

Collaborative Design for Young Children with Autism: Design Tools and a User Study

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ABSTRACT

This paper provides an overview of a collaborative design effort that involves computer scientists, psychologists, and designers working together to investigate design methods to help in the creation of technology to people with cognitive disabilities. The focus of this effort was in developing techniques to help novice designers create technology interfaces to support anger management in young people with autism spectrum disorder (ASD). The primary output for designers is a card set for which each card has a claim about an anger management technique that can help young people. Design activities leveraging scenarios and personas are suggested that leverage the card set in the creation of technology interfaces. This paper introduces the card set and supporting techniques, describes a design session in an undergraduate classroom setting, and speculates about future directions for this work.

Categories and Subject Descriptors

H.5.2 [Information interfaces and presentation (e.g., HCI)]:
User interfaces – *User-centered design*

General Terms

Design, Human Factors

Keywords

autism, autism spectrum disorder (ASD), human-computer interaction, mobile interfaces, design methods, claims, scenarios, personas

1. INTRODUCTION

Technology for individuals with cognitive disabilities is an underserved market in dire need of successfully and thoughtfully designed systems. However, the small population size and the lack of knowledge about the strengths and limitations with regard to people with cognitive disabilities means that technology needs often are not serviced by the en-masse designed systems of today's culture. The technology currently employed for this population is highly customized and often expensive, driven by a dedicated group of developers who are often employed in small companies or academic settings and tend to work in a siloed model without the opportunity to acquire and share design knowledge. Instead, what is essential is a merging of ideas from technology experts and from domain experts, bringing together the expertise necessary to create well-targeted products.

The goal of this research is to develop technology design approaches targeting people with cognitive disabilities and their network of supporters. The research effort was spearheaded by a workshop at the Designing Interactive Systems (DIS) 2012 Conference [McCrickard & Lewis, 2012; McCrickard, 2012]. This paper represents a stage in this research effort, focusing on designing for *autism*, a cognitive disability that includes impairments in social functioning, communication, and repetitive behaviors, interest, or activities [APA 2000]. More than 1 in 100 children are affected with an autism spectrum disorder (ASD) in the United States [CDCP 2012]. However, experts in technology and technology design generally will not have expertise in designing for people with autism. This work seeks to provide a means for technology designers to gain insight into possible technological interventions that may help people with autism—providing designers with a starting point for their designs.

Specifically, our approach leverages the Stress and Anger Management Program (STAMP), a series of validated intervention techniques that help children ages 5-7 deal with anger management [Scarpa & Reyes 2011; Scarpa, Wells, & Attwood 2013]. The STAMP focus on emotion management can be a stepping stone to addressing lots of other behavioral issues. While the STAMP method is tailored for a series of therapist-led sessions with no defined role for technology as part of the method, this research effort puts forth that aspects of the method could be adopted or adapted for use in technological solutions that augment the goals of the original STAMP method.

This paper focuses on one approach to help technology designers find promising paths to help young children with autism with anger management. Specifically, this work considers how undergraduate computer science majors can augment their budding interface design techniques through a focus on supporting people with cognitive disabilities. A core challenge in the fields of human-computer interaction and interface design lies in understanding the target user population. Few novice user interface designers have sufficient knowledge about autism, resulting in unrealistic prototypes. It is hard to connect directly to domain experts, and professional papers and the like are often inaccessible to people unfamiliar with the domain. This research effort captures some of the core lessons from STAMP in a set of designer-digestible cards, with a claim about a technique on one side and a representative image on the other. Building on prior successes with similar card-based design approaches in other domains, this paper explores how STAMP lessons can be captured in the card set and shared with technology designers in a way that encourages both creative thinking and grounded

solutions. This paper describes the stages in creating this card set, describing its use in an educational setting.

This paper represents the first step in an effort to share design knowledge about cognitive disabilities. We chose to focus on young people with ASD initially, as there are many common behavioral features that appear in children. We expect this work to enable sharing of design ideas not only within the community of people designing for ASD, but across other cognitive disabilities—creating opportunities to share design ideas toward supporting multiple cognitive disabilities.

