Meaningful Engagement:
Computer-Based Interactive Media Art in Public Space

Jiun-Jhy Her and Jim Hamlyn

Gray's School of Art, The Robert Gordon University, UK
{j.her,j.hamlyn}@rgu.ac.uk

Abstract. Interactive technologies, including electronic devices are increasingly being utilized as a medium for artistic expression and have been placed in freely accessible public environments with mixed results. When audiences encounter computer-based interactive media arts in a public space they are drawn by various interactivities, to play and experiment with them. However, whether the audience is able to gain a meaningful experience through those physical interactivities has remained an issue of both theoretical and practical debate. This paper will focus on these aspects, most specifically through the study of interactive art in freely accessible public space. The author proposes four new conceptual/analytical tools for examining the subject. It is anticipated that this paper will provide possible alternative strategies for both artists and art researchers in this field with a purpose to enhance intellectual engagement with their audiences, so as to succeed in leading interactors to obtain meaningful experience and rewards.

Keywords: Interactive Art, Media Art, Public Art, Meaningful Engagement.

1 Introduction – The Research Background

'Interactive art is said to be 'created' by the people engaged in the active experience of it' [1].

The research has drawn upon both the allure and the awareness of issues of the subject. The allure of interactivity and the dynamics of computer-based interactive media arts, which often actively grasp the attention of audiences with its diverse presentations, in contrast to the conventional ways of viewing art, this active participation is often encouraged as an artistic input so as to obtain meaningful experiences and reveal the artistic intent [2]. Since the 1990's there has been a growing study of aesthetic and emotional experiences in the area of computer-based interactive media art research (Edmonds and Graham et al) [3], [4]. Artists and art researchers have been investigating the interface of these media arts in an attempt to reveal forms which engage audiences. Various strategies for engaging audiences have been developed. 'Playfulness' might be considered one of the most viable tactics that is often employed as the main ingredient as for an initial engagement as well as being a catalyst to arouse subsequent more meaningful experiences (Polaine and Moggridge et al) [5], [6]. In addition to this, others have been proposed by the author, which include: Dominance Transfer, Mind Orientedness and Accessible Challenge, all of which have been examined to some extent by previous research, the pilot and field studies which will be discussed further in the following sections.

2   The Pilot and Field Studies

In order to establish the scope for further research and tests for the viability of the research methodology, an experimental interactive installation was made and a pilot study conducted. The work "Event Horizon" is a screen based interactive installation, which is equipped with an infrared-sensor as means of detecting the audiences' presence. The image patterns of the work changes randomly and dynamically and is triggered by the audiences' movement. The pilot study was conducted in The Robert Gordon University, in a public hallway of the Scott Sutherland School; it is one of the major thoroughfares that leads to both the main exit and lecture rooms in the building. The criteria for choosing the pilot site were: 1) It must be a mundane and non exhibition space 2) Is accessible for everyone 3) It is a major route for everyday use.
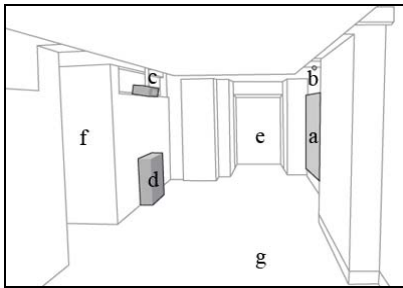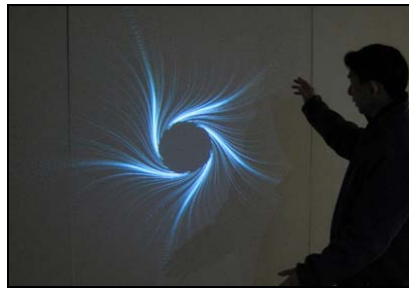

Fig. 1. The pilot site   **Fig. 2.** Event Horizon

Fig 1. Label Descriptions			
a. Screen	b. Infrared-sensor	c. Projector	d. Computer and speakers
e. To the atrium	f. The elevator	g. To the lecture theaters	

The first field study was carried out in Taiwan, Kaoshiung County, Fongsan West (Mass Rapid Transit) station. A phoenix shaped computer-controlled interactive installation was made from articulated stainless steel pipes, which were hung beneath the ceiling inside the station near the exit one. The form of the installation symbolizes the legend of Fongsan City (Fong Sang in Chinese means Phoenix Mountain). The streamlined phoenix shaped installation resembles Chinese calligraphy, and is not only made for reflecting the cultural value but also with the purpose to elicit affection from the passengers toward their hometown. Several stainless maracas are attached to the end of the pipes. The sound of maracas is triggered when the passengers pass underneath it.

