

Designing an Inclusive Activity Mediated By Technology and Performative Arts

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Abstract - The project "Through Myself" aims to create an inclusive space in which everyone - whatever level of vision she or he has - can experience creativity through digital technologies and performative arts. To evaluate the potential effectiveness of the idea, research was conducted on existing similar activities. Several interviews were held with people with visual impairments, operators of an association for persons with vision loss, musicians, and dancers. Based on the results of the first phase, an artistic performance was designed. Participants' feedback has validated the project's intent and suggested useful insights for designing an interactive installation for inclusive educational activities. These activities can be proposed in schools or centres dedicated to inclusion as a tool for building awareness about creativity and visual impairments. Furthermore, the project could be implemented by designing an interactive installation or environment based on the data collected.

Keywords: social inclusion, art technologies, interactive technologies, participatory design, qualitative research

1. Introduction

There is a wealth of evidence supporting the positive influence of arts participatory activities on well-being [1]. Furthermore, the entanglement of interactive technology and design for inclusion in the heritage field has already demonstrated positive results. Design and art studies for society and communities have mainly been used to enhance accessibility in museums and to redesign public environments in more inclusive ways [2]. Inclusive technology in the artistic field is mainly used to build accessibility to arts [3]. Art technologies are mainly employed to promote social inclusion and build a more aware community in the public sphere.

This study aims to combine art technology with socially inclusive purposes by designing an activity accessible to people with visual impairments to foster awareness and encourage dialogue. The idea is to exploit the potential of performing arts and artistic technologies by designing an inclusive educational activity. It would represent the first step for filling a gap. It lacks a meeting point for interactive technologies, art technologies, design for inclusion, performative arts and educational activities. They meet each other separately.

It is important to remember that the end user of technology is always a human being. Educational technology must also consider creative behaviour, which should be an integral part of any type of education. Human perception, experiences, and resulting behaviour are reflective processes [4]. However, many technological devices require rapid jumps in attention and hardly allow for reflection, thus ignoring the complexities of our mind and body as stated by Ilgen [4].

To develop the activity, we conducted 17 interviews to explore the interest and potential usefulness of using Playtronica's TouchMe in combination with body movements and voice use for creative educational activity. TouchMe was chosen as an interactive technology designed for performative arts that measures the intensity of touch between people and turns it into sound. TouchMe operates using the tactile sense, which is one of the most used senses for exploration and experience by individuals with visual disabilities. It is a simple and intuitive haptic interface for exploring tactility. Being based on the sense of touch, it did not require any adaptation for its use with those with vision loss.

With the term "disability", we refer to long-term physical, mental, intellectual, or sensory impairments that, in interaction with various barriers, may hinder full and effective participation in society on an equal basis with others - as it is stated by the United Nations human rights office of the high commissioner.

There were four participants in total, two with different levels of vision loss and two without any vision loss. During the research phase, the interviews raised awareness that designing an inclusive activity required creating something for everyone, not only for those with visual impairments. Involving people with different kinds of vision was our first step in creating this workshop. Then, an artistic performance based on the activities we did was designed. At the beginning, a focus group was

conducted with the participants and, at the end, interviews were made to collect qualitative data on the quality, effectiveness, and ease of the project. Based on the feedback of the participants, further research was conducted focused on already existing interactive artistic technology that could be used in such activity.

2. Related work

Several studies and projects have been conducted on participatory arts activities and health, on the contribution of art and design to society, and on the design of interactive installations for tactile exploration for people with visual impairments. Participatory arts are gaining recognition as a non-clinical approach to the management and promotion of mental health and well-being. Recent evidence suggests that participatory arts may reduce symptoms of depression and anxiety and improve mental well-being [1]. The findings suggest that a reduction in tense arousal is a crucial component of arts-on-prescription services and establish a direct link between experiences during art workshops and changes in global wellbeing as stated by Holt, N. J. [5]. Moreover, reviews have identified a positive effect on stress, social isolation, autonomy, and a sense of achievement [1].

Arts and health initiatives in communities grew in the late 1980s, using community arts activities to engage people in thinking about their health and to help individuals in disadvantaged areas or contexts [6]. Different artists and researchers have been using artistic practice within projects aimed at enabling researchers to collaborate with young people and communities [7]. They regularly run workshops in different contexts such as schools or as part of participatory design projects. The application of artistic practice combined with participatory design methodology in projects for education and communities is a recognized practice.

