

The Cave Experience: People and Technology in an Experimental Performance Space

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Abstract. What happens when people, technology, art and global networks start to interact in a performance space? This is a case study of an experimental performance built up in an abandoned nuclear reactor hall. The performance was collaboration between artists and technology students and was shown to a limited audience. The main goals of this experimental performance were to:

- explore the emotional experience triggered by the artwork and the environment
- develop and test technical solutions and explore their interaction.

Interviews were conducted among visitors and project members. The recorded material was analysed, providing the following conclusions:

- people adapt easily to new perceptions of reality and become emotionally involved by adding their own expressions and experience to the totality
- the installations lived their own life; the technology became a secondary element
- the environment, along with sound, light and projections, was an important factor in the visitor's perception
- the installations gave visitors the impression of being in a combination of concert hall, art gallery, church and laboratory
- new technical solutions were developed as a result of complex interaction and installation difficulties
- interaction of local human behavior with visitors over the global web was both an unpredictable and exciting factor at the performance.

1. Introduction

“The Cave Experience“ took place thirty meters under ground in the first Swedish nuclear reactor (R1), and gained its name from the experience of spending ten days installing cables in what would be transformed into an experimental multimedia installation. Master and doctoral students from the Division of Media Technology and Graphic Arts cooperating with several other institutions at The Royal Institute of Technology (KTH), Stockholm, Sweden were responsible for the installation.

The main research goal of the installation was to explore how elements of new interconnected media technology, placed in a historical environment, could trigger emotional and artistic experiences in both the physical and the network-connected visitors. We also wanted to explore scientific and artistic methods for planning and evaluating such experiments, and to define problems for future research within this context.

Our exploration of new media in an old environment was made possible by students, researchers and administrators.

1.1 A historical environment and a script

Sweden's first nuclear reactor, R1, was built on the KTH campus in 1954 and was closed in 1970 [3]. Measuring 12 x 12 x 24 meters, the hall had not been used since a thorough cleanup of radioactive rock. "The Cave Experience" on May 15th, 1998 marked the first recovery of the hall.

This historical environment and a multimedia script [2] were our starting points. A hermeneutic method [1] based on the script was used for planning the interactive scientific and artistic expression. During the project planning, this combination of precise technological planning and artistic philosophical dialogue brought us closer to a convergence between art and science.

An internet audience was invited through advertising on the largest search engines while e-mail was employed to invite physical visitors. Our project URL [8] was visited frequently by hundreds of persons both before and after the installation's four hour performance.

1.2 Method

Two interview studies were carried out in order to investigate the response from the sixty-four physical visitors invited. The first study was conducted immediately after visiting the installation, the other six months later. I have included some excerpts from the first round of interviews, but will focus on the second study. The discussion part is based on the second interview study. I have chosen to add a subjective narrative script at my conclusion for better artistic understanding or emotional expression.

2. The installation fragments

The installation was planned to have one total expression consisting of several single multimedia pieces, here called fragments. These fragments will be described in technical terms and in terms of their functionality in this section.

The pilot function for communication consisted of two computers (Macintosh and PC) connected to the internet and equipped with a camera, microphone, headset and keyboard/mouse. The communication software and methods used included: CUSeeMe [11], WebPhone, ICQ, IRC (Internet Relay Chat), e-mail and WWW pages (homesite and entrance for networking communicators). The Macs were equipped with a local hand-held camera and, additionally, displayed a video feed from a remote camera at the ISDN two-way television installation located at the opposite side of the hall. Audio was fed from the Kacor project and mixed with a local microphone. The Mac operator also fed incoming video from internet to large screen RGB projection (3x4 meter). These were the only visible computers with operators in the hall and their functions were more like pilots manoeuvring in a virtual environment on the internet.

Cyber Gallery was a stand-alone fragment which, through a javascript on a Mac computer, fed art from selected URLs through the internet onto a large screen RGB back projection (3x4 meter). The script was developed at KTH and the selection of art was done by an artist in Tallinn, Estonia, delivered through e-mail.

The Kacor project [4] played music from a "Sentograph" [5] through a 6 channel full frequency range amplified system. Four speakers were placed in the corners, while two were raised at one side of the hall to create the effect of depth and distance. A mixer was used here for sound from the "interactive theatre" and for the exporting of sound for

streaming on the internet. The hall had a natural acoustic reverberation of several seconds which created a need for special attention to the music and effects used.

Artificial light and sculptures were explored during the installation. The large hall was filled with small water/oil pearls, giving light the effect of physical being (Cracker technology). Two projectors with art slides were combined with a powerful radio remote-controlled laser sculpture and a 10 x 12 meter high light organ. The light organ interface was fed with music played by the composer from the Kacor project and the rotation movement of the laser sculpture was activated by visitors operating a wireless remote control.

