

Improving Collaboration in Online Group Art Therapy (Final Report for CPSC 502.07)

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Abstract

Art therapy allows people to express themselves through the process of art-making, and it provides therapeutic benefit to people suffering from chronic pain. Even though art therapy has numerous well-established benefits, many people who would benefit from art therapy cannot meet up with a therapist or join an art therapy group because travel may be a challenge. One possible solution is to deliver art therapy online. Currently, there is clinical work underway that is exploring the use of online chat forums and discussion boards to deliver art therapy to groups that are not collocated. Group members use these tools to post images of their artwork and chat with others in the group. The problem with these tools, however, is that they provide little opportunity for collaboration and shared art making. Because group members are not aware of each other's actions and non-verbal cues in a chat room, they cannot collaborate with each other easily. This work discusses the design, development, and evaluation of tools that promote collaboration and enhanced awareness of group presence in online art therapy.

Key words: Art therapy, online therapy, group therapy, telehealth, art making, collaboration, user embodiment, telepresence.

1 Introduction

Art therapy allows people to express themselves through their artwork and explore deep thoughts and emotions through the process of art-making [13]. Common art therapy activities include painting, sculpting, and collage making. It can be very beneficial for cancer patients because it is a drug-free intervention that allows them to reduce stress [14], improve self-awareness [14], and even reduce physical pain [13]. Cancer patients can also use art therapy to express to others the true extent of the pain and the treatment that they are experiencing [12].

Depending on the type of program the art therapy client is enrolled in, the client can create artwork individually, one-on-one with a therapist, or in a small group with about five to seven other group members and a therapist.

When art therapy is done in small groups, groups usually meet about once a week for several weeks. In a typical face-to-face group session, the therapist would give the group an activity to work on, either individually or collaboratively. This activity could be media-based (i.e., uses a specific art medium, such as collage or charcoal painting), theme-based (i.e., can be based on a specific topic, such as identity or body image), or both. Group members would then work on that activity, either individually or collaboratively. After some time has passed, the group and the art therapist would get back together to discuss the art pieces that come out of the activity and the personal process that each person went through to create their art piece. This stage presents a great opportunity for group members to bond with each other.

Recent clinical research has explored the use of the Internet to deliver art therapy (e.g., [5]). Many of those who would benefit from art therapy cannot meet up with a therapist or join an art therapy group because, for them, travelling to a clinic is a challenge. This is especially true for people not living in large urban areas. One possible solution could be to deliver art therapy to the client, possibly via the Internet, so that the client does not have to travel anywhere. Collie et al. [5] designed a system for online group art therapy that utilizes a shared drawing system connecting users across a network of computers. While this system did present problems, both from a technical and clinical perspective, those problems helped shed light on a relatively new domain. The major conclusion from this study was that the general approach of providing art therapy online is feasible, but it still needs to be improved from a clinical and technical perspective.

A fundamental issue with online art therapy today is that not everyone in an online art therapy group is in the same space together, and so it is difficult for group members to collaborate on artwork. Collaborative work online is made better by enhancing awareness of other users' actions [8]. Because of this, our suspicion is that collaborative work on art therapy activities online can be improved if the group members could see each other work-

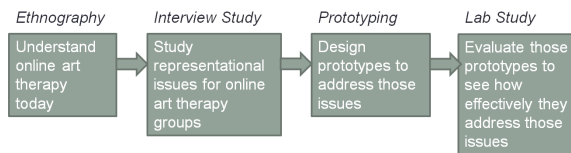


Figure 1: Our research approach.

ing. This could be done in a variety of ways. For example, a video conferencing system could be set up so that group members could see each other’s workspaces. The problem with this approach, however, is that although it may provide full awareness of other group members’ actions, there is the risk of revealing “too much.” Often, those who participate in online art therapy, especially cancer patients, find value in remaining hidden from other group members [6]. The benefit of a text-only platform is that it allows people to discuss difficult topics while still remaining anonymous to some extent [16].

Thus, the challenge is figuring out how to provide sufficient awareness for group members to collaborate on artwork without compromising on privacy. The research question is therefore: what is the best way to improve collaboration in online group art therapy without putting privacy at risk?

