

NEW TECHNOLOGIES FOR ART THERAPY INTERVENTIONS TAILORED TO SEVERE DISABILITIES

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SUMMARY

Individuals with multiple disabilities can have a wide range of characteristics depending on the combination and severity of the disabilities, such as intellectual disability, mobility issues, sensorial impairment, language issues and brain injury. New technologies can help therapists find an alternative way to engage and interact with clients by opening a communication window and starting to build the therapeutic relationship.

The need to use more customized technological tools led us to develop the Painteraction system, an intuitive tool based on Augmented Reality that allows clients to be immersed in their own images. Just by moving their bodies individuals are able to make drawings and receive visual feedback, both from themselves and their therapists, as it appears on the screen.

The pilot testing of Painteraction was performed on 21 inpatients at Istituto Serafico (Assisi, Italy) with severe/multiple disabilities in order to explore and assess reaction and responsiveness in a semi-structured art therapy setting. The sample was formed by 14 males and 7 females (N=21) between the ages of 7 and 35. All participants attended three twenty-minute individual art therapy sessions which were approximately one week apart.

Through direct and indirect (video recordings) observation of the sessions, it appeared that the specific Augmented Reality tool introduced in the art therapy setting was easily accepted by most of the clients involved and generally allowed the development of an interpersonal therapist-client relationship.

The present study therefore gave us the opportunity to test new digital tools in the challenging setting of severe/multiple disabilities and observe the huge potential of new media to empower clients to express themselves and their creativity, and ultimately overcome mental and physical barriers.

We propose that Augmented Reality tools are particularly well-suited to art therapy and create an equally suitable therapeutic environment to address specific client needs.

Key words: severe disability - multiple disability - art therapy - augmented reality - Painteraction

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INTRODUCTION

The present paper aims to present the results of the pilot test of an Augmented Reality tool in an art therapy setting on individuals with severe/multiple disabilities.

The complexity of interventions with this population resides in the wide range of their characteristics, depending on the combination and severity of their impairments.

Every person with multiple disabilities presents a unique challenge.

Art therapy is a mental health profession that uses the creative process of art-making to foster personal development and improve the psychological, affective, cognitive and relational well-being of individuals. It is based on the premise that the creative process generated in artistic self-expression, when practised by a professionally trained art therapist, fosters the growth and development of a sense of self. This type of therapy involves a tripartite relational structure: client with art image; client with art therapist; art therapist with art image (European Federation of Art Therapy EFAT 2018).

The availability of digital technology has increased opportunities for creative expression and communication exponentially. Art therapists have reflected upon the opportunities for incorporating digital technology as a useful intervention tool in clinical sessions (Carlton 2014, Choe 2014, Darewych 2015, Malchiodi 2009, Orr 2012, Peterson 2010).

In Augmented Reality (AR) virtual elements are used to build upon the existing environment. Clients can see their own body in an imaginary context while feeling inside the "real" world. It has been claimed that the virtual environment enables a synthesis of the actual and the imaginary (Vincelli 1999). In AR the combination of an existing environment, one's own body and imaginative and artistic elements creates dream-like experiences in a safe environment. What happens on the screen represents the achievement of the tripartite relational structure: client and therapist with art image on the screen. It is easier for the client to accept the presence of the therapist, to look at him/her on the screen, to start interacting together and even accept physical contact rather than having to engage directly in the "real" world through eye contact etc. From this

perspective the screen can be seen as a sort of “third space” (Ogden 1994) where the relationship between client and therapist can be safely developed. This reminds us of Winnicott’s “potential space” which is an intermediate area between the inner world, the “inner psychic reality” (fantasy), and “actual or external reality” (Ogden 2004). Winnicott states that: “It is a space where we can develop psychologically, to integrate love and hate and to create, destroy and re-create ourselves”, thus promoting the development of the self and facilitating psychological growth (Winnicott 1997). This shared dreamlike space incorporated within an immersive and interactive environment shows great potential for enhancing the efficacy of art therapy (Hacmun 2018).

We hypothesize that the use of a tailored tool can allow for a less invasive relational approach, combining a playful environment with an art therapy intervention. The new technological tool presented in this paper, Painteraction, has strong clinical experience and allows a highly customized approach to the specific needs and skills of each client. According to our hypothesis, using the tool in an art therapy setting allows the fine-tuning of the intervention to the needs of the client. The resulting approach is respectful, playful and can improve social relationships, body movement and creative expression in people with severe/multiple disabilities.

METHODS

The present pilot test aimed at exploring and assessing reaction and responsiveness to specific digital tools by a population affected by severe/multiple disabilities in a semi-structured art therapy setting.

A qualitative piece of research was run to evaluate reactions through direct observation of avoidance or acceptance of the proposed activities during each session.

The study explored the following two research questions:

- How do people with severe/multiple disabilities experience digital technology as a clinical intervention tool in art therapy?
- Do technological tools in an art therapy setting improve the opportunities to establish a relationship with therapists?

