

Article

The Silent Researcher Critique: A New Method for Obtaining a Critical Response to a Holographic Artwork

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Abstract: The purpose of this article is to provide a plausible answer as to whether the Z-axis of holographic space can be used to depict a chronological narrative with an affective impact. This article describes a practice-based holographic arts study in which the author created interactive artworks with family photographs taken from the late 1800s to the present day, and stacked them in chronological order within the Z-axis of holographic space. The artworks were evaluated by different audiences to determine whether the viewer could perceive the new application of holographic space, and whether the artwork had an affective impact. An art critique method used both in Higher Education settings in the UK and in professional art practice, was adapted as a research tool for use in this study and termed ‘the silent researcher critique’. The findings of the project were that audiences had a new experience when interacting with the works and were impacted emotionally by them, however only a group of experts in art and holography were able to identify and comprehend the new conceptual use of the Z-axis of holographic space. This study’s value can be measured by its offering practice-based arts researchers a novel method of obtaining valuable critical feedback from peers and by its contribution to the aesthetic development of the medium of art holography.

Keywords: holography; holograms; digital animated hologram; holographic space; practice-based methodology

1. Introduction

Artists began working with holography as soon as the new medium became available in the late 1960s, attracted by its unique spatial and temporal characteristics (Benyon 1969; Nauman 1968). Holographic space was defined graphically by Pepper (1989, p. 298) depicting the spaces in which a holographic image can appear: behind the holographic plate; floating in front of the plate; or crossing the image plane. Holography can not only enable the artist to choose where to place an object in space, but it can appear to freeze or capture time and show different moments in time situated in the same space (Dawson 1999). These different spatial and temporal characteristics, along with the verisimilitude of the subject matter depicted, have resulted in emotional responses from audiences, particularly those encountering the medium for the first time, who express amazement and disbelief at what they are seeing (Benyon 1980).

This paper describes a practice-based Ph.D. study by the author which produced a body of holographic art work using holographic space in a new way to represent a virtual time-line. Practice-based research within academia relies on the production of a new artefact, or artefacts, and is accompanied by a written argument proving that the work provides a contribution to knowledge (Candy 2006). As is typical of a practice-based research methodology, the author took on many roles during the research process. Gray and Malins have described the role of the researcher in this methodological approach as being three-fold:

- a generator of the research material-art/design works, and participant in the creative process
- a self-observer through reflection on action and in action, and through discussion with others
- an observer of others for placing the research in context and gaining other perspectives. (Gray and Malins 2004, p. 21).

The author's research questions asked: could interactive artworks be created to depict a chronological time-line in space, with images farther back in the hologram representing a period further back in time? Could this new use of holographic space be perceived by an audience, and could the artwork move an audience emotionally, beyond a sense of amazement and disbelief and toward a sense of connection with the work. The artwork produced was interactive, relying on the movement of the viewer to create the four-dimensional image as a result of their interaction. As the viewer was part of the artwork, and the audience's perception of the work was required to answer the research questions and it became necessary to obtain feedback from the viewers themselves. A critique group consisting of the author's peers was used to gain feedback of the artwork produced in the study. The critique was novel in that the author was asked questions about the artwork by the group, but remained silent in response. The process and rationale for the approach is described further in Section 3.

A description of holographic space and time is outlined below and followed by an account of the research methods used in the study. These methods include both the production of new artworks and a critical evaluation of their impact on audiences. This article also includes the results of the study in the form of a description of the holographic artworks produced and an analysis of the artwork by a critique group.