To address this question, we took a multiphase approach (Figure 1) involving four phases: (1) the *ethnography* phase, where our goal was to understand how online art therapy is done today (i.e., the current state-of-the-art); (2) the *interview study* phase, where our goal was to study representational issues for online art therapy groups; (3) the *prototyping* phase, where we designed online art therapy prototypes to address those issues; and (4) the *lab study* phase, where we evaluated those prototypes to see how effectively they address those issues. Our explorations have resulted in a small set of viable prototypes that we have demonstrated result in enhanced feelings of connectedness that can be used in online group art therapy.

2 Related Work

Art therapy can be very beneficial for many people, but especially for cancer patients. Art therapy can help cancer patients explore their identity, become more self-aware, and communicate deep feelings and emotions to others. Luzzatto et al. [12] wrote about one such intervention in which cancer patients are given a body outline template—a blank outline of a human silhouette—and are encouraged to fill the space in and around the body using markers, pastels, and other painting and drawing tools. Several patients used this intervention to visualize and

communicate physical pain, communicate deep feelings and emotions, and search for meaning and spirituality.

Art therapy can also help control and alleviate cancer symptoms. Nainis et al. [13] wrote about a study in which fifty cancer patients participated in a one-hour art therapy session. Their symptoms were assessed before the art therapy session, and again after the art therapy session. There were significant reductions in most of the symptoms assessed for all of the participants, and participants expressed overwhelming comfort with the process and a strong desire to continue with the therapy. The participants mentioned that the therapy provided positive distraction and was calming and relaxing.

Art therapy has many benefits for cancer patients. Despite these benefits, some cancer patients are still unable to participate fully in art therapy programs. Often this is because they cannot make it to clinics. Some cancer patients are too sick and cannot leave the hospital room, while others live in remote areas too far away from clinics. Often times art therapy groups are too geographically distributed, and this can make it difficult for groups to meet up regularly in person. In order to alleviate this problem, art therapists could form groups based on the geographic location of clients, instead of on the basis of diagnosis, gender, age, or other personal characteristics, but this may not be desirable.

Recent research had explored the feasibility of delivering art therapy services to clients and groups remotely. People in the computer-supported cooperative work (CSCW) community have developed tools to support online art therapy. For example, the first study looking into the feasibility of online art therapy was conducted by Collie et al. [5] in 1998. In this study, a tool was developed to try to mimic the face-to-face group art therapy experience. A participatory design team, consisting of participants with knowledge and expertise in counselling, psychotherapy, support services, and art actively evaluated this system throughout the design phase and provided feedback that contributed to the evolution of this system. The major finding from this study is that computer-supported distance art therapy is highly feasible, and it has a lot of potential.

Hoey et al. [9] designed a tool for online art therapy that helps clients stay engaged in art activities. This tool was primarily designed for adults with dementia, but could be beneficial for anyone looking to participate in art therapy exercises. This tool uses several metrics, including gaze and level of drawing activity, to measure and report the client’s level of engagement. The idea behind this tool is that, by reporting the client’s level of engagement to the therapist, the therapist could, for example, intervene and give the client more prompts. This sys-

tem was evaluated through simulated examples and interviews with art therapists. The therapists gave feedback, and two major themes were identified: (1) issues related to the customization of system actions and intervention, and (2) issues related to engagement monitoring.

Perhaps a better approach than having the tool measure engagement is to instead have the tool make it easier for the therapist to make a judgement about how engaged the clients are in the art activities. The problem with the two art therapy tools listed above is that they do not communicate a lot of non-verbal communication information. Non-verbal communication information such as body language, gestures, pen and brush pressure, how aggressive the client is handling the art tools, etc. might be very important for art therapists. Without this non-verbal information, the therapist could be missing out on a lot of very important details on the client's current state and well-being. If the therapist is more aware of the clients non-verbal actions, then the therapist might be able to become more aware of how engaged the clients are.