2. RELATED WORK

Technology has the potential to make an enormous difference in quality of life for people with cognitive disabilities—particularly young people in the developmental part of their lives. However, poorly-designed or ill-targeted technology can incur significant cost with little or no benefit in a population that can ill-afford it. The work described in this paper examines ways in which informed design with a focus on capturing and sharing knowledge about the target user population can lead to more appropriate designs. This section focuses on user-centered design methods that seem particularly well-suited for designing technologies for people with cognitive disabilities.

One area of guidance for technology designers is in the identification of guidelines, methodologies, and standards for interface design (e.g., [Shneiderman & Plaisant, 2010]). Attempts at formalizing standards, structure, and validation methods for interaction design, such as the International Organization for Standardization (ISO) document ISO 9241-110 (commonly referred to as Part 110), can result in large and unwieldy documents, like ISO 9241-110's 22 pages that presents, "...ergonomic design principles formulated in general terms (...without reference to situations of use, application, environment or technology) and provides a framework for applying those principles to the analysis, design and evaluation of interactive systems" [ISO. 2012]. ISO standards lack of adaption in the majority of US industries, including IxD and HCC, are perhaps rooted in an individualistic confidence in designers' contributions to a problem solution. Moreover, the ISO standards are not readily accessible to the average designer and typically are only incorporated by those practicing in a government entity that requires compliance.

One drawback to this rule-centered approach is that assumptions must be made about an equality of skills in a target population, which can result in the marginalization of populations with different needs. Techniques like the *cognitive walkthrough* encourage the evaluator to focus on the cognitive steps that a target user would encounter rather than any single rule [Lewis, Polson, Wharton, & Reiman, 1990]. The introduction of *heuristics* can encourage reflection about design principles [Nielsen, 1994], particularly when are often tailored to match a specific domain or population (e.g, large displays [Somervell, Wahid, & McCrickard, 2003; Somervell & McCrickard, 2005]). Both cognitive walkthroughs and heuristics seek to provide a technique over capture knowledge.

These types of expert guidance provide general methods for evaluation, but they do not encourage design for specific domains. One method for conveying design concerns toward inspiring design is to capture them on card sets, in which each card focuses

on a key concern that should be considered in the design process using images, figures, and text. This presentation style has been shown to be effective in promoting discussion within design teams about the card content [Herring et al, 2009]. Card sets have been developed for specific technology domains and design concerns (e.g., notification systems [Wahid et al, 2010] and environmental issues [Nathan et al, 2009]), and they have been used in industry, consulting, and academia (e.g., IDEO's method cards [IDEO, 2003], von Oech's whack pack [von Oech, 2008], Larsson's context cards [Larsson et al., 2011], Tholander's body cards [Tholander & Jensson, 2010]—and our own PIC-UP card set, that resulted in knowledge cards to assist designers of notification systems [Wahid et al., 2011; Wahid et al., 2010; McCrickard, 2010]).

Card-based approaches to technology design can inspire design, but if not created with caution they can suggest a false level of confidence or "truth" in an idea in all contexts, when it may not be universally true. For example, a STAMP technique—singing a song when angry—may have been shown to be effective for young children in certain settings, but it may not be true for older children, or in a non-therapy situation, or for people with a different cultural background. This is particularly important to consider when designing for cognitive disabilities like autism, for which the skills and limitations of people may vary greatly. Prior work has shown that cultural differences can result in differences when designing for people with autism [Boujarwah et al., 2011].

To address this issue, information is presented in the form of claims. A *claim* is a lightweight knowledge representation that encapsulates positive and negative tradeoffs of design features [Toulmin, 1958; Carroll & Kellogg, 1989]. Together with a representative image, claims have shown promise in encouraging creative but well-grounded design ([Wahid et al., 2011; McCrickard et al., 2011; IDEO, 2003]) and in making connections between knowledge chunks (e.g., [Chewar et al., 2005; McCrickard et al., 2003; Conklin, 2005]). A *claims library* stores claims and maintains relationships between claims to encourage designers to imagine how disparate ideas can be combined together [Wahid et al., 2004b]. Claims libraries have been speculated and created previously (e.g., [Rosson & Carroll, 2002; Sutcliffe, 2002; Payne et al., 2003]), but only recently with a highly accessible claims format and associated tools.