2. Holographic Space and Time

While Pepper defined holographic space to include both the area behind the plate and the area between the surface of the hologram and the viewer (Pepper 1989), it has since been argued that holographic artwork can include other spaces. In this journal, Jacques Desbien describes the 'dispositif' of holography to involve:

... the wall, room, ambient light, the specific optical characteristics and also the viewer. (Desbien 2018)

Other spaces which can be included in the artwork are psychological and conceptual spaces: Richardson (1992) noted that holographic portraits can push or break the proceptive boundary of the viewer, entering their personal space when the holographic image escapes the frame of the hologram. In her Ph.D. thesis, Mrongovius (2011) describes the affective impact holograms can have causing physical responses in the viewer who is compelled to move to animate the holograms. Artist and holographer Isabel Azevedo has included time, as well as space, within her description of her animated digital holographic artworks (Azevedo et al. 2014). There is a performative element in Azevedo's artwork which includes not only the time taken to view the hologram, but also the time taken for preparation of the artwork, the performance captured in her hologram and the printing of the hologram.

The author's own artwork aimed to build further upon the psychological and conceptual spaces described above to depict a chronological narrative within the Z-axis of holographic space and include the viewer.

3. Research Methods

The author used a variety of different methods to create artworks and to evaluate them. Lenticular images, analogue shadowgrams and a digital animated hologram were produced as part of the study and exhibited to audiences. The analogue holograms were produced with a Helium Neon laser and split beam one step reflection holography process in which light passes through a transparency mounted on a ground glass screen and is recorded on holographic film. The digital image was

produced from scanned photographs and a digitized edited video used as textures on plane objects in a Cinema4D software programme. The animation was output to 2000 jpeg images and printed by Geola, a holographic digital printing manufacturer. The manufacture process which created these works is beyond the scope of this article but is covered at length in the author's Ph.D. dissertation ([John 2018](#)).

Evaluating Audience Experience

It is impossible to directly observe the inner feelings of the audience ... being able to explore the "interaction space" involves some form of evaluation with audience cooperation. ([Edmonds 2010](#), p. 2)

The author considered the use of typical methods used to evaluate interactive art: log-data, video footages, interviews, and questionnaires ([Morreale and De Angeli 2015](#); [Morrison et al. 2007](#)), audience observation ([Bech 2014](#)) and self-evaluation ([Mrongovius 2011](#)). The author chose the following methods as the most appropriate for the type and number of viewers surveyed: paper-based questionnaires and on-line surveys; observations of the audience interacting with the artwork, self-evaluation of interaction with the artwork and lastly a silent critique group in lieu of interviews. The silent critique method was introduced to the author in 2014 by the facilitator of an informal contemporary artists networking group called 'Questions'. The Hampshire-based group met monthly to critique each other's work, helping to develop each other's professional practice. While the 'silent student critique' is common in Higher Education ([Elkins 2014](#)), the silent critique method had not previously been used in art holography research to obtain feedback on interactive artworks.

A small group of three artists working in film and mixed media analysed and evaluated the author's artwork (including the works shown in Figure 1a,b below) during a critique session held on 13 October 2014. While this appears to be a very small sample size, the Social Scientist Anthony Onwuegbuzie describes this limited number of participants as an acceptable number for a mini-focus group if participants have specialist knowledge ([Onwuegbuzie et al. 2009](#)). The group met and responded to the artwork for one-and-a-quarter hours. An audio recording was made of the session by the organiser and the discussion transcribed verbatim by the author as recommended by [Elkins \(2014\)](#). The second critique group was composed of a different audience; nine experts in art and holography. The criteria for the selection of the experts in art and holography included those with doctorates; doctoral candidates; long-standing or award-winning artists working with holography; and university or college teachers working in art and holography. Volunteers were sought during the International Symposium on Display Holography in Aveiro, Portugal (ISDH2018) and three men and six women agreed to help. Two of the nine members of the group had English as a second language.

The critique group met with the author at the Aveiro City Museum where one of the author's artworks was on display as part of the *Art in Holography: Light, Space & Time* exhibition. The author provided transport to and from the symposium to the museum and provided refreshments after the critique session.