Gutwin and Greenberg [8] discuss how the users of a workspace gather perceptual knowledge through consequential communication, the changing state of artifacts (feedthrough), gestures, and verbal communication. Each of these four things improves workspace awareness amongst the users of a workspace. In an art therapy setting, consequential communication information can be gathered by glancing over at someone to see if that person is working or how engaged the person is. Feedthrough information can be provided by the changing state of the client's canvas or the sounds that the client's brush strokes make. The therapist and the clients could make pointing gestures to refer to a piece of someone else's work. Lastly, the therapist can give verbal prompts to the clients or the clients could talk to each other or ask the therapist questions at any time. All of these pieces of communication information give the therapist a sense of how the group is performing.

Benford et al. [3] discuss user embodiment in collaborative systems, and identify a set of key issues related to user embodiment. Among those issues are: presence, degree of presence, availability, identity, location, activity, history of activity, viewpoint (where one is looking), action point (where one is completing some action), gesture, facial expression, and truthfulness of representation. These are issues that have to be taken into account when designing a system for awareness support. In an online art therapy setting, the therapist (and indeed the clients) should be aware of who is actually present (and to what degree each person is present and available to participate), who everyone is, what actions are being performed by whom, what activities are going on in the workspace,

the history of the activities that had taken place (i.e. the art-making process), where others might be looking (i.e. what artifacts each person is looking at and what parts of the artifacts each person is looking at), where others are performing some action (i.e. where others are painting or moving objects around), what types of gestures each person is making, and what types of facial expressions each person is making. Truthfulness of representation of identity may be less important in an online art therapy setting because cancer patients may wish to express their identities in whatever way they please, so they can be seen not as sick patients, but as whomever they are on the inside [15].

Although awareness is important in an art therapy setting, privacy is also a very important issue in online art therapy [6]. Boyle et al. [4] discuss the issue of privacy in always-on video systems. Researchers have suggested that always-on video may be an effective means of providing distributed work groups with high-fidelity presence and availability awareness. However, there are concerns over privacy and solitude with these systems. This study considers the effects of blurring and pixelization of the live video stream at various levels on both awareness and privacy. Participants were recruited to evaluate the effects of the filters on both privacy and awareness. The general consensus was that, with these filters, as the level of intensity of the filter increased, the level of privacy increased while the level of awareness decreased, and vice versa. The problem with these two video effects is that they affect the levels of almost all aspects of awareness mentioned by Benford et al. [3], including presence, degree of presence, availability, identity, location, activity, history of activity, viewpoint, action point, gestures, and facial expressions. Individuals participating in an online art therapy group find value in keeping their identities private [6], but there could be some value to having high levels of awareness in every other aspect. Therefore, in an online art therapy setting, the only aspect of awareness that may need to be restricted is identity. An ideal filtering technique for online art therapy might restrict awareness of identity while providing a high degree of awareness in every other aspect.

3 Ethnography and Interview Study

Currently, there is clinical work underway that is exploring the use of online chat forums and discussion boards to deliver art therapy to groups that are not collocated. This work is being conducted by researchers and art therapy professionals from the BC Cancer Agency and the Cross Cancer Institute on a platform called *CancerChat-Canada* [1]. So far, no publications have been made regarding this work. Art therapists conducted pilot groups

on this platform to evaluate its effectiveness in delivering art therapy. These pilot groups were comprised mainly of practicing art therapists, and no cancer patients or actual clients were involved at this stage. Our exploration into this design space begins here. The author of this paper participated in two of these pilot groups and interviewed other members of these groups afterwards. Based on the author's experiences and the group members' responses, some interesting observations were made.

The first observation was that, compared to face-to-face group art therapy, art therapy on CancerChatCanada provides little opportunity for group members to collaborate on artwork. Essentially, all communication and interaction between group members comes to a halt when the group is asked to work on an art activity. This is because when group members work on an activity, their attention shifts from the chat window to an art program of some kind. The chat realm and the art-making realm are completely separated. In some ways, this could be seen as a benefit. During the interviews with other pilot group participants, some people mentioned that they enjoyed being able to create an art piece without any distractions and without anyone looking over their shoulder. This is certainly a benefit for when art activities are done individually, but it also means that activities that are generally done collaboratively are difficult to complete on this platform. In order to successfully collaborate on activities in online art therapy, the communication realm and the art-making realm should be combined.