Ethnographical approaches were employed in both studies that included non-participant observation and semi-structured interviews with the audiences and passengers concerning their physical reaction and sensory responses with the art installations. Thirty research questionnaires were issued at the conclusion of the verbal interviews for the pilot study of which twenty were retrieved at the end. In consideration of any ethical issues and with regard to the efficiency of the interview process, a digital voice recorder was utilized as a major research data collecting tool. This methodology was applied to research gathered from passengers at the Fongshan West MRT station, of which ultimately fifteen passengers were interviewed.

Fig. 3-4. The field study site (Fongsan West MRT station)

2.1   Initial Findings

The sounds and image patterns of the works were constantly changing as people passed the installation, and as such it did not require any active physical intervention to trigger an initial interaction; the installation instantly gained people's attention in the hallway. The same response to the installations acoustics' was also identified during the field study at the Fongsan West MRT station. As the interactors realized that they were the stimulus to trigger the interaction, they instantly became involved, and enjoyed this 'creative authorship' [7]. Within the retrieved questionnaires from the pilot study, ninety-five percent reported that the interactive effect stimulated their curiosity and thought the shifting sounds and image patterns, which were not repeated, kept their attention and made them want to explore and try to understand how it worked.

While the majority of interviewees reported initially being mainly attracted by the sound of the installation, they were then subsequently curious to ascertain the meaning of the artwork. Ninety percent of interviewees indicated that they were trying to discern how the installation worked and actively interacted with the installation. They waved hands, shook feet, moved back and forth, and some even danced in front of the installation with the goal of trying to manipulate the changing the image patterns. During the pilot study, an interviewee (A1) was asked about his thoughts when he first saw the installation, he wrote: "Aroused and helped brighten what was a grey boring day, and even helped for a moment to think about different happy thoughts and possibility it would be song as I could dance to"[sic]. This is in contrast with the first field research site where none of the physical reactions mentioned above were exhibited by passengers.

When the interviewees were asked what they felt when learning that their movement triggers the changing of the patterns, nineteen people gave positive responses ("excited" and "interested") and some even responded that the interaction had encouraged discussion between their friends. Though the passengers from the Fongshan West MRT station were not seen to be as active as those from the pilot study, they all gave positive responses. Some of them discussed the audible interaction with their friends too. In spite of the two different forms of presentation between "Event Horizon" and "The legend of the Phoenix", the finding from both research studies were very similar in a number of respects: for instance, the non repeated sounds succeeded in engaging the audiences initially, and together with changing patterns this evoked interactors' curiosity so as to lead to further explorations.

Despite this success, there are two issues which must be mentioned here: 1) Both art installations were installed in fairly quiet surroundings, which means the audiences were able to hear the sounds produced, however, these sounds might not be audible at other busier stations or bustling spaces e.g., the Taipei Main MRT station. 2) Both art installations were new to the environments and in general, people tend to be drawn to new. The interviewees from the pilot study were asked about their thoughts when they first saw the installation, they replied: (A2) "It was a bit fresh to see a piece of art at an unexpected place like that, (Corridor of the Scott Sutherland School)". (B3) "What is this? It was quite strange". (B5) "What is this and why is here and I stop, and read [sic]". However, how long this sense of novelty can be sustained, and whether the interactors will be able to obtain a meaningful interactive experience, remains to be seen. These questions will be discussed further in the following sections, along with other audience's characteristics of engagement.

3   Characteristics of Engagement

3.1   Playfulness

In both research subjects, the interactivities acted as the bait which lured the audience to further play with the art installations. 'Play is a core of human value; even a core of mammalian value, we used an analogy that lion cubs learn to hunt and fight by play together' [6]. By playing, the audiences are urged to participate, to stand closer, and to become involved and even to touch. At this point, they become active players; they question, explore and test the possibility of the art installations. This brings about a child-like state of joy. 'In game-type interactive works, the term player is common' [8].The encouragement of participation is not the sole purpose of the installation; a key function is also to bring about a sense of empathy and to simulate the interactors imagination.

