

Rich experience design through public installations

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ABSTRACT

Public installations have the opportunity to influence many people due to their location and the vast amount of people that are exposed to them. However, due to lack of interaction these installations might waste this opportunity of creating a rich experience for the people. This paper investigates how interaction with public installations affects its users by evaluating the experience of users while interacting with a specially designed prototype.

Author Keywords

User Experience, Social Connectedness, Public Installations, Activity Spaces

1. INTRODUCTION

Public installations have the opportunity to reach a large crowd at once, they therefore the opportunity to influence a lot of people at the same time. However, a lot of installations have no interaction with the user, therefore limiting the user in being able to engage with the installation and creating a richer experience.

My first experience with this was during the Glow festival 2012, a light festival in Eindhoven with over 20 light installations and with over 400.000 visitors, where I worked on the design and realization of SHIFT, an interactive light installation. This installation was designed in such a way that it could be engaged by multiple users simultaneously, opposite of the other installations at Glow, which were either not interactive or could only be engaged by one user at the same time. One of the most striking differences in how the public reacted to this installation compared to the other installations, is how the public connected with each other. They got out of the comfort zone of only socializing with their own group, and engaged with the other people using the installation.

In this work we focus on the experience of social connectedness, and investigate how different interactivity would influence the feeling of social connectedness.

2. RELATED WORK

2.1 Social connectedness

According to Jodi L. Forlizzi [1] The design of a product should yield not only a usable product but an interaction which is satisfying, if not rich, experience. When I use the term rich experience, I mean an experience that has a positive and pleasing value for the user, allowing him to perceive beauty in the product and its use.

Social connectedness is described as the momentary affective experience of belonging by Retty et al. [2]. Studies by Paul Jose [3] show that a greater social connectedness has a direct correlation with a greater sense of wellbeing. Van Bel [4] described the concept of social connectedness along 5 dimensions.

1. Relationship saliency – The prominence of the relationship in ones mind, which is the outcome of thinking of another person or being aware of him/her.
2. Closeness – The experience of feeling close to another. This does not relate to physical proximity, but rather to the social presence in ones mind.
3. Contact quality – The perceived quality of social contact with another person.
4. Knowing each others' experiences – being aware of each others experience, both in terms of subjective experiences (e.g. love, enjoyment, sadness), as well as awareness of things that happen in ones life.
5. Shared understanding – having a similar view on the world. Having similar opinions and being on the same wavelength.

With this in mind, social connectedness is an important part of having a rich experience.

2.2 Interaction

Public installations can be defined in 3 subcategories regarding interaction.

1. Non-interactive installations: This category encloses both static and dynamic installations.

Installations with passive observers who has no influence on the behavior of the artifact. An example is the Glow installation Les Orpailleurs de Lumière, which was a projection of mapped on the Catherina church. (fig. 1)[5]



[fig1: Glow 2012, LES ORPAILLEURS DE LUMIÈRE]

2. Single-User interactive installations: This category includes installations where the behavior of the installations can be influenced by the observers, but this is limited to one person at the same time. An example is the Glow installation Skertzo, where a single user could influence which projections were shown on a public building. (fig. 2)[6]



[fig 2: Glow 2012, SKERTZO]

3. Multi-User interactive installations: This category encloses installations where the behavior of the installations can be influenced by multiple users at the same time. Either influencing one feature as a group, or every user influencing a different feature while together creating a whole. An example is the Glow installation SHIFT, where the public could walk over/stand on a big tilting platform and shifting of the weight influenced the movement of the projections on the surrounding walls and the accompanying sound. (fig. 3) [7]



[fig 3: Glow 2012, SHIFT]

3. STUDY

3.1 Questionnaire

Firstly the Social Connectedness Scale Revised (SCS_R) questionnaire [8] was chosen to measure the level of social connectedness of the participants during this study. SCS-R consists of 20 items (10 positive and 10 negative). All of the questions could be scored from Strongly Disagree to Strongly Agree and had a range from 1 to 6. The negatively worded items are reverse scored and summed with the positively worded items to create a scale score with a possible range from 20 to 120. A higher score on the SCS-R indicates a stronger feeling of social connectedness.

3.2 Installation

To evaluate the level of social connectedness during different kinds of interaction, an installation was designed with the focus on producing similar output while the installation is in a non-interactive setting (fig. 4), controlled by one user (fig. 5) or controlled by multiple users simultaneously (fig. 6). Therefore, providing a testing environment where the only element that changed was the type of interaction.