4 Prototype Exploration

We explored new ways of providing group art therapy online such that collaboration and group cohesion are not compromised. We derived a set of design goals based on our observations from participating in the CancerChatCanada online art therapy groups:

1. Promote shared creative experiences
2. Promote a sense of connectedness between individuals
3. Allow for meaningful interaction through non-verbal communication
4. Allow group members to be aware of each other without actually seeing each other

Based on these goals, we came up with a set of design ideas for tools that seek to make collaboration and social bonding easier in online group art therapy.

To implement our design ideas, we used C#, Windows Presentation Foundation (WPF), and the .NET Framework to build the prototypes of the programs that run on

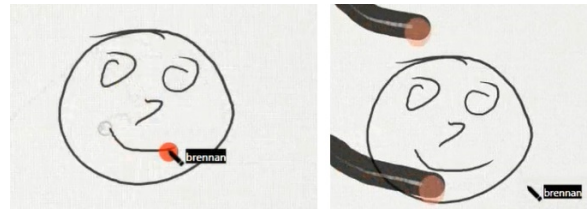


Figure 2: An art therapy painting tool for tablets that reveals non-verbal communication information such as pen pressure, finger contact width, and drawing speed.

the clients' machines, and Node.js to build the prototypes of the servers that handle the communication between the clients' machines.

4.1 Shared Drawing Space with Improved Non-Verbal Awareness

We built a painting tool, utilizing Microsoft Surface tablets with pressure sensitivity, that allows pairs and small groups of users to draw together on a shared canvas (Figure 2). Aside from just showing other users' cursors, this tool also reveals information such as pen pressure, touch contact area, and cursor paths, to add an additional level of awareness. Instead of just being aware of where in the workspace another user is drawing, one can also be aware of where another user is coming from, whether the user is drawing with a pen or a finger, how much pressure the user is applying to the canvas, how much of the user's finger is touching the canvas, and how fast (and perhaps how aggressively) the user is drawing. Our hypothesis is that revealing this additional information helps users become more aware of the presence and the actions of other users.

4.2 Awareness of the Body

To facilitate even more awareness, we considered representing users as silhouettes and placing them in a virtual environment where they could interact with each other and create art with each other in the environment. We came up with a series of designs, utilizing Microsoft Kinect commodity depth cameras, that support this (Figure 3).

Using the environment as a canvas. The first tool we created, shown in Figure 3(a), allows pairs of users to paint together in their environment. Users' strokes are drawn in 3D, and users can walk behind, in front of, and around their strokes.

Using the body as a canvas. We also explored the idea of allowing users to control their identities by letting them paint on their own bodies. This idea was inspired by the body outline art therapy activity described by Luzzatto et al. [12]. Users can paint on their bodies and then use

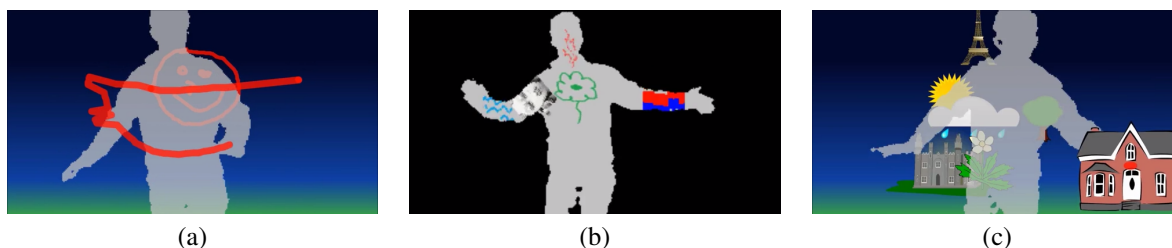


Figure 3: A series of art tools, utilizing a commodity depth camera, that provide awareness of the body without revealing too much about identity.

