

Published in *Proceedings of the 2000 International Computer Music Conference*
Presented at the 2000 International Symposium on Electronic Art (ISEA) Paris, France

Audience Participation and Response in Movement-Sensing Installations

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Abstract

Audio and video installations requiring audience movement and participation pose a unique set of problems. These works are realized through physical action within a responsive environment. Participants may become part of the work itself, as others outside of the sensing area view the spectacle of their interaction while seeing the results. Those inside the sensing area (if more than one person is allowed) share in a collaborative “performance,” their social interactions contributing significantly to their experience of the work.

What is the psychology of this participation? How can installation artists engage, prompt, and empower amateur “performers” who have no prior knowledge or particular expertise? How does the computer program and content facilitate action and encourage response?

This paper examines factors contributing to the audience experience, with special attention to non-digital concerns. Strategies to engage audience participation will be shown in several of the author’s interactive audio and video installations.

1. INTRODUCTION

Movement-sensing installations offer audience members an opportunity to become actively involved in the creative process by influencing image and sound output from a computer. These works typically use various types of sensors to analyze human activity, location, and gesture, so that natural movement can be used as primary input to a responsive computer system. Interactive installations are often presented as environments open for exploration, with each “realization” determined by individual action, curiosity, and play. What separates interactive installations from other types of art installations or interactive performances is that the work is only realized through a participant’s actions, interpreted through computer software or electronics, and those actions do not require special training or talent to perform.

All of this suggests a new social and artistic dynamic that is unique to interactive installations, requiring the audience to physically participate in creating their own artistic experience. Rather than create finished works, interactive artists create the potential for many works to be realized through anonymous collaboration. With the audience’s acceptance of this new responsibility may come a greater acceptance and ownership of the results: participants seem to enjoy, accept and pay great attention to the results of their own responsive actions.

The term “audience” may ambiguously refer to anyone viewing or participating in an installation. To clarify those roles, person(s) activating an installation will be referred to here as the “player(s),” as in a musician playing music or someone playing a game. Audience members simply viewing the players will be called “spectators,” implying a group’s role in a live event.

2. FACTORS IN THE AUDIENCE EXPERIENCE

Artists investigating computer installations often focus on theoretical concepts, digital content, and technical issues. However, many aspects of the work are only realized after the installation is taken out of the “laboratory” and set up where the public can try it out. Revelations pour in after observing that the non-digital aspects of an installation are not trivial, but have a large impact on the audience’s perception of a work.

Four interconnected factors may be examined to gain a better understanding of the complex relationships at force in movement-sensing installations. These broad categories could be further subdivided, but are presented here as a way to analyze the non-digital aspects of a work. They are listed, in order, by the amount of direct influence an artist has over aspects of a work. Although indeterminacy and surprise may be built into software as features, they are given when dealing with players.

The Digital Factor refers to anything residing on the computer: digitized video, sound and other stored material, generative algorithms, real-time processing, and software for interpreting and mapping movement data.

The Physical Factor involves the installation space and set, including items used to create the space and interface with the computer, such as sensors, props, video screens, constructions, printed images, and furniture. How people move around the space and the activity required to interact with digital material should be considered here. One could view this active area as an expanded computer interface. The feeling of the venue and location also contribute to the audience’s reaction to a work.

The Social Factor examines the relationships between people before, during, and after the installation experience. Artists may consider designing situations where social interactions are likely to occur based on decisions regarding the number of players allowed to participate and the role and location of spectators. A work may accommodate a single player or multiple players, it may include spectators or take place in isolation away from the crowd. Several studies of audience reactions to museum installations suggest that works encouraging social interactions among multiple players are often viewed as the most popular and engaging (Graham, 1997; Mitchell and Bicknell, 1994). Ironically, the presence of many players triggering the same system makes it more difficult for individuals to follow the results of their actions in the digital domain. Their engagement with the computer may decrease as their social interactions increase.

Humans are social animals, and part of the reason they go to an exhibition is to spend time with companions, watch other people, and feel the excitement of the social scene. A big factor in an audience’s potential understanding and enjoyment of a work is the ability to have companions watch them play (in single player works), or play together (in multi-player works). A few artists have gone so far as to devise installations requiring cooperation amongst players to realize their work (Ritter, 1997). However, the potential for a work to foster social interaction is an essential artistic decision that will not be appropriate for particular works, or may be limited by a given space, or the capabilities of software and sensors.

