum, you would have to go to, respectively, Amsterdam, Paris and St. Petersburg (Florida). What make the idea of going to all the single artist museum while studying them at university or college, impossible.

# VR in museums (Felipe)

The concept of using VR in museum is not something new, there's many museums around the world that are already using this technology potential to bring collections to life and to make exhibits interactive (Coates, 2019). There are already, also, museum tours which intend to bring museums inside a classroom, however it is only VR video and not interactive, the viewer can only control the video by scrolling to look in different directions and from different angles (Coates, 2019).

Nevertheless, most museums that use VR, implement the technology to aggregate to what is already available in the museum, for example in exhibitions. The Kremer Museum went beyond it though, they created a museum with Kremer collection (that comprises 17th century Dutch and Flemish Old Masters) that is available only on VR. This virtual museum was created to make possible for public from different background and location, to be able to experience masterworks in a museum atmosphere by recreating "paintings and an exceptional space whose design alludes to the scientific and artistic vigour of the Golden Age" (The Kremer Collection, n.d.).

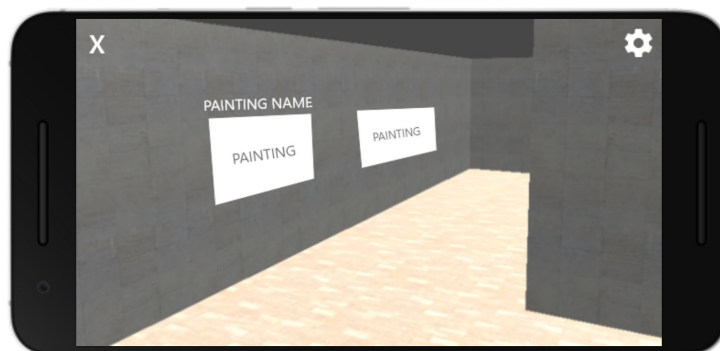
## VR Prototype

### Proposal

The main objective of this prototype is to create a connection between the artist and the user through an engaging environment. We recreated a museum in VR basis where the user can walk through the corridors and check the main works of Leonardo da Vinci. To know the name of the work, the user will simply have to look at it and then the name will appear in the top of it, and, in addition, they can also click in the work to know more information about it, which will come in voice message.

### Wireframes

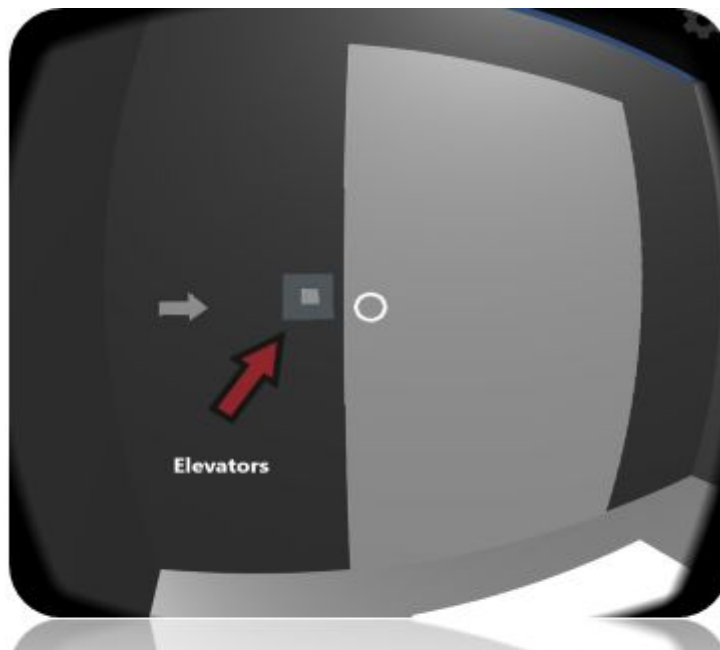
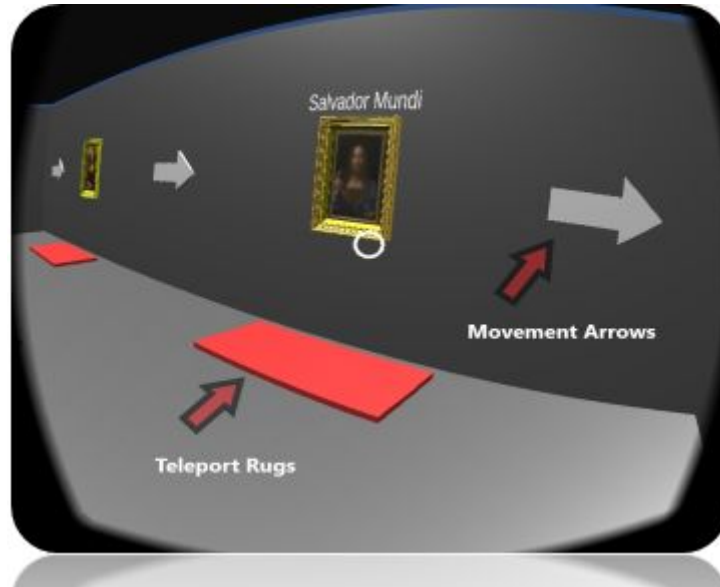
UI used in this project is Spatial