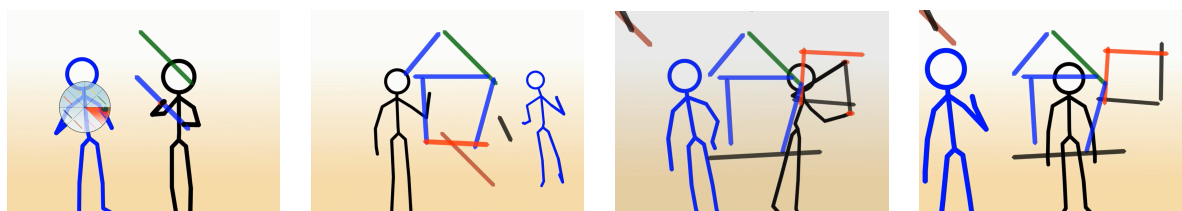


Figure 4: A tool, utilizing a commodity depth camera, that represents users as stick figures and allows users to create artifacts together using sticks.

their body outline drawings as avatars in a remote collaboration space (Figure 3(b)).

Exploration of other art-making primitives. We then explored the idea of allowing users to move clip-art-like elements around a 3-dimensional space (Figure 3(c)). Rather than drawing strokes, users can create collages together, or play with each other as if in a sandbox.

4.3 Stick Figure Art Therapy

After much brainstorming and discussion, our iterations resulted in the idea of representing users as stick figures and allowing users to create artifacts together using sticks. We created an art tool (Figure 4), utilizing Microsoft Kinect commodity depth cameras, that does just this.

To use this tool, a user would step in front of the depth camera and would be represented as a stick figure on screen. To grab a stick, the user reaches his arm out to the stick and clenches his fist. If the user grabs a stick with one hand, he can move the stick around. If the user grabs a stick with two hands, he can stretch and rotate the stick. If two users grab a stick with one hand each, both users can stretch and rotate the stick together. The user can move forward and backward with the stick in hand to move the stick back and forth along the z-coordinate in the 3-dimensional space. To bring a new stick into the environment, the user can clap his hands to reveal a radial menu where he can select from different colour sticks.

The stick figure representation conveys its user's body language in a unique way, providing people with even

more ability to shield themselves from unwanted attention to their actual appearances. In contrast, the silhouette approach still reveals too much about the user's bodily appearance, even though it hides the user's face. Group members can focus less on how they appear to others and more on the activity on hand. In therapy sessions, it is often easier for people to express themselves or reveal deep thoughts and emotions when they are doing so as someone else (or something else) [7]. This is why puppetry is a popular exercise for children in play therapy and other expressive therapies [7].

This tool also frees people from their drawing skills. Often in art therapy groups, group members start out nervous because they feel that their drawing skills are not good enough, or that everyone else is better than them at drawing or painting. This tool gives everyone an equal playing ground. It helps people feel like they have the same skill sets as everyone else in the group. Instead of painting or drawing, group members build objects and artifacts out of sticks.

5 Evaluation

We evaluated two of the design ideas we came up with: the shared drawing space with improved non-verbal awareness (the "tablet" art tool), and the "stick figure" art tool. We considered these to be viable designs that could be conceivably deployed with current technologies. We measured and compared each tool's ability to provide subjective feelings of awareness of group presence. To do this, we used the Temple Presence Inventory (TPI) ques-

tionnaire [11]. A subset of the questions from this questionnaire were used to evaluate and compare each tool's ability to provide awareness of presence in the following factors: social presence, active social presence, engagement, and social richness.

5.1 Participants

We recruited three pairs of participants (six participants in total) to take part in art therapy and art therapy-related exercises using each prototype.

5.2 Tasks

There were four different types of tasks, each utilizing one of the prototypes and involving either a turn-taking activity or a "creating together" activity. In other words, there were four test scenarios: a turn-taking activity with the tablet tool, a turn-taking activity with the stick figure art tool, a "creating together" activity with the tablet art tool, and a "creating together" activity with the stick figure art tool. Each pair of participants worked on one activity that fits one of the scenarios.

