



Embodied Narrative: Data Storytelling of Online Artwork Experiences

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Abstract. This paper describes a pilot ethnomethodology study of visiting a 3D virtual gallery that exhibits 3D models of physical artworks and of viewing photographs of artworks in a 2D online artist portfolio. Artwork, with its intrinsic information and layers of meaning, is a form of data which narrates a compelling and evocative story to engage audience. The digital landscape is a compelling medium to deliver this storytelling. However, such approach demands a delicate balance between technology incorporation and artistic vision. In an era of converging data and art, this paper explores the aesthetics of data storytelling and immersive online art experiences. Amid CoVID-19 lockdowns, physical art exhibitions migrated online, prompting a study of 3D virtual gallery visits and 2D online artist portfolios. Participants engaged in think-aloud protocols while navigating both formats, revealing insights into rationalizing actions and interpreting artworks online. Challenges emerged, including disrupted responses due to the inability to discern texture in 3D models or artwork photos. Navigational control, viewing distance, detailed artwork descriptions, and stable internet connections further influenced the online viewing experience. This prompts a further exploration on means to curate online exhibitions thoughtfully, where data aesthetics and artistic storytelling is harmonized for realistic interpretation within the digital expanse.

Keywords: 3D Virtual Gallery · Online Artist Portfolio · Ethnomethodology · Think Aloud Protocol

1 Introduction

Digital realm has served as platforms to support execution of tasks in both professional and personal settings. The richness of the digital realm is harnessed through archotyping – how technologies can be reconfigured incorporating social arrangements for contemporary society. This is enabled by mimicking some universal patterns of human nature, enabling a more intuitive participation in the digital realm. The art community

has also utilized digital platforms for online art exhibition. This allows visitors to not only view art exhibits but to also interact with them. An art exhibition comes in many forms such as photography, paintings, and sculpture, among others. Utilizing the digital realm as an exhibition space, these artworks are digitally captured as images or rendered as 3D virtual contents. This begets several questions that we feel are important to explore. Some artworks require a 360-degree view and come in sensory presentation, are they justifiably presented in terms of its structural or elemental build up? Does the digital realm hinder the honest presentation of these art exhibits due to the present technological constraints?

This paper reports a pilot ethnomethodology study of the experience of viewing artworks in virtual online environments. It also presents the challenges in viewing artworks online and discusses design considerations relating to the development of future online galleries. Restrictions on social contacts and gatherings is the main motivation for this study, as art galleries and museums are forced to close or could only have limited visitors during the Covid-19 global pandemic. As an alternative, museums, galleries, and artists created online exhibitions. Prior to the pandemic, some art galleries, museums, and artists have had virtual exhibitions, but these are usually in conjunction with the exhibitions in their physical spaces. Conversely, the pandemic has abruptly made stand-alone online exhibitions, or online exhibitions without physical counterparts a more viable alternative.

This pilot study was undertaken as a response to a situation faced by a group of artists. A commercial art gallery has had to employ a stand-alone online exhibition as a result of the Covid-19 pandemic. This meant that the work would be displayed online only. The gallery had prior experience in hosting virtual exhibitions using 3D renderings of the gallery space and the artefacts exhibits, but were usually paired with exhibitions in their gallery's physical space. Some of the concerns following the decision by the organizer and the gallery to do the online exhibition only, included that the artworks may not be fully appreciated or understood by visitors if presented via 3D renderings. Thus, this pilot study was conducted as a precursor to future work that will involve participatory design of an online art exhibition with a curator, artists, and members of the audience. The challenges which stemmed from this study are presented in this paper, along with the design considerations for future online exhibitions.

2 Related Work

Web-based or virtual galleries have been researched and developed since the 90's. One of the earliest works on virtual galleries used HTML and VRML [1]. Catton and Smith's temporal analysis of virtual exhibitions for gallery, library, archives, and museum (GLAM) institutions shows that virtual exhibitions have evolved from being websites to fully immersive virtual experiences using VR headsets [2]. Whilst the proliferation of internet use in the 90's provided the catalyst for web-based virtual environment (VE) for exhibitions, it was in the 2000s that the technology for VE in the form of 3D rendering technology was being developed and refined [2]. One example of such development is the Augmented Representation of Cultural Objects (ARCO) project [3]. The project aims to provide 3D archiving of museum artefacts so that artefacts that are costly to maintain

or fragile in nature can be observed and appreciated by more audiences without the extra costs of transport and security.