'Playfulness' has been spotted in many computer-based interactive media arts that successfully engaged their audiences in various public contexts, e.g., United Visual Artists' Volume at the V&A (2006) [9] and Lozano Hemmer's Body Movie (2001-2008) [10]. Once the audiences' role becomes that of an active player, they could further become 'an independent causal agent' [11], who might unwittingly take over the stimulus while interacting with the art installations. Their responses could motivate the curiosity of spectators nearby and further influence their behavior. As soon as the interactivity reaches this level the effect is no longer constrained between art installations and the individual but provokes further interaction among people. This is an ideal psychological state, which indicates one has reached a state of 'Immersion, The sensation of being surrounded by a completely other reality, as different as water is from air, which takes over all our attention, our all perception apparatus' [7].

However, not only the result of the state is unpredictable, but it is also delicate. Eisenberg points out 'The fragility of the jamming is evident in that it can never be routinized, habitual, linked to a specific set of antecedents, or necessarily self-sustaining once begun. On the other hand, it is possible to court these experiences and to cultivate the attitudes and expectations that make jamming most likely to occur' [12]. Based on this argument 'Playfulness' may not be the sole functional characteristic and other strategies and processes may be required in order to invoke meaningful experiences.

3.2 Dominance Transfer

This is the power of 'transformation' [7] that is bestowed on interactors. 'Digital narratives add another powerful element to this potential by offering us the opportunity to enact stories rather than to merely witness them' [7], giving the sense of control to the audiences may be another crucial element in arousing interactivity.   Works that have this characteristic are often deliberately designed to function as a charming and hospitable 'host' [13] who invites the guests to the game. In the meantime the space for the guests is given [14] where hearty play is allowed and, in fact, is strongly encouraged.

One interviewee (A5) from the pilot study, who was asked, did the interactive effect of the installation stimulate your curiosity, he reported: "I was fascinated at the way the patterns change. I had to stop severally [sic] trying to figure out what it's all about". Here the audiences do not feel any demand, on contrary they act enthusiastically and actively engage with the art installation. This echos Murray's 'Agency, it is the satisfying power to take meaningful action and see the results of our decisions and choices' [7].

In contrast to interactive installations, Dominance Transfer is not usually sensed in static art forms. 'Traditionally the interaction of the viewer with the work of art has been via looking and respectfully appreciating' [15] under this, the audience is often positioned as inferior to the work and always physically passive [15]. Whereas, the exclusive intellectual and physical hegemony of the artist does not exist in computer-based interactive media art. The host relinquishes dominance to its viewers and gives them conceptual space and a sense of control, whilst 'creative authorship' is shared. Once the audiences perceive interactivities are activated by their physical movements, they will go further and try to manipulate them, at this stage the artist's dominance has been overcome and creativity is shared with the audience.

3.3 Mind-Orientedness

Traditionally aesthetics in general encourage viewers to think about author's intention [16], which usually through visual admiration and contemplation, the action of which is deemed as 'Reading' [15]. To truly comprehend traditional arts requires a high degree of fluency in the artistic techniques and history concerning the work. This is not to say that art cannot be appreciated by the untrained eye, but merely that to appreciate it fully, knowledge is required. In relation to computer-based interactive media arts, the barrier to appreciation is lowered, thanks in part to the themes discussed in the paper, and as such may be accessible more widely than static art forms.

The sound of maracas "The legend of the Phoenix" is activated when the audience enters the reception/exhibition area that instantly attracted the attention of the audience. This installation succeeded in attaining the first goal in this regard, secondly its form reflects a strong cultural value and represents the story of the land, which closely ties to passengers who originate from this area. This generates resonance with the locality. Some interviewees from the field study reported that they can tell the form of the installation resembled a phoenix and that they were interested in finding out the meaning it represents.