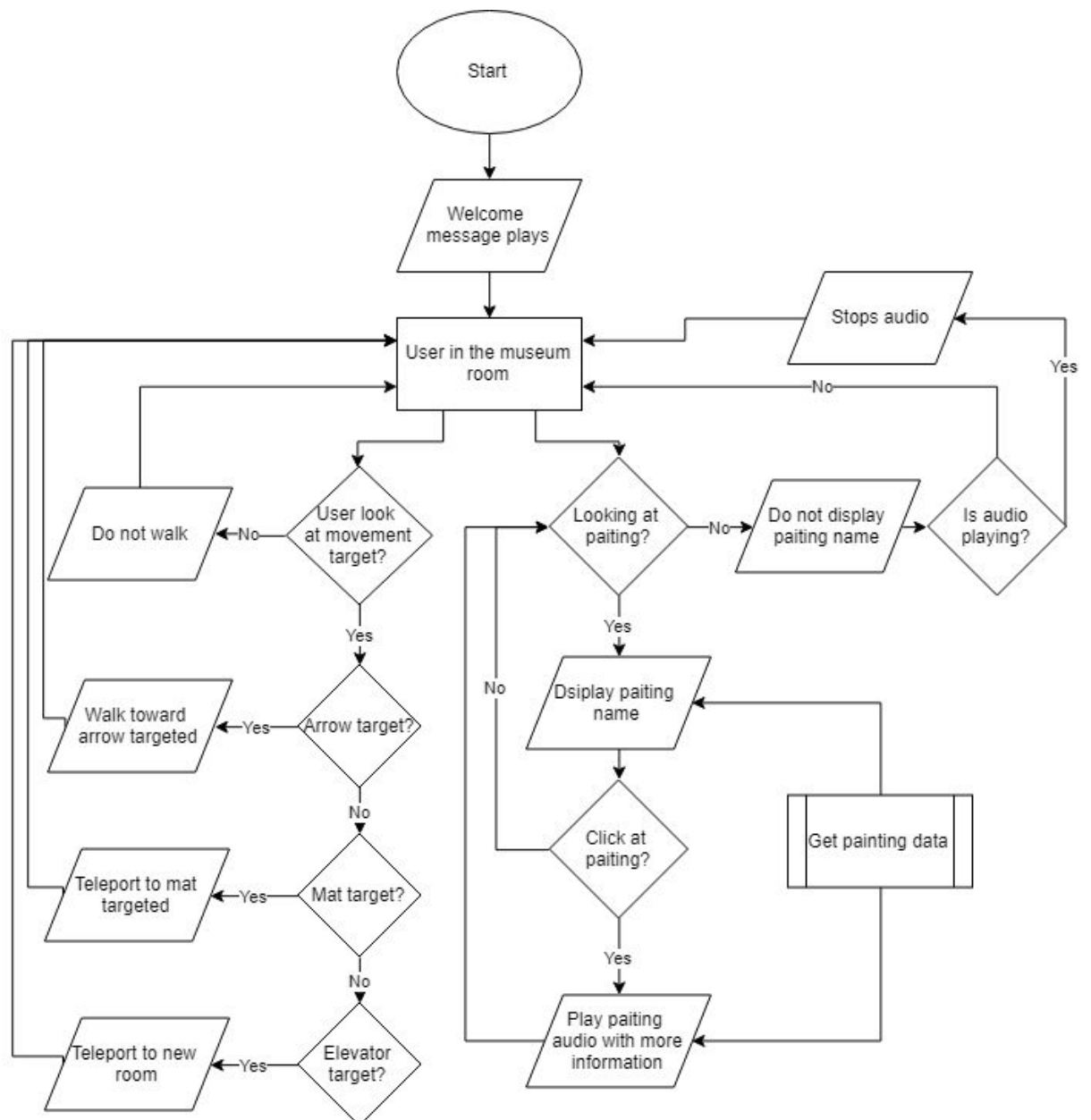
# Movement

Within the artefact there are three methods of movement:

1. Walking Arrows
2. Short Teleport Rugs
3. Elevator Teleportation



## Flow chart



# Prototype Method/Hypothesis

## Method

1. Volunteered users will be given the prototype along with a short brief & two identical test forms.
2. The user will be asked to fill the first form before the artefact test
3. Users will navigate through the prototype till completion and will immediately follow up with filling out of the second test form.
4. The questions will be basic facts in relation to the works of Leonardo da Vinci showcases within the museum.