3D representation and Virtual Reality (VR) that enables interactions with 3D artefacts were developed in the 2010's [2]. Virtual exhibition has since been associated with immersive VR experience with the availability for VR headsets in the consumer market [2]. However, when the Covid-19 pandemic hit, GLAM institutions had to quickly create virtual exhibitions [2]. VR or AR have been applied in GLAM context to enhance audience experience at museums and galleries [4, 5]. Despite the availability of VR headsets in the market, they are not widely used compared to mobile phones and computers. With such preference, virtual exhibitions seem to be limited to web browsers (accessible by mobile phones and computers) and very few in between employ VR-based art exhibitions.

In hindsight, online platforms to exhibit art are now fast emerging. This is partly due to the COVID19 pandemic putting a constraint on physical exhibition but also a better embracement to the digital age. What may have begun as a force majeure slowly transformed into a democratization process of sharing artworks that transcend geographical barriers as the conventional means largely means only exhibiting to a particular locality. This pursues convenience and accessibility of an even wider audience [6], leading to higher engagement rates and exposure [7]. Online platforms are also more economically attractive as exhibiting in traditional galleries can be very costly particularly for new artists [8]. Online platforms with engagement features could foster a sense of proximity between the artist and the audience and in turn help gather valuable feedback to the artwork [9] creating a win-win situation for all parties involved. Moreover, online platforms can capture digital trails serving data-driven insights [7] for artists to better understand audience preferences and tailor their artistic endeavors accordingly. In addition [10], argues that, although online exhibitions can facilitate experience not afforded by physical exhibitions, such as interacting with digital copies of artefacts which usually cannot be touched, and the artefacts can be enhanced with digital multimedia contents. However, viewing a digitized representation of a physical artefact reduces "encounter that a physical display can facilitate." This is because people perceive values in the 'real things' that link the objects with the times in the past, or with people admired for their achievements [10].

Despite the advantages an online platform may offer, not all artists are enthusiastic. As art can be in various forms, shapes, textures and dimensions, the lack of a physical platform to appreciate these elements can be a drawback. However, an experiment conducted by Lin [11], that quantitatively measures if viewing artworks physically, on a head-mounted VR display, and on desktop VR differs on a set of subjective feedbacks asked in a questionnaire, shows that there is no significant different in responses in the three settings the artworks are viewed. The study suggests the design of virtual art exhibitions should focus on the readability of texts and the size of the artwork images instead [11]. Besides that, intellectual property protection is a huge concern as there is no clear form of control to unauthorized reproduction of artwork [12]. Curatorial arrangements on an online platform can be challenging due to the vastness and lack of tangible characteristics as usually found in traditional galleries [13, 14]. This is part and parcel of the

situation faced by our group of artists, who must exhibit their artworks in a web-based 3D virtual gallery in a virtual exhibition that does not have a physical counterpart.

All of these factors combined could potentially affect the formation of meaningful engagement between the artwork and the audience, as intended by the artist. The fleeting nature of online interactions can hinder deep engagement with artworks [15], making audiences either missing the complex narratives or emotionally disengaged from the full sensory richness of the artwork [16]. Contrary to the finite space offered by a physical gallery, the vastness of online platforms may inadvertently be used to exhibit many artworks. This makes it challenging for individual pieces to stand out making it harder to retain audience attention.

We argue that, in a time of pandemic, encountering digitized versions of physical artefacts is better than not seeing them at all. The need to conduct a fully virtual exhibition is not unique to our group of artists. The 2020 Biennale of Sydney had to close two weeks after it opened and moved the exhibitions to Google Arts & Culture [17]. Meanwhile, Dentro, a Portugal based artist-run space, curated an online exhibition by asking artists to create artworks based on the photos and videos of the physical space sent to them. The produced digital works were then displayed on the artists' Facebook and Instagram pages [17].