Two-way television with shared applications consisted of an RSI VideoFlyer codec [12] for multiple ISDN channels, an RGB projector, a remote-controlled video camera and a microphone. A 3 x 4 meter screen covered the end of a corridor with incoming video from digital dialed-up remote sources showing the remote space as an extension of the local space. This stand-alone solution gave the visitors the possibility to audiovisually communicate with people outside the installation. Additionally, the remote source could control the treatment of our local internet-streaming camera.

Interactive theatre was a CD-ROM application [6] with a digital theatre space visualising a stage with actors in three dimensions to facilitate, as well as perform and replay, a pre-programmed piece. The picture was projected on a 3 x 4 meter screen and the sound was fed to the central mixer at the Kacor project.

3. From fragments to defragmentation – one expression

By connecting interactive stand-alone fragments we wanted to achieve a larger and more extensive expression. This was done by distributing the local video, showing people and the environment in the hall from remote source points of view, to both remote source ISDN, two-way television connections, and the internet. The camera was controlled by remote-side ISDN visitors. The video output to the internet was compressed using MJPEG and streamed to our MeetingPoint module [11], where up to 20 video/audio connections could be handled at the same time with a frame rate of up to 12 fps. The Meeting Point software (White Pine) was running on a Unix server connected to the internet.

The music from the Kacor project was distributed to speakers in the hall, to the internet through the communication fragment (pilots), and the light organ. Sound was also fed from the Interactive Theatre and mixed with the music generated from the Kacor project. Through these technical interconnections the installation achieved one total expression.

4. Results and experiences

4.1 The immediate interview study

As it was difficult to gather feedback from net visitors, the main target group were those physically present. The immediate feedback was measured by a questionnaire handed out after the visit, and by spontaneous incoming e-mails. Because of the short time between the visit and the measurement of the experience, the visitors' emotional reaction was still intense and can be characterised by statements such as:

"...like entering a mix (convergence) of cathedral and a underwater aquarium,"

"...beautiful laser light, fantastic acoustics and a feeling of viewing the world through virtual windows,"

"...lots of nuances, fascinating media experience in a impressive environment."

4.2 The delayed interview study

Half a year after “The Cave Experience,” a new questionnaire was sent to all registered visitors to measure how the time filter of six months had affected their memory. Out of fifty-six e-mails sent, eighteen persons replied (32%). The results of the interview study are presented here and discussed in section 5.

The group of visitors that replied had physically visited the installation. Just one visitor had done both a virtual and a physical visit. 77% of them had private internet connections. They were a mixed group of researchers, artists and administrators.

The most impressive experience was the *environmental space*, the architecture and the artistic light. Some pointed out the connection between the, at that historical time, "new" nuclear elaboration on atoms and this elaboration of new media using bits. They found the environment ideal for such experimental exhibitions. A few did not understand the meaning and missed receiving a pamphlet with more explanation, prior to the visit.

Sound and light affected the visitors greatly. Projections and odours were less important. Some pointed out that it was hard to rank effects because of the totality of the experience.

The visitors associated their impressions with *church, art exhibition and laboratory*. A few associated it with the theatre and a show. The interaction consisted mostly of human to human conversations about the experience but some of the visitors also used video conferences for net-based communication.

Visitors felt some fear and insecurity at the entrance, not knowing what to expect as they descended the staircase into the dark hall. Some found the smell unpleasant while others pointed out that this reaction was a part of the experience and amplified the exciting effect.

The visitors were influenced by the historical space in many ways. The fragments installed gave strong impressions. The visitors felt fascinated by being in an old reactor hall with new media technology and “new“ forms of expression. Others felt that the space was fantastic both in its imagery and scientific connotation. Some found that the location of the space, its shape and also its history, were positive factors in integrating the different installation fragments. "In an ordinary room, the experience is usually not that total", they wrote. Some few felt a claustrophobic tightness from the depth, the darkness and the cold echo.

About 50% of the visitors were interested in the technology hidden behind the installation fragments while the other half didn't care at all. Most visitors thought that they had no problem absorbing the impression of all the fragments.

4.3 News media

The only newspaper invited, Svenska Dagbladet, published their experiences through two types of media; the printed newspaper with text and picture (black and white) and the electronic newspaper on internet with VR, Quick Time Virtual Reality in colour [8]. The project homepage (our electronically advertised net entrance) was linked to the electronic newspaper and the project documentation had a communication “tunnel“ on the net for several months. Especially the VR was an effective medium for publishing the performance space.

5. Discussion

The number of visitors and the answering percentage of 32 were far too low for any scientific conclusions. Still I find interesting factors that can be seen by investigating the

interview study and other information sources. The physical visitors were a group of internet - connected people with a background from, or connection with, scientific or artistic work. This gave me response from a target group that is used to express themselves through written and visual material.