Each pair worked together on an activity in separate rooms using one of the tools. Each participant was taught how to use the tool before they began working on the activity. Pairs then spent 15-20 minutes on each activity. The following activities were used in our study:

- **Turn-Taking Activity with the Tablet Art Tool:**

Name of the Activity: Silent conversation

Description: Person A starts drawing whatever they want for a minute or two, then person B responds for another minute or two, and so on for about 15-20 minutes.

- **Turn-Taking Activity with the Stick Figure Art Tool:**

Name of the Activity: Silent conversation

Description: Person A starts building whatever they want out of sticks, stones, and bricks for a minute or two, then person B responds for another minute or two, and so on for about 15-20 minutes.

- **"Creating Together" Activity with the Tablet Art Tool:**

Name of the Activity: Draw a flag together

Description: Both people spend a few minutes in a chat room discussing what they would stand for as a pair. Then, with the chat room on the side, they draw a flag together that reflects their shared values. The pair can speak to each other using the chat room if they desire.

- **"Creating Together" Activity with the Stick Figure Art Tool:**

Name of the Activity: Build a house/castle together

Description: Both people create a structure of some kind together using sticks, stones, and bricks.

5.3 Dependent Measures

After working on an activity, each participant filled out a set of questions with items from the TPI questionnaire. Likert scale questions with rankings from one to seven were asked to measure subjective feelings of passive social presence, active social presence, engagement, and social richness. *Passive social presence* refers to one's ability to see and observe the actions of another person in the collaboration space. A sample question to measure this would be "how often did you feel that the person you saw could also see you?" *Active social presence* refers to one's ability to respond to and engage in two-way interaction with another person in the collaboration space. A sample question to measure this would be "how often did you laugh or speak in response to the person you saw?" *Engagement* refers to how mentally immersive the activity in the collaboration space is. A sample question to measure this would be "to what extent did you feel mentally immersed in the activity?" *Social richness* refers to how much social and emotional value one gets out of their interaction in the collaboration space. A sample question to measure this would be "please circle the number that best describes your evaluation of the experience: unsociable – sociable (7 points)."

We also interviewed participants as pairs to learn about their personal experiences using the tools. The questions we asked them were of the following nature:

- What did you (most) enjoy about the experience?
- What did you not enjoy (or least enjoy) about the experience?
- How did you think the experience would have compared to interacting face-to-face?
- What do you think the experience would have been like if you had not known each other or met each other before?

6 Results and Observations

Levels of passive social presence and engagement were reported higher with the stick art tool than with the shared drawing tool, but levels of *active* social presence and social richness were reported higher with the shared drawing tool than with the stick art tool. One possible reason for this could be that, while it is easier to see the other person and observe the other person's actions in the stick art tool media space, it may be easier to respond to the other person and feel as if one's responses to the other person are meaningful in the shared drawing space. Perhaps the

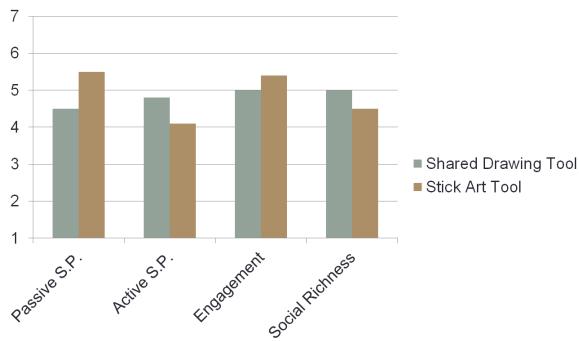


Figure 5: The mean levels of passive social presence, active social presence, engagement, and social richness provided by the shared drawing tool and the stick art tool as measured by the TPI questionnaire.

reason for this is that body language alone is not enough to communicate one’s thoughts, and the ability to express one’s self in an artistic way can help improve communication by a lot. Essentially, the problem with the shared drawing tool is that, because it is hard to see and observe the other person being in the media space, it may be difficult to feel as if one is present with the other person in the media space. On the other hand, the problem with the stick art tool is that, while this tool provides much more awareness of one being present with another person in a media space, it does not provide as much artistic freedom as the shared drawing tool does, and this makes it more difficult for two people to communicate and interact with each other meaningfully in the media space. Often, participants reported that, while they could see and observe each other perfectly fine in the media space, they felt as if they were not able to communicate or interact with each other meaningfully in the space. Our hypothesis is that, if the stick art tool provided more freedom for creative expression by providing more art tools and art-making primitives, making communication easier and increasing one’s confidence in creating meaningful art pieces with the tool, then it would also provide higher levels of active social presence and make interactions more socially rich.