The author introduced the group to the silent researcher questioning process. She requested that participants ask her questions about the artwork presented and explaining that she would consider the group's questions very carefully, but not answer them during the session. The structure of the silent critique session was largely unfamiliar to the participants, and at times they found it difficult to phrase their comments as a question. It proved almost impossible for one researcher who did not speak English as a first language; however, it was unclear whether it was a language barrier that prevented the person from doing what had been asked of them. Despite being asked to address questions to the researcher only, the group did discuss the work with one another on occasion. The silent critique group differed from a focus group in two ways: firstly, the researcher was silent during the session and was therefore unable to guide participants to answer research questions which would have been more typical in a focus group. Secondly, in a focus group, discussion between group participants would have been encouraged, however in the silent researcher critique participants were encouraged to address the researcher only not each other (however, in practice this was not always the case).

The session was filmed and audio-taped. The filming enabled a better understanding of artists' views through observation of their body language and gestures, which became an important part of one participant's method of communication as English was not their first language. Filming and recording were done by the author's fellow researcher Tove Dalenius.

As the study included participants, it required and obtained ethical approval from the Art, Design and Humanities Faculty Ethics committee of De Montfort University. The author used archival images from her own family in which individuals are identifiable. Permission was obtained from family members to use their photographs, film footage and precious objects in the artwork and to retain the photographs indefinitely. Other areas of concern regarding the ethics of the study included: the gathering of information from or/and about human beings through on-line questionnaires; observation of human behavior, and the recording of focus group (critique) sessions. The critique session participants were notified of the following in an introduction:

- that recording equipment would be used and that the discussions were to be transcribed
- that anonymity was strictly preserved,
- to whom the information they gave would be supplied to and the purpose for which it would be used
- that their co-operation in a research project was entirely voluntary at all stages
- that the film and audio recording of them was to be destroyed after five years.

Participants signed forms to agree to take part in the research process. All the participants were given the author's contact details and were made aware of how to see the results of the research process. The comments of the participants were anonymised and each contributor was assigned a letter of the alphabet to distinguish their remarks from one another.

The process of evaluation using the silent researcher critique method resulted in a wealth of qualitative data, which was coded, and themes generated and analyzed using a simple general inductive approach. The purpose of the inductive approach was "to allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data" (Thomas 2006). The transcribed text was read carefully a couple of times to identify themes and categories and this enabled the author to make links between the evaluation aims and the results from the raw data. NVivo Qualitative data analysis software was used to speed up the coding process with evaluation objectives providing a focus for the analysis. To help with creating codes and themes Dalenius, was trained in rudimentary social science methods and assisted with the holography critique.

4. Results

The results below include a description of the artworks produced, and the results of the evaluation of the works by the critique groups with a focus on the last critique. Photographs of the animated three- and four-dimensional images are shown below for illustrative purposes only as it is very difficult to visualize these artworks in two dimensions. Figure 1a,b are of the monochromatic analogue shadowgrams. Figure 1a *Great Great Grandfather* depicts a holographic image of a man, contained within an antique compass, striding along with a walking stick. The image looks to have been taken in the 1940s. The transparent holographic film on which the image is produced is placed on top of the glass protecting the compass needle which is clearly visible beneath it. The image of the walker appears to be sunk beneath the glass existing in the same space as the compass needle. Figure 2b depicts two portraits of the same woman 50 years apart. A transparent hologram of a photographic portrait taken in the 1940s sits on top of a digital photographic portrait. The earlier holographic portrait is sunk beneath the surface of the later photograph.