## Hypothesis

Users will be able to successfully learn two facts about Leonardo Davinci after the completion of the museum. The first form will be based on prior knowledge and the second will be the knowledge they pertain after the process.

## Correct answers

Year Leonardo da Vinci was Born: **1452**

Time period Leonardo da Vinci was Alive: **Renaissance**



## VR Museum Form

Please fill in the form provided

1. Name:

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2. Age

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3. What is the name of any of Davincis paintings?

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4. What year was Leonardo Davinci Born ?

Mark only one oval.

☐ 1452

☐ 1430

☐ 1570

☐ 1520

5. What time period was Leonardo Davinci alive?

Mark only one oval.

☐ Romantic

☐ Renaissance

☐ Reformation

Powered by

 Google Forms

(test form example)

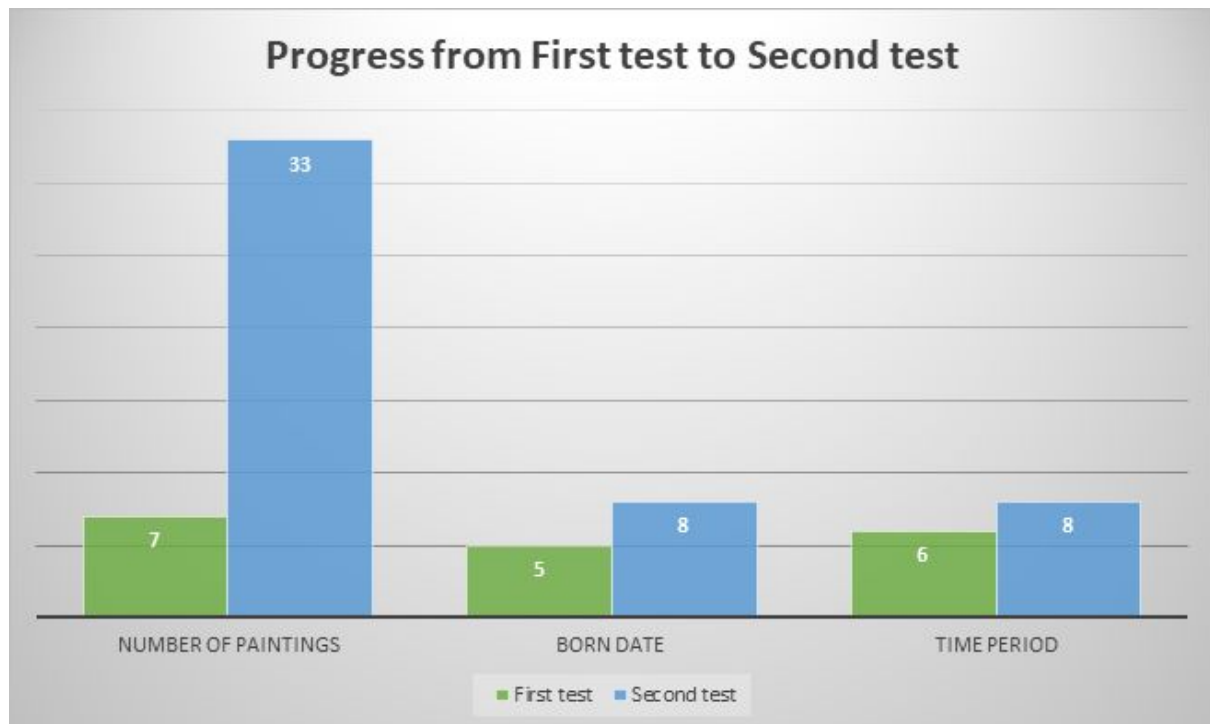
## Table Results (Before)

Name	Age	Number of Paintings	Born Date	Time Period
Jae J.	19	1	1570	Renaissance
Misha VDB.	19	0	1452	Renaissance
Reuben D.	20	1	1452	Renaissance
Ranju R.	38	2	1430	Renaissance
William D.	19	0	1452	Romantic
Kisoon P.	20	1	1452	Renaissance
Ole M.	60	0	1430	Romantic
Michele P.	58	1	1570	Renaissance
Cade T.	27	0	1520	Romantic
Isabel L.	28	1	1452	Romantic

## Table results (After)

Name	Age	Number of Paintings	Born Date	Time Period
Jae J.	19	2	1452	Renaissance
Misha VDB.	19	1	1452	Renaissance
Reuben D.	20	4	1452	Renaissance
Ranju R.	38	4	1430	Renaissance
William D.	19	2	1452	Romantic
Kisoon P.	20	6	1452	Renaissance
Ole M.	60	3	1430	Reformation
Michele	58	4	1452	Renaissance
Cade T.	27	3	1452	Renaissance
Isabel L.	28	4	1452	Renaissance

## Progress



## Results

As shown above, the results of the study are very positive. All 10 participants had some improvement from the first to the second test. We can see a substantial rise in the number of painting names the participants could remember after the test in comparison to the first test, with their score improving by 471%. Also, it is important to highlight that 4 of the participants did not know the name of any painting, but after the test, all the participants knew at least the name of one painting.