The Personal Factor is the area most difficult for artists to predict and influence, although the three previous factors all contribute to create the individual experience. Beyond the control of the installation artist are issues such as a person’s mood, musical taste, interest in technology, or whether they have the knowledge and skills required to participate and understand the installation. Some people may be easily intimidated and unwilling to participate, or they just don’t have the time. However, by knowing the audience, some potential problems may be solved in the design and layout of the installation.

3. CHALLENGES TO PLAYER PARTICIPATION

One big challenge to the installation artist is to know the full range of audience members, and provide a multi-layered work that will be engaging on many cognitive, physical, and emotional levels. Ideally, all of these factors add up to more than the sum of their parts, reinforcing the artist's intentions, and leaving the participants with transforming ideas or emotions.

Potential problems can be identified in each stage of participation: waiting/watching, decision to play, playing, staying, and leaving. Although a crowd of spectators watching an installation reduces the chance of anyone playing, people will flock to a group out of the assumption that the installation must be good if so many other people are watching or waiting. Allowing spectators to view an installation engages both non-players and potential players, who carefully watch the performance to learn how it works, how long it will take to play, and how "safe" it is to enter. Many players enjoy the attention of the audience, and the rapport that comes from the collective experience. Other people might be intimidated by spectators, afraid of looking foolish because of a perceived lack of knowledge, or body conscious and uncomfortable being watched.

On the other hand, installations that only allow one or more players inside a closed space can evoke a more intimate, reflective, and "whole" world, without the distractions of everyday life. Sound and light can be more carefully controlled within a closed space, as can the number of people entering and exiting the installation.

The role in which players are cast by the artist will ultimately shape their experience and willingness to participate. Will they be separated from family and friends to be isolated in a dark room for an exciting and dangerous experience? Will they be asked to playfully cooperate with others in a well-lit open space? How are they invited in? Are people forced to wait on line or read confusing instructions? What about the digital material? Is it insultingly simplistic, pleasantly aggressive, or impenetrable in its complexity?

Once inside, players will need to know how to run the installation and the rules of engagement. One challenge is to make instructions and prompting part of the work, so that players are educated and guided in a non-obtrusive manner. "Natural" interfaces requiring everyday movement or the manipulation of familiar objects may be so obvious as to not require further explanation. Players also learn how to operate the installation simply by watching others.

What are the minimum and maximum times needed to get a good understanding of the work? The scope of the installation may determine the necessary range of time needed for a full experience. Factors that influence the duration of use include: attraction to the material, intellectual and emotional interest, ability to understand and enjoy the content, the feeling of engagement with the computer, and social interactions (Graham, 1997). The pacing will also contribute to the perception of expected time as will physical objects in the room, such as couches or comfortable chairs (both spectators and players will stay longer if they have a chance to be seated).

Most people avoid doing things in public that will draw the attention of strangers. Usually, people do not feel free to dance in front of an audience, and they know not to touch artwork in a museum. Artists need to give permission to players to do the activities required of the installation, even if it goes against the normal expected behavior in a museum or other public space. The permission may be liberating or intimidating, depending on social and personal factors, and the intention of the artist.

4. DESCRIPTION AND ANALYSIS OF TWO INSTALLATIONS

The author's *Light Around the Edges* (1997) is a sound/video installation that uses a video camera to detect location and movement of people in a large public space. The sensing camera is placed high above the audience, pointed downward at an angle. Movement on the ground is transmitted as numbers into the Max programming environment via David Rokeby's Very Nervous System (Rokeby, 1995). There, software interprets data representing players' speed and location to create original music or to triggers individual sound samples. While participants hear the results of their actions, they simultaneously see themselves in the form of a processed and abstracted video projection.

The players are not only the musicians playing the music, they are the dancers in their own dance. In other words, the players are the content of the work. For example, in one instance, two young women were in the middle of the floor, holding hands and swinging around in circles, the speed of their movement altering the density and speed of computer-generated music. The installation sets the stage for this event to occur, but this particular realization only exists because of this particular performance. The installation, therefore, is not an interface designed to "get to" content in the way a mouse is used to retrieve data from a computer, but a more complex system that requires a tight feedback loop of action/results/modified action/modified results, where each component is interdependent, brought into existence only with the help of the other.