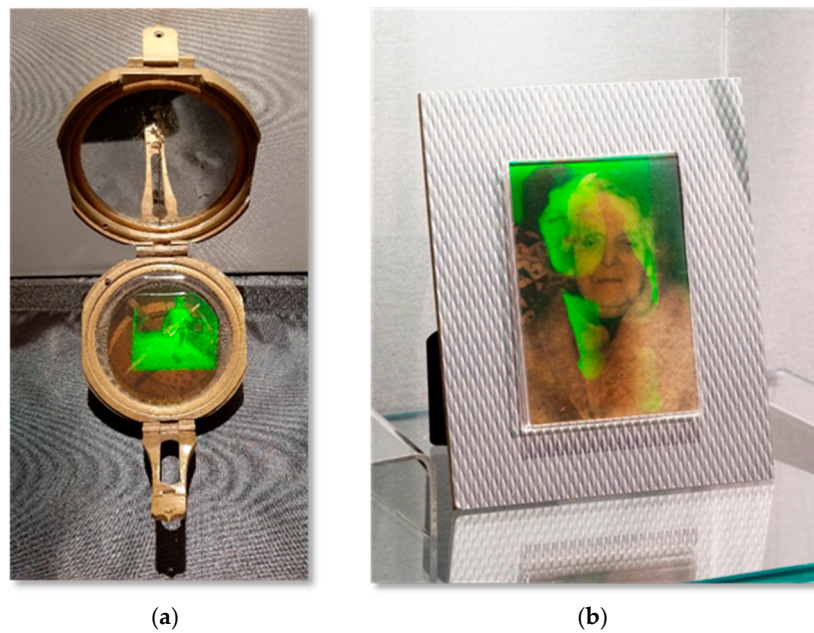


Figure 1. (a) *Great Great Grandfather* 2014, mixed media with reflection hologram, 8 cm × 20 cm, P. John and (b) *Great Grandmother*, 2014, mixed media with reflection hologram, 12.7 cm × 15.2 cm, P. John created and photographed by the author.

The first two holograms in Figure 1 *Great Great Grandfather* and *Great Grandmother* were shown to both the small group of contemporary artists working in film and media in 2014 and to the group of experts in art and holography at ISDH2018. To see the holograms, the viewers had to move the artworks around in order to illuminate the embedded holograms at the correct viewing angle. The comments from the artists focused more on the emotional impact of the work and of the medium, rather than the content of the holograms. The artists were unable to determine differences in the depth of holographic space used in the works. As a result, the author chose an audience of experts in art and holography to evaluate the last artwork produced in the study.

Passing Time, Distant Memory shown below in Figure 2a,b was created during the very last phase of the study and critiqued by the art and holography experts only. The digital animated hologram was hung and lit as part of the exhibition in City Art Gallery, Aveiro, Portugal. As the viewer moves laterally in front of the hologram from left to right, the photographs swing in an arc to show spaces and distances between them; the images on the left become obscured by those on the right-hand-side as if the photographs were solid. The images farthest from the viewer on the left-hand-side of the image depicted older photographs and these were sunk deeper within the Z-axis of holographic space. The image, an animated video on the far right-hand side was the most recent. Seven seconds of footage taken from a wedding video were edited to produce an animation in which the bride is shown to speak and laugh as the viewer moves. The video sits on a virtual surface which projects in front of the image plane of the hologram, protruding into the viewer's space.



Figure 2. (a) First view of *Passing Time, a Distant Memory*, 2018, digital animated hologram, 65 cm × 25 cm, P. John. (b) Second view of *Passing Time, a Distant Memory*, 2018, digital animated hologram, 65 cm × 25 cm. Produced and photographed by the author.

The purpose of the final silent researcher critique was to determine whether the audience could perceive and comprehend the concept that the Z-axis of holographic space depicted a chronological narrative; whether the viewers had a new experience in viewing the work; and whether it had an affective impact. The results demonstrated the following: that the experts thought that the artwork was novel; depicted images and memories within holographic space in a new manner; and had affective impact. They described their experience of the work as follows:

“A new way to present the past.” (Expert I); “You are sinking memories into holographic space.” (Expert G); “I felt sad when I looked at the image.” (Expert A).

The audience of experts recognised that they were part of the time-line and that the Z-axis of holographic space included their own present time and space:

“... if we’re thinking we’re dealing with a timeline are we were part of that line by viewing the work?” [Laughter] (Expert B); “Okay. I mean it’s about this moment. It’s about this very particular moment.” (Expert D).