Finally, there are several studies and projects proposing the design of technologically mediated exhibitions for blind and visually impaired people [3]. Most of them focus on the use of tactile or auditory systems. However, a combination of both systems would be even more effective. A multimodal combination may enhance cross-modal perception. It has been found that technological examples of simultaneous union of both senses are quite rare in communication devices for the visually impaired, and in museums, this lack is substantial [3].

All performative and participatory arts, workshop activities for educational contexts and technologies-mediated activities and exhibitions can have a great impact on creativity education and experiential learning. What about creativity? Why should we take this into consideration?

One main definition of creativity is that a creative product or behaviour satisfies the criteria of being novel and appropriate [8]. There are also four major categories, known as the 4Ps, that explain clearly what creativity is. These include the creative product that results from creative activity, the creative process involved in the creation of ideas, the creative person who creates, and the creative press or environmental influences on creativity [8]. Each of these can be useful both in the personal and professional life of a person. That is why it should be important to train creativity and make this training accessible to everyone.

3. Through Myself

The starting point was the qualitative and quantitative data collected both from the literature review and the interviews. The main starting points for the design of the activity were different. From the perspective of the value of the activity, evidence was found in the literature on the usefulness of participatory arts activities and the use of technology-mediated experiences for people with visual disabilities. From the data collected through the interviews, the main outcome was the strong differences between blind and visually impaired people. Those who are completely blind have different challenges compared to those who have visual disabilities, as their experience of sight varies from person to person. The aim that guided the activity design was to use performative arts, such as dance and singing, in combination with a mediated-technology experience to promote body awareness and enhance creativity in an inclusive way.

3.1 Interviews and focus group

To validate the activity, a qualitative approach was chosen, which was in line with the nature of the project - as it is aimed to construct an educational experience focused on emotion and creativity.

Two rounds of semi-structured interviews were conducted. At the beginning of the project, 17 interviews were conducted using snowball sampling. To develop the activity, 17 interviews were conducted: 10 with people who are blind or have visual impairments, 2 with operators of an association for persons with vision loss, 3 with musicians and 2 with dancers that also dance teachers. These interviews were conducted in Italian. The age range of the people with visual impairments was between 20 and 45 years, with 4 male and 13 female interviewees. The first contact was made through the local association for people with vision loss. The objective of the semi-structured interview was to identify the interests and the possible needs for activities aimed at educating creativity involving both the body and the use of technology.

Based on thematic coding carried out during the analysis of the interviews, the activities to be implemented during the project were planned. In the second round, a focus group was organised with the 4 participants involved in the activity. At the conclusion of the activity, one interview with each participant was conducted to collect feedback. Both the focus group and the final interviews were held in English. This material was used to assess the participants' experience. We manually transcribed all the interviews and the focus group. Thematic coding and cluster analysis were performed on the data.

The participants included two individuals with visual impairments and two without, all between the ages of 20 and 24, with three Italians and one Syrian. The small number was chosen because of the nature of the activity - which emphasised interpersonal contact - to allow participants to get to know each other and feel comfortable working together.

3.2 The activity designed

The activity "Through myself" took place at a local dance centre. All those who expressed interest in participating during the exploratory phase were contacted; four of them accepted to participate. The proposed activity took place over four, with each meeting lasting three hours. Each meeting was focused on making participants experience a different performing art, through which they could get in touch with each other. The project started with a focus group in which the project and the operators of an association for persons with vision loss, a dancer, and a singer, were presented. Participants were asked to present themselves and then the following points were explored: *What motivated you to participate?* What is *your opinion about creativity?* What do you think about "*artistic research*"? Have you ever participated in a dance activity? Have you ever participated in an activity that involved using your voice and singing? What do you expect from these days and this project? What are your fears about this project? What are your desires for this project?

The focus group ended by asking the participants to reflect on what they could think of if they knew they were going to meet someone new and share it with the other participants.

3.3 Framework

The first day was focused on dance experimentation. The dancer worked using:

- Study of musculoskeletal possibilities
- Creative workshop
- Theatre with principles of the Limón technique - weight study, fall and recovery [9].