We postulate that the transition from physical exhibitions to purely digital exhibitions may take full advantage of the interactivity and information accessibility afforded by a virtual space. In this research, we aim to describe the moment-by-moment actions that people take to make sense of their experience of viewing 3D representations of physical artefacts in a virtual gallery and the experience of viewing photographic images of physical artworks in a 2D online artist portfolio. Research that studies the comparison between 2D and 3D web-based art exhibitions have found advantages and disadvantages for both formats [18]. Communication of information is better with 2D representation compared to 3D representation as the latter distract users by having to focus on navigating the 3D world instead of focusing on the displayed artefacts simulated in it [9]. Despite this distraction, a 3D virtual exhibition provides more enjoyment to the users not afforded by a 2D website [18]. As aforementioned, each medium has its pros and cons. It must be acknowledged that the effectiveness of a virtual exhibition as a form of communication and artefact experience is dependent on the audience background and motivation, the social aspects provided by the exhibition and most importantly, the quality of the content and the robustness of the information system that hosts the exhibition [19]. This research is different from previous research that compares 2D and 3D online exhibitions and the efficacy of the types of media used for virtual exhibitions in the sense that this research looks at how people account for their viewing of digital representations of physical artefacts. By describing these accounts, the contribution of this paper is in the theoretical discussions about the embodied meanings of artworks and the translation of meanings across different media.

3 Implementation

In line with HCI research tradition that uses ethnomethodological approach [20], the aim of this pilot ethnomethodology study is to elicit how people account for their experience of viewing digital representations of artworks in online environments. These behaviors

are governed by rationalization of actions displayed and known by the social actors [21]. From these experiences, the challenges which are faced are recorded and design considerations are then suggested.

3.1 Method

Due to the CoViD-19 pandemic, this research was conducted online. Nine participants were recruited (4M:6F), between 18–50 years old of age. Participants and the researcher met online using Zoom. The researcher demonstrated to the participants how to do a think aloud protocol whilst they visited a virtual gallery and a web portfolio. The participants were given the link to the virtual gallery and were asked to share their screen. They were asked to visit the virtual gallery for 30 min, but they could choose to end early. After the participants visited the virtual gallery, they were given a link and asked to visit the 2D online artist portfolio. A post-visit interview was conducted by employing open-ended questions to clarify the comments made by the participants during the think aloud session and for in-depth understanding on the meanings and intentions of their actions in the virtual gallery and the 2D online artist portfolio. Each of the Zoom sessions were recorded and then transcribed. Analysis was done using the same approach by Crabtree et al. [22], which do not follow constructive analysis and documentary interpretation.

3.2 Virtual Gallery

The virtual gallery and artist portfolio used in this research are copyrighted therefore the detailed images of some parts of the gallery and the portfolio were pixelated so that they could not be recognizable in our description. The virtual gallery platform in this research displayed 3D representations of a physical gallery space, while the artworks displayed in this virtual gallery are 3D renderings of the physical artworks. The virtual gallery is accessible through a website. There are the navigation circles placed in front of every artwork on the floor which lit up and pulsated to attract the users' attention (Fig. 1). Users could click on these navigation circles throughout the floor of the virtual gallery to view the artworks. At the bottom right corner of each artwork there is a floating 'i' (information) button which will pop-up a window to display information on the title, artist's name, materials used, and size of the artwork (Fig. 2). Videos will be played automatically in the pop-up.

3.3 Artist Online Portfolio

In the second part of the study, participants were given a link to an artist's online portfolio. Their artworks are displayed as a collage of photographs in the 'Gallery' page of the website. Users could click on a photo, and it will be enlarged to fit the browser. Additionally, users could also click and drag to the left or right to see another artwork in the collection (Fig. 3). An 'About' page with a short description of the artist and the technique they used was also provided for each artwork.



Fig. 1. The navigation circle on the floor in front of an artwork.

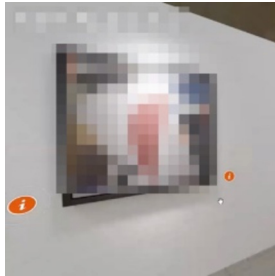


Fig. 2. The “i” button next to a painting



Fig. 3. Artwork viewed in the enlarged view

4 Results

The results obtained are taken from the think aloud sessions and interviews with the nine participants. The data is then analyzed, and the challenges encountered is presented.