The experts discussed different concepts of time inherent in the work they were shown and included their felt experience of time and the concept of linear time.

One of the study’s aims was that the work should have an affective impact. During the silent researcher critique, participants reported feeling sadness and nostalgia. However, as the critique

continued enabling people to talk without discussion, other emotional responses to the works became evident: there was slight discomfort, and then when the group broke the ‘no discussion’ guidance there was disagreement. Two experts expressed that they distrusted that the family history included in the artwork was authentic. A sense of tension during the silent researcher critique was relieved with laughter when there was a suggestion by one expert that the family in the artwork was not actually the author’s and that the narrative presented as authentic was fictional. Another area of discomfort was due to three of the art and holography experts disagreeing with one another regarding issues of metaphysics and physics. Two participants shared concepts of objects containing memories, or the essence of the person that they related to. One art expert jokingly said that the objects contained ghosts, and another, whose training had been rooted in science, firmly disagreed. Two contemporary artists in the pilot ‘Questions’ session evaluation had discussed the same concepts of objects containing memories; however, the research artefacts did not contain the author’s memories; most of the photographs included in the artworks were taken before the author was born. Instead, the photographs suggest memories, someone’s memories.

5. Analysis

This section analyzes both the artworks produced, and the silent researcher critique method used to evaluate audience experience of the artworks. The holograms all used the Z-axis of holographic space to depict different time periods. Images were sunk into the depth of holographic space to show a period further back in time as illustrated in Figure 3 overleaf. The dotted red line depicts the present moment, the space behind the holographic image plane depicts the past and the space between the plane and the viewer depicts the present.

Experts in art and holography were able to determine how the Z-axis of holographic space was being used to depict different time periods and a chronological narrative.

The artwork had an affective or emotional impact on its audience, causing viewers to move physically to view the works and interact with them, and declare an emotional response, beyond that of mere wonder. Those unfamiliar with holography more readily expressed their emotional responses.

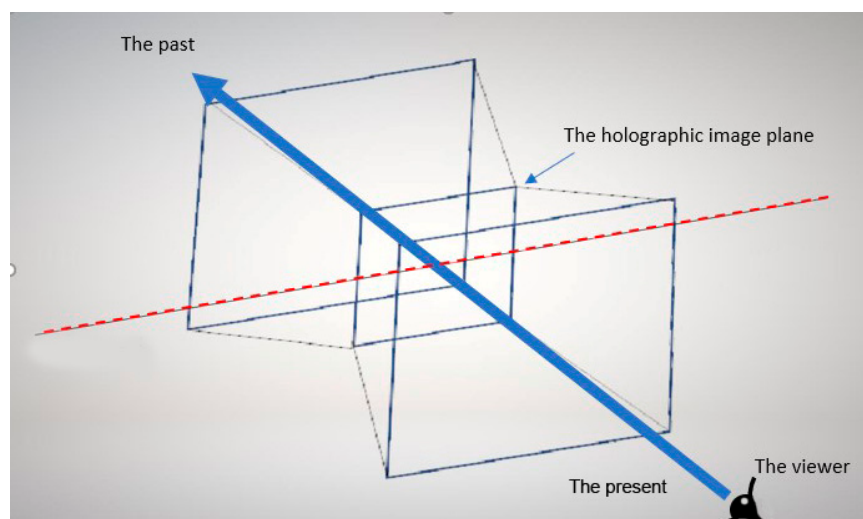


Figure 3. Depiction of holographic space including the Z-Axis marked with an arrow to delineate the structure of a chronological narrative. Illustration by the author.