In the first multiple choice question, 50% of the participants, in the first test got a correct answer on the year Leonardo Da Vinci was born, and on the second test, 80% knew the correct answer. The improvement for the time period Leonardo was alive was very similar to the second question, having the participants getting 60% and 80% in the first and the second tests respectively.

# Conclusion

## Findings (Jae)

Based on the findings of our research each one of our users learned something new about Leonardo Davinci. The results have shown that VR is an effective teaching method especially when the users did not know anything about the topic of interest (in this case Leonardo Davinci's). These findings show that VR is more than a plausible teaching method, VR is a reality that can be easily implemented into modern day life with minimal cost and huge benefits to all that decide to take advantage of VR.

## Difficulties/Solutions (Shea)

The first problem as a group we had encountered before the project began was of our members working remotely, but quickly was unnoticeable due to the fact all members communicated well, all tasks had been discussed with detail and completed efficiently. Possibly this became more of an advantageous situation due to the fact most of our communication was documented in full using Slack and Google docs which gave us clear objectives.

Another difficulty we had experienced was mostly due to learning curves when developing a VR application. For example personally the use of efficient coding practices so as not to impair the Artefact, but ultimately the solution being due to quick completion of tasks earlier within development left an optimal amount of debugging time and with the help from online documentation and the tutors, the knowledge necessary to use "good" coding practices. Which I believe eliminated any possible late surfacing problems within the application.

## Future thoughts (Felipe)

Having as a barrier the amount of time given to the group and the small number of participants that could participate, the study cannot present a consistent result in all case scenarios. Future studies could test our result deeper and confirm whether the use of VR is beneficial for learning or not. Sequential projects may consider re-applying a similar or more detailed and elaborated test with a higher number of participants and with a longer break between the tests to make sure the subject actually learnt what they were taught in the museum.

Another important consideration is that groups may be categorised. The application should be able to efficiently reach two main kinds of people, students and art lovers who would use the application as a source of knowledge and curious people with no background on the subject who are there just to explore something new. So, it should be able to give detail and resourced information and also be able to present the artist's work in a way that would make it interesting even for lay people. For that, a few important changes should be made, such as

implementing a more friendly voice to the explanation, adding more detailed research about the artist's work, as well as adding a more complete collection of their work.

The success of this study is something to be considered when thinking about the implementation and creation of a singular artist VR museum application as a source of teaching/learning. The results show a promising field of research and an open area to be explored.

## References

1. Boas, Y. A. G. V. (2013, August). Overview of virtual reality technologies. In *Interactive Multimedia Conference* (Vol. 2013).
2. Pantelidis, V. S. (2010). Reasons to use virtual reality in education and training courses and a model to determine when to use virtual reality. *Themes in Science and Technology Education*, 2(1-2), 59-70.
3. Freina, L., & Ott, M. (2015, April). A literature review on immersive virtual reality in education: state of the art and perspectives. In *The International Scientific Conference eLearning and Software for Education* (Vol. 1, p. 133). "Carol I" National Defence University.
4. Ota, D., Loftin, B., Saito, T., Lea, R., & Keller, J. (1995). Virtual reality in surgical education. *Computers in biology and medicine*, 25(2), 127-137.
5. Art history. (November 2011). Retrieved June 5, 2019, from [https://en.wikipedia.org/wiki/Art\\_history](https://en.wikipedia.org/wiki/Art_history)
6. Marks, T. (2015, March 2). Editor's Letter: The single-artist museum | Apollo Magazine. Retrieved June 5, 2019, from <https://www.apollo-magazine.com/editors-letter-single-artist-museum/>
7. Coates, C. (2019). How Museums are using Virtual Reality? Retrieved June 5, 2019, from <https://www.museumnext.com/2019/01/how-museums-are-using-virtual-reality/>
8. Coates, C. (2019). Bring the Museum to the Classroom with Virtual Reality Field Trips. Retrieved June 5, 2019, from <https://www.museumnext.com/2019/02/bring-the-museum-to-the-classroom-with-virtual-reality-field-trips/>
9. The Kremer Collection. (n.d.). The Kremer Museum | The Kremer Collection. Retrieved June 5, 2019, from <http://www.thekremercollection.com/the-kremer-museum/>
10. Bowman, D. A., & McMahan, R. P. (2007). Virtual reality: how much immersion is enough?. *Computer*, 40(7), 36-43., from <http://www.cs.rug.nl/~roe/courses/OriInf/Bowman-Virtual-Reality>