4.1 Navigation

The ability to navigate in 3D was the most important feature of the online gallery. In general, users would take some time to figure out how to navigate in the 3D world, but once they knew how to navigate, they could easily jump from artwork to artwork by clicking on the navigation circles on the 3D virtual gallery floor. It was also highlighted that although the navigation circle in front of the artwork had already been animated to pulsate to attract attentions, it was still easily be overlooked, as users tend to place their focus on the visual display first. Another main issue with navigation is relating to the view control. For example, if the camera view had accidentally moved on to areas other than the artwork, it was found that some users had struggled to return to the camera view back to the artwork.

P3: Ok, figure painting exposition of non-figurative art. What shall I do? This, keep on clicking on the circle there. Go to see the painting okay. I am able to move around to see the painting, it's very interesting.

P1: If I look at the display, this is the one that is attracts my attention... But how do I go there? Usually people can click here [the navigation circle], if they are impatient and want to go there straightaway, they won't be able to do it.

4.2 Viewing Distance

Users had reported that there were not able to change the viewing distance between themselves and the artworks. This felt unnatural and rigid to them, as typically, in a real-world setting, they would tend to move to gain different perspectives on the work, i.e. stand further and then move closer to the work. In addition, users also expressed that a zoom-in feature was needed, as they it would enable them to study the materials and certain aspects of the work, enlarged.

P7: But when I go to a (physical) gallery, how is it? Usually, if I go (to physical gallery) sometimes I look (at an artwork) from afar, and then try to interpret. And then I will do near (to see the painting up close).

P6: I don't get the satisfactions when viewing some of the artworks. For some artworks you really have to have a closer look to see and appreciate what the artist did, how they layered the colors, how they layered the things, you know, mixed media, like in mixed media. So, we know what kind of media they used. But when I can't zoom in, I feel a little bit frustrated.

P4: Hm...and I think it's like with some of the paintings, [...] you know paintings are very like textural. [...], I think you can't really get that textural feel if you are not in there personally. Like you're not there physically. You can't really see, like the texture and how certain texture...off the paper sort of thing, are off the canvas. So it's like virtually you can't just replicate.

4.3 3D Online Gallery Versus 2D Online Artist Portfolio

After the participants ended their 3D gallery visit, they were asked to view the artworks of a textile and paint artist on a web portfolio. The same interactions occurred in a 2D website, where the participants switched between navigating the website, viewing, and

interpreting the artworks, and reading. In all cases, browsing a 2D website was faster than navigating a 3D gallery. However, the participants felt that the viewing experience was a less explorative, and even compared it to the interactions they had with viewing their phones' photo gallery, Instagram, reading a book or just browsing a website. Hence, although navigation was found to be easier on a 2D website, a 3D virtual gallery provided more values even though it took more effort to navigate.

P3: ...the purpose is to have similar experience as though as we are in an art gallery. If I am to see for example this particular photo gallery. I might as well go to Instagram I can scroll through the Instagram and see the photos. But the experience of actually going into a virtual art gallery [...]. So, I find it's different because if you want to see photos you can just, photos, even photos on Instagram have captions.

P5: In terms of navigation the (2D online portfolio) is easier, but the sense of being in a gallery, the (3D gallery is better).

4.4 Lack of Dimensionality

When a tangible, 3D sculpture in the real-world was represented in a flat, still 2D image online, some participants had difficulties in deciding an artwork was a painting or an image of a sculpture. This was due to the lack of dimensionality that images depicted. This was true for both the 3D gallery and the 2D online portfolio, where participants only identified the materials of the artworks by reading the description of the work. In some cases, participants had zoomed into the photos, but they still could not clearly identify the texture.

P1: Ah, it doesn't look like fabric here...so if I go nearer [zoom in on 3D model]. Maybe this 3D model, has to be more real I think...because the woods, I can see the woods, but to say, fabric, I don't know, maybe I will say that this thing looks like a banner or plastic.

P9: So it's not really a canvas painting. They are actually, textile, put them together. So, so what I'm seeing here is not really paintings. I thought they were paintings. So sorry... But I don't know, I kinda like (their) work.

4.5 Internet Connection

Half of the participants reported that they had experienced slow internet connection at some point during the online gallery tour, which affected the overall experience. Typically, in this setting, fast internet connection is needed to be able to fully enjoy a 3D online gallery. Viewing the 2D online artist portfolio required significantly less internet bandwidth but provided lesser visual support. Most participants agreed that that they preferred 3D gallery but acknowledged that a good internet connection was imperative.