The benefits of using silence during both critique sessions were evident in that members were given the opportunity to finish their thoughts when the researcher did not answer back, and when posed as a question, participant comments were carefully considered and formed. Silence is recognised to be a useful interview tool when used by a facilitator, enabling the participant to complete their response (Lerpiniere 2015). The silent researcher critique method avoided the need of either participant

or researcher to feel defensive in preparing a response and the researcher was able to concentrate on listening. The process enabled a depth of engagement between the artwork, the researcher and the participant in the critique. Lastly, the process ensured that the viewer was in control of describing their experience, even if it did not relate to the evaluation aims and this was both a benefit and drawback of the method. The researcher was unable to steer the discussion if evaluation topics relevant to the aims and objectives of the project were not being covered, as is possible with a focus group.

It could be argued that the length of time for the second critique of 25 min was too short: In his *Art Critiques: A Guide*, Elkins (2014, p. 27) describes appropriate timings and structure for a critique; which has, he argues, a recognisable start, finish and end: “A very simple reason why some critiques don’t make sense is that they are too short. Even an hour can be barely enough to get acquainted with an artwork.” However, the critique did make sense despite being limited because the experts in art and holography were already acquainted with the artwork having seen it on display previously and Elkin’s critique structure also describes a situation between a teacher and students, while participants in this research process were all experts. The shorter critique length did not prove problematic as there was no sense that the session was unfinished, the questions from participants came to a natural end.

Other potential limitations of the evaluation process were more general: Social Scientist David Thomas points out that the interpretation of qualitative data is influenced by the evaluators:

“Inevitably, the findings are shaped by the assumptions and experiences of the evaluators conducting the study and carrying out the data analysis.” (Thomas 2006, p. 240).

The author learned basic evaluation methods used in social science to ensure a robust approach, and Delanuis checked both the transcript and the coding produced by the author as a result.

Overall, the silent researcher method proved a valuable method of obtaining thoughtful feedback from peers in a concise, efficient manner.

6. Conclusions

The research questions asked during this study were answered: the new artwork described above was able to use the Z-axis of holographic space to depict a chronological narrative; the new use of holographic space could be determined by an audience of experts in art and holography and the artwork had an affective impact on all the audience groups surveyed. The silent researcher critique proved a suitable new method to determine that research goals were met, and it will be used by the author when appropriate to evaluate the success of future artworks and exhibitions. The silent researcher critique may also benefit other practice-based researchers who need to obtain feedback from peers. A summative evaluation of audience experience was a necessary part of the research process both because the viewer produced the interactive artwork through their movement in front of it, and because their personal experience was needed to determine that the research goals were met and a contribution to knowledge confirmed (Edmonds 2010). The use of holographic space was perceived and described as novel by experts in art holography and it can therefore be argued that the research, which included both the production of new artworks and accompanying text, has contributed to the aesthetic development of the medium of holography.