Another example of "Metamorphosis" [17] is a holographic artwork installed at C.K.S Memorial Hall MRT Station, Taipei, Taiwan. There are separate 3-D images, e.g. paper airplanes, birth certificates, textbooks, graduation photos, personal identification, wedding

certificates, and near the end an image of a dove flying away. The images are installed from the bottom to the top alongside the escalator leading to the exit. Passengers are engaged as soon as they step onto the escalator. The static holographic images become a slow animation while following the moving escalator. The images represent different stages of life that connect to the people who were born and raised in the countryside and in the city. The sentiment between the country and the passengers is invoked and reflects to the viewers following the movement with their eyesight. These are Mind Oriented characteristics. 'Not relegated solely to self-reflexive aesthetic concerns, artworks increasingly reflected cultural values, responded to political issues, and directly engaged their audiences in critical dialogue of the day'[18].

3.4   Accessible Challenges

An issue that was mentioned at the very beginning of this article: how long can fresh feelings be sustained? In many cases the majority of the audience showed curiosity at the beginning. Curiosity as a widely accepted aspect of human nature can 'act as facilitators of the process of making sense of the objects' [19]. However, this effect usually does not endure. In order to allow the audience to develop their 'Optimal experience' [11], a viable strategy may be to increase the challenge with the intention of prolonging the time of engagement. Challenges and Skills are two indices used for measuring aesthetic/emotional experience. The 'Flow research model' [11] has been adopted by researchers in attempts to decipher the codes leading to engagement in various contexts (Costello, 2005, Forlizzi 2004, Stuart 2005 et al). One of the most remarkable findings is that people give positive reports when challenges and skills are balanced, and when both indices reach a high level, people reported entering the 'Flow', whereas reports showed boredom when challenges and skills lay on a low level [11].

Other indices such as 'use-time' are often used as a reference to indicate the level of engagement (Graham, 1997, Candy, 2006, Brigid, 2005 Ann, 2007 et al). Over time the audience might react to the 'emancipatory effect' [15], which allows the development of thought, imagination or might even produce interpretation. Thus to raise a challenge might be one of the crucial components to extend 'use-time'. However, high challenges in artistic appreciation may become counterproductive. It is understandable that people feel intrigued when they are in charge and able to cope with challenges, whereas they lose interest when things get boring or when there is no foreseeable hope in solving the challenges [6]. Hence an accessible challenge for art themes may be a way to provoke the interest of the audience, tempt them to explore, and lead them to obtaining meaningful experiences. This is where "Intelligent" interactivity may become increasingly important since, in theory, it can respond to different levels of skills and present an appropriate challenge for different interactors.

4   Interactivity in Free Accessible Public Spaces

When art is encountered in freely accessible public space the level of complexity and difficulty is increased, not only concerning the aspects of security, maintenance etc., but also concerning the audience which consists of people who are normally unaccustomed to being intellectually engaged in such a context. Variables related to the

audience might also be more difficult to account for. 'As Harriet Senie asserts, the public is often an "involuntary audience" for public art' [18]. Also as Birchfield argued 'Public art in this scope is housed outside of traditional art settings and is intended to engage a public audience that might not otherwise seek art experiences'[20]. However, by equipping the concepts of functionality and site specifics (Miles, M. 1997, Kaye, N. 2000, Kwon, M. 2004 et al) upon art installations, the tactics have long been considered the antidotes to revitalize the environmental surroundings. Nowadays 'an active interactivity' is also deemed a functional alternative as technology is becoming a mature part of artistic creative professions. Many interactive installations are installed in free access public places and have successfully provoked audiences' reactions and responses e.g. Jaume Plensa's "The Crown Fountain" (2004), Lozano-Hemmer's "Under Scan" series (2005-2008) and Hsiao's "The Legend of the Phoenix" (2009). Some of them have even been placed as permanent installations with specific artistic intentions that relate to various public contexts. Hence the combination of functionality, site specifics and interactivity (Meaningful Engaging Characteristics) could prove a feasible strategy to revitalize and engage wider public audiences in non art public space.