P2: I prefer the [3D gallery]. Because even though...for a (3D Gallery) we need a strong internet connection. When the internet connection is stable than we don't experience lagging when we want to rotate, move forward or backward.

P9: I personally would prefer the virtual art gallery because it, because it made me go round [chuckles] to view...but...at the same time, it also depends on your speed connection et cetera. So, if connection speed is an issue, I would prefer the (2D artist's portfolio).

4.6 Information Scarcity

Half of the participants also expressed that they wanted more information to be provided in the 3D Gallery, in addition to the descriptions provided e.g., artist's name, title of the work, media used, and the size. One participant suggested to have an e-catalogue available, comparing the 3D virtual gallery experience with visiting a physical gallery where catalogues and brochures were common.

P4: So, I think one thing that's sort of missing from, if I compare my experience then and my experience now, it's like I think one is like, what is lacking from this sort of gallery viewing right now is, like each painting like for example, like this one, it doesn't necessarily have a lot of like information on the painting itself.

P1: Because, like when I go to, like the National Art Gallery, there is a bit more description. Who made it? And what are they trying to convey.

5 Discussion

There are two main contributions of this paper – (1) the theoretical discussion on the loss of embodied meanings in the digital representations of some forms of artworks; and (2) the general guidelines in designing an online gallery. The results show that users focused more attention on navigation in a 3D gallery compared to in a 2D website. Although navigating a 3D gallery requires more effort, and the experience can be hampered by a slow internet connection, the participants perceived values in the ability to explore a 3D space. Our work replicated the findings by Kim and Hong [9] which demonstrated that visitors of 3D galleries relate their experience of a 3D world to navigation and manipulation, while browsing a 2D website is like reading a book.

Our findings brought up the theoretical discussion on the loss of embodied meanings in the digital representations of some forms of artworks [17]. Argue that digital representation of a physical exhibition cannot replicate the “aura” of physical works and space. We agree with this view, perhaps, there is something special in being able to see the real thing. However, some forms of arts do not need the “aura of physicality” and can be translated into digital forms better than others, e.g. movies, songs, books, and dance performances. We argue that how well an artwork translates from one medium to another depends on how well its embodied meanings can be translated across media. For instance, a story can be told orally or written in a book. In a book, some aspects of storytelling, such as the orator's voice, tones, and inflections are missing, but the essence of the story, which is embodied in the language, is not lost.

On the other hand, for physical art artefacts, such as paintings, sculptures or installations, the meanings of such artworks are embodied in their materiality, e.g., strokes of a brush, textured patterns on the canvas, etc. As we have shown in our findings, our participants tried to interpret the artworks they saw in the 3D gallery and the 2D online portfolio. This is in line with Grayling's art function to elicit response [23]. However, the response in the audience cannot be completed because the embodied meanings of the artworks in their texture and materials are lost when converted to 3D representations or photographs. This is similar to the findings in the research by Wolf, Reinhardt and Funk [24], which compares user experience of a physical exhibition and a VR version of the exhibition. It was demonstrated that the ability to zoom into digital artefacts is

important in order to ascertain the materials of the artwork from the 3D representations and make the experience feel similar to visiting a physical exhibition.

As a general guideline, several design considerations for the development of an online gallery are drafted from the results of this study. This includes:

- Better navigational control.
- The flexibility in adjusting the viewing distance of the artworks.
- The ability to zoom in on the artworks.
- Stable internet connection
- In-depth information relating to the artworks and artists.

6 Conclusion and Future Work

In conclusion, we have conducted a pilot ethnomethodology study on viewing 3D models of physical artworks in a 3D virtual gallery and photos of artworks in 2D online artist portfolio. Using the think aloud protocol we were able to elicit rich accounts that reveal how our participants experience online exhibition. We argue that physical artworks' meanings are embodied in their materiality and texture which do not translate well in 3D models and in photographs and hence disrupt the process of response elicitation that artworks can evoke. Therefore, it is expected by providing the ability to zoom in to see the texture, in addition to stable internet connection and flexibility in controlling the navigation and viewing distance, a better and improved user experience when viewing online exhibition will be formed. In the future, we plan to use the findings from this research to form participatory design with a curator, artists, and audiences to design an online art exhibition.

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