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References

- Azevedo, Isabel, Richardson Martin, Elizabeth Sandford-Richardson, Luis Miguel Bernardo, and Helder Crespo. 2014. The Place for Performance in the Digital Holographic Space. Paper presented at Practical Holography XXVIII: Materials and Applications: SPIE OPTO, San Francisco, CA, USA, February 1–6; Volume 9006, p. 90060N.
- Bech, Tine. 2014. Playful Interactions: A Critical Inquiry into Interactive Art and Play. Unpublished thesis, University of the West of England, Bristol, UK.
- Benyon, Margaret. 1969. *Interference Pattern Box* [Laser Transmission Hologram]. Available online: <http://www.jrhologcollection.com/index.php/margaret-benyon/item/81-interference-box> (accessed on 19 September 2013).
- Benyon, Margaret. 1980. *Phases: A Twelve-Year Retrospective of the Work of Margaret Benyon: 11 October 1980–14 January 1981*. New York: Museum of Holography, pp. 10–11, 21.
- Candy, Linda. 2006. *Practice Based Research: A Guide*. Sydney: Creative & Cognition Studios. Available online: <https://www.creativityandcognition.com/> (accessed on 19 September 2013).
- Dawson, Paula. 1999. The Concrete Holographic Image: An Examination of Spatial and Temporal Properties and their Application in a Religious Art Work. Unpublished Ph.D. thesis, The University of New South Wales, Sydney, Australia.
- Desbien, Jacques. 2018. The Dispositif of Holography. *Arts* 8: 28. Available online: <https://www.mdpi.com/2076-0752/8/1/28/htm> (accessed on 19 July 2019).
- Edmonds, Ernest. 2010. The Art of Interaction. Paper presented at the 'Create 10' 2010 International Conference on The Interaction Design, Swindon, UK, June 30–July 2; British Computing Society. pp. 5–10. Available online: https://www.bcs.org/upload/pdf/ewic_create10_keynote3.pdf (accessed on 22 January 2018).
- Elkins, James. 2014. *Art Critiques: A Guide*. Washington, DC: New Academic Publishing, p. 62. Available online: https://www.academia.edu/3315720/Art_Critiques_A_Guide_second_edition_chapters_1-7 (accessed on 19 July 2019).
- Gray, Carole, and Julian Malins. 2004. *Visualising Research: A Guide to the Research Process in Art and Design*. Aldershot: Ashgate Publishing, pp. 20–21.
- John, Pearl. 2018. Temporal and Spatial Coherence: Chronological and Affective Narrative within Holographic and Lenticular Space. Unpublished Ph.D. thesis, De Montfort University, Leicester, UK. Available online: <https://www.dora.dmu.ac.uk/handle/2086/18127> (accessed on 9 September 2019).
- Lerpiniere, Claire. 2015. The Textile Archive: Curating Personal Histories and Family Narratives. Ph.D. thesis, De Montfort University, Leicester, UK. Available online: <http://hdl.handle.net/2086/11438> (accessed on 18 July 2019).
- Morreale, Fabio, and Antonella De Angeli. 2015. Evaluating Visitor Experiences with Interactive Art. Paper presented at the 11th Biannual Conference on Italian SIGCHI Chapter, Rome, Italy, September 28–30; pp. 50–57. [CrossRef]
- Morrison, Ann J., Peta Mitchell, and Margot Brereton. 2007. The Lens of Ludic Engagement: Evaluating Participation in Interactive Art Installations. Paper presented at the 15th ACM International Conference on Multimedia, Augsburg, Germany, September 25–29; pp. 509–12. [CrossRef]
- Mrongovius, Martina. 2011. The Emergent Holographic Scene: Compositions of Movement and Affect Using Multiplexed Holographic Images. Unpublished Ph.D. thesis, RMIT University, Melbourne, Australia.
- Nauman, Bruce. 1968. *First Hologram Series: Making Faces* [Laser Transmission Holograms]. LACMA Collection. Available online: <https://collections.lacma.org/node/2113767> (accessed on 5 March 2018).
- Onwuegbuzie, Anthony, Wendy Dickinson, Nancy L. Leech, and Annmarie G. Zoran. 2009. A Qualitative Framework for Collecting and Analyzing Data in Focus Group Research. *International Journal of Qualitative Methods* 8: 1–21. Available online: http://research.apc.org/images/2/2f/A_Qualitative_Framework_for_Collecting_and_Analyzing_Data_in_Focus_Group_Research.pdf (accessed on 9 September 2019). [CrossRef]
- Pepper, Andrew. 1989. Holographic Space: A Generalised Graphic Definition. [illustration]. *Leonardo: Journal of the International Society for the Arts, Sciences and Technology. Holography as an Art Medium* 22: 298. Available online: <http://www.jstor.org/stable/1575382> (accessed on 29 September 2017). [CrossRef]

- Richardson, Martin. 1992. The Invisible Engineering of Holographic Illusion. Paper presented at the Holographics International '92, 1992 Conference, London, UK, July 26–30; Volume 1732, pp. 444–46. Available online: <https://vimeo.com/46436335> (accessed on 19 March 2019).
- Thomas, David. 2006. A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation* 27: 237–48. [[CrossRef](#)]



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