The Feldenkrais method is an educational system that aims to promote deep somatic reconnection and neuromuscular relaxation through breathing. Its purpose is to reorganise movements and actions and to establish greater fluidity and awareness of your body [10]. For those who do not work daily with their bodies, it was an important tool for a first approach, giving them the opportunity to explore new parts of themselves. This was followed by the musculoskeletal work which, in addition to listening, involved the search for one's own movement and physical possibilities. This allowed participants to feel confident to move in their own space and with others. The creative workshop was then needed to foster communication and freedom of expression, leading to the use of Playtronica, experimenting with sound, touch, voice, gesture, and word, on the principles of the Limón technique "fall and recovery" based on the study of the bodies' weight [9].

The second day has been dedicated to the use of voice. The singer worked using:

- Call and response,
- Body percussion,
- Circle singing,
- Canon,
- Training for collective listening.

Call and response are a succession of two distinct sentences; it is one of the basic elements of musical forms (typical of blues forms) that corresponds to the same concept of "question and answer" of human communication. It is useful for developing the melodic sense and interaction between multiple subjects.

Body percussion involves using the body like a percussion instrument, allowing participants to directly experience the pulse, the rhythm, and the metric of words, while also developing their motor coordination.

Circle Singing is a spontaneous practice that originated in Africa and involves using singing as a means of communication and community building. Participants typically arrange themselves in a semicircle or circle and create an improvised choral song together.

Usually, there is a conductor who suggests musical phrases to the other participants by ordering when to start, when to stop and when to change the melody, through visible gestures. In this case, the visible gestures have been replaced by touch or simple speech.

Canon is a contrapuntal composition that combines a melody with one or more imitations, which overlap progressively. It is a fun and, at the same time, complex exercise for a beginner, and is useful to develop their own autonomy and useful to maintain high concentration.

Training for collective listening works as follows: among the participants, there were some who had never been part of a choir or sung together with several people. This can be disorienting. For this reason, it was necessary to train the ear to a collective listening that included both itself, perceived as an isolated element, and itself, as part of the whole of the other voices. So as also to take care of the dynamics and respect the space of others as much as your own.

On the third day of the meetings, the operation and use of the TouchMe were explained. In addition to the exercises from previous days, the TouchMe was used to design an artistic performance as the result of the activities carried out in a group.

The last day was dedicated to the performance, which was an open show organised for the public as a short event. The event was open to everyone, but it was primarily advertised to the local community and the personal networks of those involved.

3.4 TouchMe

TouchMe [11] is a MIDI controller developed by Playtronica that allows users to create sound through touch and a digital audio workstation. The device is a thin metal plate about 15 centimetres long and 5 centimetres high, and the ends are round and produce sound when touched. The sound is generated by an algorithm programmed with Ableton Live software, which is managed by a workstation connected to the TouchMe. To allow participants to move freely in the space, a 10-metre USB 3.0 extension cable is used to link the MIDI controller to the workstation.

3.5 The performance

The performance was designed to incorporate body movement, vocalisation, and technologically mediated tactile experiences that produced sounds. In particular, the TouchMe device was used to enable tactile interaction between participants, which generated music when touched. The sound produced was a combination of synthesised sounds designed in collaboration with a sound designer.



Figure 1. Performance done as a conclusive event of the activity designed.

3.6 Analysis

The starting point was the qualitative data collected by the interviews and the review of the data both qualitative and quantitative found in the literature review that is constituted by the related work. There has been a significant improvement in well-being in terms of contentment, perceived energy level, and reduction of tension in participation in participatory arts activities. From this evidence, the question was:

could be effective to combine participative art activities with art technology to design an educational inclusive activity?

It was decided to use thematic coding and cluster analysis in the interviews and the focus group made to highlight the possible usefulness and difficulty of the project idea. The aim was to triangulate the data by mixing existing data reviewed with the qualitative one collected and through the experimental social project performed. The thematic coding of the interviews highlighted several points.

4. Results

The results of the thematic coding of the first round of the 17 interviews highlighted four macro categories: relationship with the body, relationship with the environment, relationship with creativity, and relationship with technology. All this information resulted from the interviews with people with vision loss and the operators of an association for persons with vision loss.

4.1 The body

The analysis revealed the challenges of educating individuals who are blind or visually impaired in managing their posture and manipulating objects in relation to others. These difficulties are especially prevalent during growth and development. Much of their education is focused on developing their own strategies for managing their body and its needs. It is important to note that each person with a visual impairment is unique and requires individual attention. While touch and hearing are often used to recognize others and objects, those who are blind face different challenges than those with visual disabilities. For them, vision varies greatly from case to case, and touch is often the preferred mode of interaction.