The study was conducted at the Serafico Institute in Assisi (Italy), a specialized inpatient facility providing rehabilitation services to individuals with multiple disabilities (mainly intellectual and sensorimotor). Extensive clinical documentation regarding diagnosis is required prior to admission.

The sample was formed by 14 males and 7 females (N=21) between the ages of 7 and 35. All subjects had severe/profound intellectual disability according to Vineland Adaptive Behaviour Scales criteria (Carter et al. 1998). Just two of them were verbal (N=2). Among

the non-verbal subjects, just one communicated via Augmented and Alternative Communication while others communicated by pointing at images, objects, words and symbols.

Therapists and clients involved had not met before the beginning of the pilot test. Clients had never used the proposed technological tools before the beginning of the pilot test, and had never received any training on the use of the specific tools involved and generally on AR.

All participants attended three twenty-minute individual art therapy sessions which were approximately one week apart in a dedicated room at the Istituto Serafico. The pilot testing took place from September to December 2018.

Each session was facilitated by one art therapist and two Major Degree Psychology students. Sessions were adapted to each individual’s level of cognitive and physical ability and were structured in the following three segments: warm-up activity, digital art therapy intervention and closure activity. Each session started with a check-in feeling chart and closed with a check-out feeling chart (Figure 1).



Figure 1. Feeling charts

In the warm-up activity the digital tool Painteraction allowed physical warm-up and user engagement. The digital art therapy intervention was preceded, if possible, by free drawing on paper with pastels. Client’s drawings or images selected by clients were used in the last digital activity, which involved body expression. The check-out feeling chart was proposed at the closure of each session. Check-in and check-out feeling charts were completed either verbally or by pointing to two different smiley faces (sad or happy). Feeling charts were considered as a qualitative measurement of a client’s acceptance/avoidance of the proposed session and as a marker of the willingness to participate in the second and third sessions. Each session was video recorded.

Permission to proceed with this study was reviewed and granted by Istituto Serafico Board. Participation in this study posed no potential risks to participants’ well-being beyond those normally encountered in everyday life.

TOOLS: PAINTERACTION

A new technological tool named Painteraction was recently developed at Atlas Centre, Italy from an original idea by Donnari (2015), (Pazzagli et al. 2018).

Key elements of Painteraction are:

- Intuitive understanding of “how it works” and ease in managing the tool: the device provides a natural user interface that allows users to interact intuitively with voice and gestures without any intermediary device, such as a controller.
- Screen acts like a mirror reproducing the real room where the action happens, with AR that enhances the real world.
- Visual feedback of movements that can catch the client’s attention and help him/her to immediately understand how the software works.
- Sensorial integration: movement, visual feedback and sound. Motion responsive technology provides the integration of different sensorial inputs.
- Different applications for a tailored treatment. Painteraction offers a range of applications that allow the therapist to better understand which approach is tailored to the needs and skills of the specific client.
- Data recording. Data stored in a cloud can be retrieved by researchers to perform assessment and evaluation. Data can also be used for supervising the therapists.

The Painteraction setting consists of a television screen, a personal computer and a Kinect, a motion sensing input device (Figure 2).

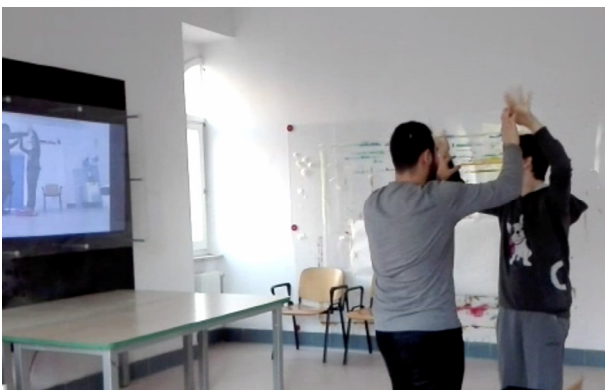


Figure 2. Painteraction setting

There are five interactive applications:

Trails: Luminous trails are generated by hand movements. The client and therapist can see themselves on the screen and receive visual feedback from their hand movements. Sound feedback can be added to the trails.

Paint: By simply using hand movements, it is possible to draw by picking colours from a menu. Colours can also be associated with basic emotions represented by emoticons. The colour lines are transparent and

behind the drawing it is possible for therapist and client to see themselves on the screen. A sound effect can be added to the colours.

Physics: The application allows interaction with a virtual ball bouncing around in response to full body motions.

Vowels: Vowels emitted by a user are sensed and transformed into coloured shapes which appear on the screen close to the user’s mouth. It is also possible to make drawings with one’s own voice.

Avatar: After choosing a background (one’s own drawing or a chosen image), the client can see his/her own body immersed in the image. A detail of the image or a favourite character can be used as a personalised avatar and can be moved by one’s own body. It can be used for storytelling or as a real life simulation tool.

A website was designed to manage the access and privilege levels of different kinds of users. Therapists and researchers can retrieve data and videos of the sessions from the website and receive a visual recap of the time spent using each application.