During our post-activity interviews, some participants mentioned that it was difficult to engage in an activity such as building objects out of sticks without at first knowing the other person in the media space. Participants also mentioned that such an activity might be better suited for younger children rather than adults. Participants also mentioned feeling “claustrophobic” while using the stick art tool and feeling as if they were “in the way” of the art. In other words, participants felt as if the media space was not big enough for two people along with an art piece.

7 Improvements and Future Work

It is obvious that the stick art tool can be improved in many ways in order to make the interaction richer and more valuable to the users. One obvious improvement that could be made is to make more art tools and primitives available the users in order to give users a greater sense of artistic freedom. Sticks alone do not provide users a good enough means of expressing themselves artistically. Perhaps adding other primitives such as stones, bricks, beads, feathers, googly eyes, triangles, and rectangles could help. Adding stock images from newspapers, magazines, and other sources to create collages out of could also make the experience more enriching. Another obvious improvement would be to increase the size of the canvas—and the media space altogether. As it is now, the media space that the tool provides is too small for people to work well in, and users are too focused on observing others and staying out of the way of others than they are on the creation of art. There is not enough room to create meaningful artifacts, and users often report feeling crowded in the media space. By increasing the size of the media space, users would have more room to create art, move around, and stay out of the way of each other if they desire.

In the future, we plan on conducting more studies with these tools and any other additional tools that we might build. By running more participants, we will get more statistically reliable results. We plan on recruiting participants from different backgrounds and age groups, including young children, adolescents, young adults, and older adults. We may also consider conducting larger-scale studies and perhaps running mock art therapy group programs of approximately six weeks with up to seven participants each to evaluate these tools’ abilities to promote group cohesion and togetherness rather than feelings of presence.

We may also consider exploring more design ideas, like for example, using a system similar to Microsoft IllumiShare [10] or Google Hangouts [2] to support interaction and collaboration between group members.

8 Conclusion

We explored a set of design ideas for improving collaboration in online group art therapy. First, we explored the idea of enhancing feedthrough of drawing activity in a shared drawing space application utilizing tablets. Then we explored several design ideas, utilizing a commodity depth camera, that provide awareness of the body. The first of those ideas was painting in the environment, the second was painting on the body, and the third was using clip art-like elements to create collages or play around as if in a sandbox. Our iterations from those ideas resulted

in our current “stick figure art therapy” design, which addresses many of our design goals.

Our main objective was to design tools that could be used for collaborative online art therapy exercises. Our four design goals were to promote shared creative experiences, promote emotional bonding between group members, allow for meaningful interaction through non-verbal communication, and allow group members to be aware of each other without actually seeing each other.

We ran studies with the tablet art tool and the stick figure art tool to measure and compare how effective each is in providing subjective feelings of group presence. We used the Temple Presence Inventory (TPI) questionnaire to measure telepresence. We had pairs of participants take part in turn-taking and “creating together” activities using both of these tools, and then we had participants fill out a series of questions, with items from the TPI questionnaire, to measure and evaluate each tool’s ability to provide feelings of group presence. We saw that, while the stick figure art tool provided more awareness of passive social presence and promoted higher levels of engagement, the tablet art tool provided more awareness of active social presence and promoted more socially rich experiences. Based on these results, we made recommendations that the stick figure art tool be improved so that it provides more art tools and art-making primitives to allow for more opportunities for creative expression. In the future, after making improvements to the stick figure art tool and maybe exploring more design ideas, we plan on conducting further studies with more participants and perhaps running mock art therapy groups to further evaluate our designs.

This work may lead the way for the development of future remote art therapy technologies that promote meaningful therapeutic experiences and more opportunities for collaboration and emotional bonding between group members. It may also lead the way for the development of technologies and practices for other forms of expressive and creative therapies online.

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