5   Conclusion and Future Works

There is no doubt that many previous research efforts about audience response have laid a strong foundation in the field. The engaging characteristics such as Playfulness, Dominance Transfer, Mind-Orientedness and the Accessible Challenge have been identified as functional strategies in the pilot study, the field studies as well as in the review of this context. However, those characteristics can not be treated as an overall solution to the issues but solely as tactics that may engage audiences. As more and more computer-based interactive media art installations are seen in open public space, the general public is starting to recognize and become familiar with this new genre. At this point, engaging audiences is not the only issue, a more important issue is how a meaningful experience can be obtained by interactors. Muller and Edmonds suggested that 'we must begin to question how interactivity as a medium produces meaning' [21]. In order to obtain in-depth research data about how meaningful experiences are triggered by interaction with interactive media art installations in open public space further studies are required. These will remain focused on the computer-based interactive media art installations that are placed in public spaces, specifically non-art spaces. Research into existing media artworks and audience responses in Taipei and Kaohsiung (Mass Rapid Transit) stations has been carried out and will be continued in other similar public settings. It is intended that the outcome will provide useful alternative methods for researchers and artists in the field, so as to deepen our understanding of the capacity of interactive art to realize meaningful engagement in the wider public context.

References

1. Candy, L., Amitani, S., Bilda, Z.: Practice-led strategies for interactive art research 2(4), 209–223 (2006)
2. Huhtamo, E.: Trouble at the Interface, or the Identity Crisis of Interactive Art. MAHArchive (2004)

3. Creativity and Cognition Studios, `http://www.creativityandcognition.com/`
4. Graham, B.: A Study of Audience Relationships with Interactive Computer Based Visual Artworks 32(4), 326–328 (1999)
5. Polaine, A.: The flow principle in interactivity. In: Proceedings of the second Australasian conference on Interactive entertainment, pp. 151–158. Creativity & Cognition Studios Press, Sydney (2005)
6. Moggridge, B.: Designing Interactions, pp. 321–325. The MIT Press, Cambridge (2007)
7. Murray, J.H.: Hamlet on the holodeck, pp. 97–182. The MIT Press, Cambridge (1997)
8. Ann, J.M., Peta, M., Margot, B.: The lens of ludic engagement: evaluating participation in interactive art installations. In: Proceedings of the 15th international conference on Multimedia. ACM, Augsburg (2007)
9. UnitedVisualArtists, `http://www.uva.co.uk/archives/49`
10. Lozano-Hemmer, R.: `http://www.lozano-hemmer.com/`
11. Csikszentmihalyi, M.: Flow: The Psychology of Optimal Experience. Harper & Row (1990)
12. Eisenberg, E.: Strategic Ambiguities: Essays on Communication, Organization, and Identity, pp. 75–97. Sage Publications Inc., Thousand Oaks (2007)
13. Graham, C.: A Study of Audience Relationships with Interactive Computer-based Visual Artworks in Gallery Settings, Through Observation, Art Practice, and Curation, University of Sunderland (1997)
14. Petersen, M., Iversen, O., Krogh, P., Ludvigsen, M.: Aesthetic interaction: a pragmatist's aesthetics of interactive systems. ACM, New York (2004)
15. Graham Coulter-Smith, E.C.-S.: Art games: Interactivity and the embodied gaze. Technoetic Arts: a Journal of Speculative Research 4(3), 169–182 (2006)
16. Manovich, L.: Post-media Aesthetics,
    `http://netart.incubadora.fapesp.br/portal/referencias/`
    `Post_media_aesthetics1.pdf`
17. Lin, S.-M.: Metamorphosis,
    `http://english.taipei.gov.tw/dorts/index.jsp?categid=2058`
18. Knight, C.: Public Art: Theory, Practice and Populism, pp. 21–28. Blackwell, Malden (2008)
19. Ciolfi, L., Bannon, L.: Designing Interactive Museum Exhibits: Enhancing visitor curiosity through augmented artifacts,
    `http://richie.idc.ul.ie/luigina/PapersPDFs/ECCE.pdf`
20. Birchfield, D., Phillips, K., Kidané, A., Lorig, D.: Interactive public sound art: a case study. In: Proceedings of the 2006 conference on New interfaces for musical expression. IRCAM Centre Pompidou, Paris (2006)
21. Muller, L., Edmonds, E.: Living laboratories for interactive art, vol. 2, pp. 195–207. CoDesign (2006)