4.2 The environment

Various devices are employed to aid in the movement and mapping of space. The white cane is one of the primary tools used for this purpose [12]. As emerged from the interviews, not all people with visual impairments use the white cane or need it. Generally, it is important that there are no obstacles in the space that are not visible or recognizable by the white cane. The space should also have clear angles to facilitate mapping. Audio sources can serve as helpful guides in space, but also become annoying and create difficulties, depending on the clarity of the sound source and whether it is stationary or moving.

Creativity has generally been described as a creative activity and a possibility of personal and emotional expression. Frequent use of creative activities in the education of people with visual disabilities has been found. A feeling of greater confidence in doing tactile activities rather than music or dance was recorded. Many of the respondents had experiences with tactile installations to enjoy works of art or creative workshops. None of them ever participated or were aware of an activity that combined body movement, sound, and tactile experience.

4.3 Activities technology-mediated

Technology is very important for blind and visually impaired people because it helps them in carrying out different activities. The most used technologies are speech synthesis. The interest in possible new accessible technologies, for creativity and not, was unanimous.

In the focus group and the interviews carried out with the participants of the project a thematic coding was made and on this a cluster analysis. Three main categories emerged, each relating to creativity and artistic research, interaction with artistic technologies, and the design of the project itself.

4.4 Creativity, artistic research and Interaction with artistic technologies

There is a lack of space to cultivate and educate creativity. This lack is to a greater extent for people above school age. Creativity is felt as a need. Common prejudices on creativity have been recognized as being more tied to artistic activity. Experimentation with TouchMe has revealed the need for the presence of tactile affordances in the interaction with the device. These observations were made by visually impaired participants, who would have preferred more tactile guidance on the surface of the device rather than just audio feedback.

4.5 Through myself

The value of a project structured around long-term activities and regular meetings became clear from the feedback of participants. They expressed a desire to engage in more in-depth exploration and experimentation over a longer period. Participants noted that activities focused on creativity and experiential learning are typically geared toward children and young people, rather than adults. Additionally, each participant observed that the activities were conducted uniformly across the group.

5. Discussion

The results of the project demonstrated its effectiveness and positive impact. By focusing on common skills between sighted and visually impaired individuals and combining technological arts with performing arts, the project achieved a positive outcome. The study utilised a mix of data from previous research and qualitative data that was collected and analysed. It would also be interesting to bring the project to schools and test its effectiveness with a larger and different target audience. All the participants shared how the nature of the activities - based on the body movements, the use of voice, and the use of TouchMe - involved the senses that all of them can use, making them feel living the same experience. The main contribution is the design of a framework that can be reused for the design of educational activities both in school and social to raise awareness of visual disabilities and educate creativity. Furthermore, the data collected from the project suggests the possibility of implementing similar activities in the future. The feedback gathered can serve as a basis for designing objects or interactive environments for inclusive and outreach activities.

6. Future work

Future work focuses primarily on two issues. The first issue is to implement the activities of the “Through myself” project, based on the feedback collected on the experience of interaction with the technology used. After analysing the data, the question arose:

could a larger object with different ergonomic characteristics be more impactful?

It has been searched for if similar interactive installations exist. An interesting work from which the project could take inspiration is Tone Ladder [13] by Christopher Bauder. It is a household ladder extended with sensors that turns into a real musical instrument. If you step on a rung or touch it with your hand, a sound or rhythm is created that varies from step to step. An individual piece of music is created by climbing up and down or by touching several rungs of the Tone Ladder at the same time. The ladder would be an object of the environment with better ergonomics features for dimensions and the possibility to map the space by posting them. It would be designed as an interactive installation dedicated to socially inclusive activities starting from existing installations like this. The second issue should be to keep collecting data and quantitative ones involving much more participants in the project.

7. Conclusion

Within the project, the collaboration between the dancer-performer and the singer was important for the design of the activities. It was also important the contribution of a sound designer to design the synthesised sounds for using TouchMe. This project presents an innovative project that utilises interactive digital technology and performance to co-design an inclusive educational activity for people who have visual loss. “Through myself” can contribute both in educational and performative arts activities for experiencing and training creativity and education to inclusion.

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