Test 1.
Users: 4
Interaction: none
Visuals: Random

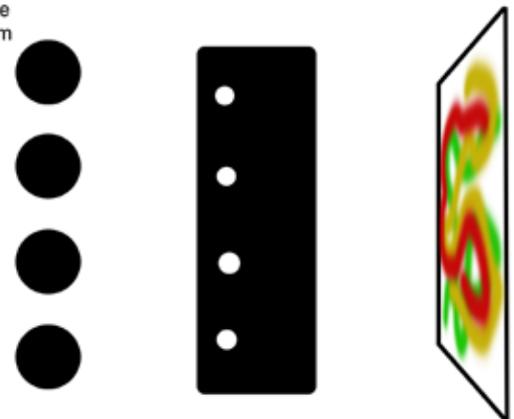


fig. 4

Test 2.
Users: 4
Interaction: Single
Visuals: Interactive

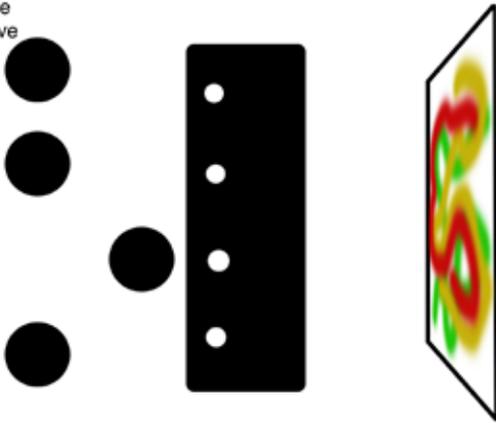


fig. 5

Test 3.
Users: 4
Interaction: Multiple Users
Visuals: Interactive

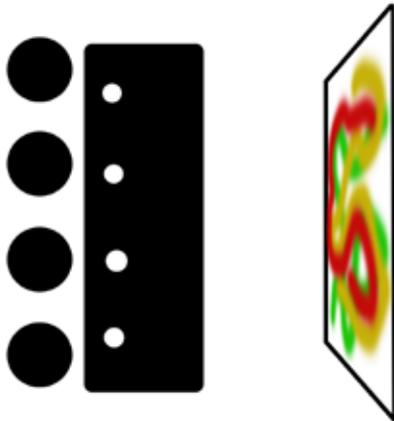


fig. 6

The installation itself consisted of four interactive components, which could control a colored dot on a big display (fig. 7). The colored dot was controlled by the four components with a turnable knob, which could control the X and Y direction, as well as the color and the saturation of the dot. While moving around, the dot left a paint like trace on the background, enabling the users to draw on the display. In order to make the system more engaging, the system was continuously scrolling up and looping the background in such a way, that the part which left the display at the top, returns at the bottom. This made it more challenging for the users to actually create something. If the system was in its non-interactive setting, the input was generated randomly.



fig. 7

3.3 Experiment

24 participants were recruited from a studentflat and randomly divided in 6 different groups. The group dynamics where important as a group of friends vs. a group of people who were not familiar with each other could have a different influence on the social connectedness.

Of the participants there were 9 females and 15 males, the age ranged from 18 to 29 and the background was spread over 4 different schools, namely the Technical University of Eindhoven, Fontys Hogeschool Eindhoven, Summa College Eindhoven and the Design Academy Eindhoven.

The experiment took place in one of the rooms in the studentflat, where the participants were sat next to each other, in front of the interactive components and a big display where the output was shown (fig. 8).

When the participants arrived, they were asked to each fill in the SCS-R questionnaire to measure their initial level of social connectedness. The experiment consisted out of 3 different rounds, after each round the students were requested to fill in the questionnaire again.

In every round, the participants engaged with the installation in the 3 different settings as described before. Each of the sessions were filmed for later evaluation of the actions of the users.

In order to rule out the influence of the sequence in which the participants were engaging in the different modes, each of the six sessions where done in a different sequence, making sure that every possible sequence has occurred.



fig. 8

4. ANALYSIS

SCS-R was used to investigate if there was a difference in the level of social connectedness throughout this study. The initial mean results shows that there was a difference in the level of social connectedness was measured (fig. 9).