Except for four speakers, the installation is invisible. Any number of people may walk through the sensing area, often just passing by. Any number of spectators can watch players dance or move around the space. As the number of participants grows, the ability of an individual to perceive direct impact on the system is reduced. To meet the challenge of accommodating an unknown quantity of players, the installation operates in three different modes, based on how many people are playing. Each mode defines a sonic environment and a lever of interaction appropriate for the number of players. For one to four players, the software is highly interactive, with speed and location perceived as having an immediate and obvious impact on the sound, generating music, processing sound, and controlling panning. With five to ten players, the perception of immediate interaction is lessened, and the space transforms into a soundtrack of a train station, with players' locations triggering conversations in many languages, train doors opening, announcements, and the sounds of trains coming and going. Thus, the space becomes an invisible set, defined architecturally in sound, with fixed locations on the floor representing specific sounds and functions (although not entirely predetermined). Finally, with too many players to identify any individual's input, the third mode turns the space into a big party, with movement triggering canned laughter, sounds of people eating, conversations, glasses clinking, and other crowd sounds. The effect is a fortified social space, where the audience's movements alter their own social interactions in real time.

All three modes are playful environments that encourage conversation, eye contact, and movement between players and spectators, companions and strangers. The participants are the subject of this work, their actions, responses, facial expressions, bodies, and social interactions are much more significant than the actual visual and sonic material they generate.

The author's video installation, *Maybe...1910* (1999), suggests a very different sense of time and interaction. The work explores concepts of memory. Here, the content is more significant, based on video-taped interviews conducted with elderly residents from Providence, Rhode Island, discussing experiences from childhood and major life events. The pacing is slow and introspective, less energetic and immediate than *Light Around the Edges*, but with compelling material structured by simple human activities within the installation space.

Players enter an intimate set resembling a bedroom from the earlier part of the 20th century, where they are free to explore the room and examine its contents. Their location and activity is tracked by fourteen sensors imbedded into a bed, a chair, a rug, and the drawers of a vanity and a dresser. Each sensor triggers corresponding digitized

video based on a theme, such as earliest memories, family, money, or dating. The project also incorporates views of seniors regarding the fast pace of modern life, and their memories of technical innovations (electricity in the home, automobiles, television). Video and audio files are processed to simulate the quality of memory which may be lucid, blurry, fragmented, or incomplete.

All sensors, wires, and speakers are hidden. Three video sources play back in the room disguised as an old television set, a two-way vanity mirror, and as scenes rear-projected onto a curtained window. Using the Icube System (Mulder, 1995) controlling Director software, each sensor rotates through its own collection of six video clips. The entire collection of video totals forty minutes, with the expectation that players will spend four to thirty minutes inside the space for a “full” experience, with little or no repetition.

Each trigger shows a person telling his or her story on one video screen, accompanied on the other screens by flashback or memory scenes using archival footage and processed images. The story is further illustrated by players examining antique objects assembled within the installation space, such as old photographs, personal letters, a dried rose, or articles of vintage clothing. These physical objects, as well as the period furniture, prove to be powerful multi-sensual links to the past, engaging players through sight, smell and touch.

The audience encounters the set as a small bedroom built inside a much larger room, with boundaries indicated by a carpet, furniture placement and ropes. Spectators gather around the bedroom on three sides, and peer through the “invisible walls” to watch players and view the computer playback. Only 2-3 players are allowed inside together; any more would add confusion about who triggered which clip, and encourages interruptions. Social interactions between companions is very high inside the room, while much lower between strangers sharing the experience. People are respectful of the interviewees, quietly listening to their stories, but are eager to speak to one another about the stories during the silence between segments. The project encourages people to reflect on their own lives, with elderly participants often recalling stories of “the old days.”

Eight-hundred people saw the installation over a three-day period at the Rhode Island School of Design as part of a millennium celebration. On the final day, chairs were provided for the spectators, and this seemed to greatly increase the average viewing time and enjoyment. Although there were simple written instructions as to how the installation worked, most people didn’t read them. An assistant was needed at all times handle the crowd. Perhaps in a less crowded and more secure museum environment, the installation could be run on its own; the most difficult aspect would be how to limit players and playing time. One solution would be to use software to track the number of players and automate new video messages encouraging them to stay or leave.

5. CONCLUSION

Non-digital aspects of digital installations have a significant impact on audience perception. Participants are asked to become artistic collaborators, performers and, finally, content in a digitally mediated work. As sensing technology matures, artists will be compelled to conceive of work where physical interaction, computer interaction, and social interaction are vital to creating new forms of expression and experience.

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