The physical entrance to the old nuclear reactor through a staircase inside massive rock, with a feeling of excitement and mystery, was essential for the total experience. The experience was confusing and more information was demanded by some of the visitors. Still, my idea was to "let things happen" within the space, with no start and no end, no stage and no public. Just to let people walk into the hall to have their own experience in an continuously ongoing experiment. The fact that visitors experienced a physical "tunnel" into a closed performance space with digital tunnel "windows" to a virtual cyber space I find important and very interesting for further investigation. The visitors associations of the space with art galleries, churches and laboratories can give a new dimension to internet research work, technological development and creation of laboratory spaces for investigating perception of new interactive media. The results show that light and sound was dominating the experience and those elements must be balanced in projected media communication. The music performed was received very positively and had a strong impact when experiencing the space.

Trough the "pilot" or "control" function the students operating the computers for internet connection were actually functioning as "producers" for two-way text, picture and video based communication. To experience their communication, we had mounted a large back projected screen for incoming information to "display internet". This did not provide enough information feedback in such a large space and the set-up could have been improved. My idea of "letting things happen" could have turned into a chaotic feeling with some of installation fragments trying to attract more attention than others. A producer function was necessary to avoid this and the problem was solved by giving each fragment periods of time to run by its own without interference from others. In this way the experience turned into sequences of different moods or feelings during the four hours of running. For example, the interactive theatre or the two way television could run with its own sound and expression for a while and let visitors feel the installation space "slow down" in anticipation of a more extensive use of light and sound. This spontaneous dramaturgy was an exciting non verbal communication within the group of project members during the installation. I experienced that artists and multimedia operators should have the same basic idea behind their way of acting in such a space. Such basic knowledge can be shared by use of the hermeneutic method, a philosophical dialogue, based on a pre-written script.

Technology became "invisible" when emotional experience became the dominating factor of perception. Also the fact that we strived to hide as much technology and cables as possible led to solutions like back projections that also minimised noise from the projectors. The complexity of interfaces and sensors could be improved. Wireless control units was a creative experience for the visitors. Such experiences and interfaces for closer connections between installation fragments will increase the quality of expression and give room for the unpredictable exciting factors of visitors' interaction.

Why make such an installation? I really do not know. I just had to experience this way of exploring new media in an unique laboratory space to investigate processes connected to such scientific and artistic work. The combination of fast digital household connections and digital broadcast will give us many future opportunities to explore new ways of expression and communication, highly interactive.

A new research project, "web@", is being planned as a continuation. This is an experimental mobile concert/theatre with an invitation to the audience to give artistic inspiration material through internet for the coming local performance [10].

Later, in December 1998, the music industry pointed its cameras at the same performance space, this time for shooting a music video for Madonna's release of her new album in spring 1999 [7]. The space can there be seen through the eye of a photographer.

6. Future work

The results from this study have given suggestions for future research:

- higher quality in multiway television and methods for achieving stronger feeling of telepresence
- integrating sound from the internet in a performance space
- wireless sound applications in limited interactive zones
- connecting the sentograph music instrument movements to interact with physical elements such as laserlight sculptures
- 3 dimensional true time screening into and from the performance space
- development of smoothly movable cameras controlled by web visitors
- web based video routing
- mobile performance spaces.

New production structures within the media industry, based on working remotely connected by digital networks, will need more research within new architectural solutions [9], technology and management systems. This installation was also an investigation in that direction.

8. Conclusion

With this experimental installation, we succeeded to produce an experience best described by a narrative story or a script:

I move downward, step by step, mechanically, as though I were a robot. Down, down, toward the unending depths within the mountain. Thoughts stop. My senses take in the cold old air. A light with substance cuts the air, downward, downward. Only at the edge of the stairs do thoughts come back to choose a new direction, only to lead me downward, downward. Suddenly, the mountain opens, as in a fairytale, a fantastic mountain hall filled with mystique and light, music, odour and pictures. I stop, unsure, walk, stop again. The senses stretch, as though from a fear of death, the unknown is absorbed, analysed, but not to my understanding. The logical progression of thoughts loses its foothold in my head and slides, while my feet lead me into the room to experience, to be where it's happening, everywhere, in a stupor. I am bombarded by impressions, confused, find myself searching out a corner to find safety, like in a mother's embrace. Cold walls and ceiling surround me, the surfaces divided into small numbered diamonds, hopefully free of radiation. Out of the floor's core shoot strong laserbeams, with the sounds, as by an unseen energy. In a atomic bang are lit blinking carpets of light from the old offices on the huge wall. Silhouettes of people are drawn in front of huge screens. Moving pictures, as though from another planet, look into the hall. Eager hands communicate on clicking keyboards, like fireworks. The space is filled with atoms and bits.

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