Descriptive Statistics

	Mean	Std. Deviation	N
Control Test	96.79	9.948	24
Non-Interactive	99.04	10.063	24
Single-Interactive	98.00	10.138	24
Multi-Interactive	101.13	10.535	24

fig. 9

Mauchly's test indicated that the assumption of sphericity had been violated $X^2(5) = 24.35, p = <.05$. Therefore the results are corrected using the Greenhouse-Geisser estimate of sphericity ($\epsilon = .603$). The results show that the level of social connectedness was significantly affected by the different levels of interaction $F(1.81, 41.64) = 8.29, p < .05, \eta^2 = .72$.

Using a Helmert contrast revealed that the fact that the user engages with an installations raises the social connectedness significantly $F(1, 23) = 37.40, p < .05$ ($M = 96.79$ v.s. $M = 99.39$) (fig. 10). However, using the same contrast also reveals that the change in social connectedness between a not interactive installation and an interactive installation ($M = 99.04$ v.s. $M = 99.57$, respectively) is not significant ($p = .58$).

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	Tests	Mean Square	F	Sig.
Tests	Level 1 vs. Later	161.894	37.403	.000
	Level 2 vs. Later	6.510	.315	.580
	Level 3 vs. Level 4	234.375	9.547	.005
Error(Tests)	Level 1 vs. Later	4.328		
	Level 2 vs. Later	20.663		
	Level 3 vs. Level 4	24.549		

fig. 10

Finally, a poc hoc test using the Bonferroni correction revealed that the social connectedness improves significantly ($p = 0.031$) between the single user ($M = 98$) and the multiple user interaction ($M = 101.13$) (fig. 11).

Pairwise Comparisons

Measure: MEASURE_1

(I) Tests	(J) Tests	Mean Difference (I-J)	Sig. ^b
1	2	-2.250	.070
	3	-1.208	.117
	4	-4.333*	.000
2	1	2.250	.070
	3	1.042	1.000
	4	-2.083	.723
3	1	1.208	.117
	2	-1.042	1.000
	4	-3.125*	.031
4	1	4.333*	.000
	2	2.083	.723
	3	3.125*	.031

fig. 11

5. CONCLUSION & DISCUSSION

Throughout this experiment, the participants showed the same behavior as observed during the Glow festival. During the non-interactive and single user interactive tests, there was little to no engagement between the participants. While during the multiple user tests every group, some sooner than others, ended up interacting with each other in a social way; either by discussing how they should work together in order to create something, discussing their opinion about the installation or how and where they would see the installation implemented (for instance upscaled at the city square, or as a game during a houseparty). A few comments were made how the actual interaction could be more fun, which is indeed a point of improvement for actual implementation, but was just fine for this experiment.

The experiment was successful in providing evidence that if a public installation is interactive, having the users interact simultaneously increases the level of social connectedness significantly compared to a single user interaction. However, there was no significant difference in the level of social connectedness between having a non-interactive installation v.s. an interactive installation. Therefore, no conclusions can be drawn from this experiment and this would be a topic for further investigation.

Another topic for further investigation would be a comparison with the interaction as described by Hu et al. [9] in the new generation of public installations, where the installation is not created by the designer as a final result, but as a platform and growing system for the public to participate and for social creativity to contribute to the artifact.

An example of is an installation designed for the Science and Education New Town, Taicang, China. One of the concepts for this installation is a platform where the public is allowed to contribute their photo's from social media, for an interactive photo show to induce the feeling of social connectedness, and reinstate the historical values of Taicang as the port to world (fig. 12).

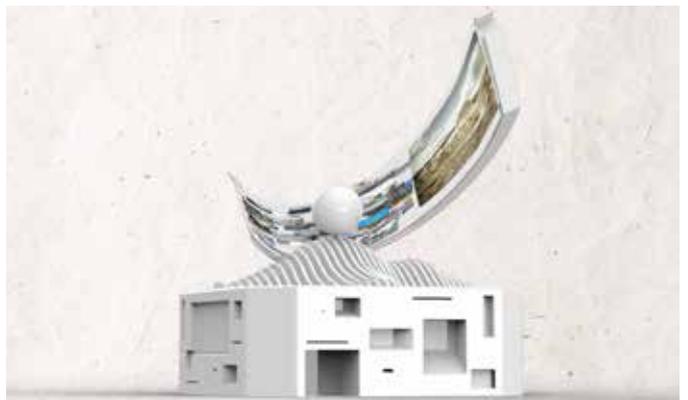


fig. 12

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