RESULTS

18 clients rated the first and following sessions positively. Three clients expressed avoidance by refusing to remain in the setting during the first and the second session. A third session was not proposed to these subjects. Therapists generally reported, as shown in the video recordings of the sessions, that the clients adopted a positive attitude towards the proposed activities.

The warm-up was generally enjoyed and helped engage 15 clients and establish a good atmosphere. Three clients were clearly not interested in the warm-up activity during the first session and did not want to repeat it in the following sessions.

Just 4 subjects could perform free drawing while the others were willing to choose favourite images from the internet by pointing at the computer screen (Figure 3, 4). Digital art therapy intervention based on personal drawings or favourite images was appreciated by the 18 remaining clients.



Figure 3. Free drawing on paper



Figure 4. Immersion in the client's drawing.

DISCUSSION

The primary research question for the study was: How do people with severe/multiple disabilities experience digital technology as a clinical intervention tool in art therapy?

Throughout the study, participants had the opportunity of experiencing a different kind of intervention that could be individually customized, thus facilitating non-verbal interaction. The technological tool gave the clients the opportunity to have their first engagement of a visual-sensory nature. The visual approach seemed effective for all 18 clients who completed the three sessions. According to our experience the use of the screen and the AR tool was a very effective way to start the session; we noticed that it caught clients' interest and focus. We experienced also that such a tool facilitated the development of an interpersonal relationship between therapists and client. Physical touch, body movement, free drawing (on paper or on the screen) were afterwards easily accepted by all 18 clients.

Clients expressed a clear appreciation of the possibility of being immersed in their own drawings or in images of their choice. In the video recording, facial expressions show joy and amusement. After the initial phases all 18 clients willingly used the final immersive tool. Three people were able to make free drawings on paper. Three clients chose images and characters from their favourite cartoons and animated them in real life with the therapists. Two clients chose the photo of their favourite singer and animated it by singing their favourite songs. The possibility of introducing sounds and music was always proposed as an opportunity to test individual acceptance and tailor the following sessions to their sensorial preferences. Just 8 people accepted music and sounds during the session.

The second research question was: Do technological tools in an art therapy setting improve the opportunities to establish a relationship with therapists? Therapists were generally impressed by the ease of acceptance of the proposed activities during the sessions, considering they had no previous contact with these clients. The possibility of having fun together seemed a powerful way of establishing relationships and getting close to

new clients. Clients were generally surprised by the potential of this technological tool, and it was described as magical. The tool was greeted with interest and curiosity by these 18 clients, at no point creating anxious reactions or facial expressions denoting fear. Interest and appreciation was also expressed in check-out feeling charts and by the fact that all 18 clients chose to participate in all three sessions proposed.

CONCLUSION

The present pilot test aimed at exploring and assessing a specific digital tool for clients with severe/multiple disabilities. Considering direct and indirect (video recordings) observation of the sessions, the specific AR tool introduced in the art therapy setting seemed to be easily accepted by most of the clients involved and generally allowed the development of an interpersonal therapist-client relationship.

The main elements that facilitated the art therapy sessions seemed to be:

- The possibility of individual personalization of the tool;
- The element of surprise generated in the client;
- The possibility of experiencing themselves in a safe and playful environment;
- The possibility of overcoming disability barriers, e.g. the possibility of drawing just by moving their bare hands;
- The possibility of integrating different sensorial channels (visual, hearing, touch);
- The possibility of expressing free individual preferences by choosing favorite images and characters to interact with.

Although there was a general appreciation of the experience by both clients and therapists, the present study has several limitations.

Since this pilot testing was the first application of this technological tool in a severe/multiple disability context, we adopted a heterogeneous sample regarding age, sex and diagnosis. Another limitation linked to the testing phase is the limited amount of time of each session and of the entire study.

The evaluation was based on qualitative observations.

Considering the favourable results, the next steps we can foresee are:

- Clinical trial on a homogeneous randomized sample with a control group.
- Quantitative research based on measurements and standardized tools to assess the positive effect of the proposed digital art therapy intervention.
- Longer time to practise (at least one year, once per week) and follow-up assessment six months after the conclusion of the clinical trial.

In the future we wish to investigate mirror neuron system activation during art therapy sessions with Painteraction and generally sensorimotor activation and improvement.

In conclusion, the present study gave us the opportunity to test new digital tools in the challenging setting of severe/multiple disabilities, and to observe the huge potential of new media in empowering clients to express themselves and their creativity in overcoming mental and physical barriers. In summary, we propose that art therapy is particularly well-suited for employing AR tools that create a therapeutic environment that can address clients' specific needs. The integration and implementation of new digital media in art therapy interventions is crucial for the evolution of the field. We believe that new technologies have the potential to enhance and expand classical art therapy approaches.

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Contribution of individual authors:

Simone Donnari & Giovanni Fatuzzo: design of the study, interpretation of data, manuscript writing.

Valentina Canonico: design of the study, manuscript writing.

Chiara Bedetti & Moreno Marchiafava: revising manuscript.

Marina Menna: design of the study.

Sandro Elisei: design of the study, interpretation of data.

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