3. APPROACH

The approach described in this section seeks to develop lightweight but effective ways to convey design knowledge to novice designers lacking domain expertise through the use of a card deck of knowledge claims. This approach draws from an approach called STAMP for helping young kids deal with their emotions [Scarpa, Wells, and Attwood, 2013], toward creating a set of claims cards to help further the development efforts of designers in the creation of technologies to help young people with autism. In so doing, it is important to help designers connect the breadth of possible technologies and techniques. A set of cards was generated in a three-iteration design cycle, with input and feedback at each stage from computer scientists, graphic designers, and psychologists.

The resulting card set consists of two types of cards: technique cards and technology cards (see Figure 1). *Technique cards* capture key activities from the STAMP treatment method that help manage feelings in young children with ASD; e.g., singing

an upbeat song or using a ruler to encourage feeling reflection. The technique cards include both a visual representation and a claims-based representation of a concept, to provide an avenue to balance the inspiration with the knowledge. There are eight cream-colored technique cards that are part of this set. *Technology cards* exemplify the range of technological solutions that a designer could consider, including computer-based standalone or web applications, multipurpose handheld tablets with specialized apps, custom hardware, and even purely analog solutions. There are eight technology cards, colored light green to distinguish them from the technique cards.

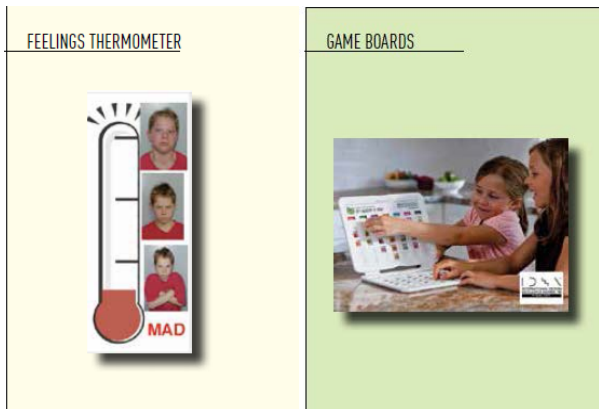


Figure 1: Sample technique (left) and technology cards created to inspire design ideas. The technique cards are augmented on the back with validated claims with 2-5 positive and negative effects regarding the technique; e.g., using a ruler or thermometer to encourage feeling reflection supports creation of “anchor” pictures for feelings, and playing a physically engaging game like musical chairs can frustrate highly competitive children

To inform and educate designers about their target users, this research developed personas that capture key user characteristics. Personas are archetypes of fictional users that capture important aspects of the needs and desires of a group of users [Cooper, 2004; Cooper 2007]. Personas have been used in assistive technologies situations previously to capture special needs of the elderly, with their visual layout and level of detail contributing to being easy to read and understand [Wöckl et al., 2012]. This research resulted in two personas, created and approved jointly by HCI designers and psychologists familiar with autism. “Greg” is a 6-year-old boy in 1st grade, and “Isabel” is a 7-year-old girl in 2nd grade. Both were described as having high-functioning autism spectrum disorder (ASD) with habits and activities typical of children with their backgrounds (see Figure 2 for personas).

Historically there have been lots of ways to use card sets, particularly in the early brainstorming stages of design. This work focuses on one idea development technique often featured as part of HCI techniques and tools, *storyboarding* [Rosson & Carroll, 2001; Landay & Myers, 1996; Truong et al., 2006]. Storyboards result in a temporal character-focused design centering on the experiences of one or more individuals. For example, a storyboard might focus on Greg becoming angry on the soccer field and needing some time by himself to sing a song that helps him calm down. Figure 3 shows a storyboard from our study.

Greg Martin

- 6-year-old boy in 1st grade
- his older brother Jeff whom he adores is in 5th grade
- Greg likes Curious George, trains, playing videogames, watching TV, & being in a 4-on-4 soccer league
- Greg has high-functioning autism spectrum disorder (ASD)
 - quickly becomes angry and irritable
 - has a few friends but does not like to meet new people
 - communicates readily with his parents and brother but few others



Isabel Ramirez

- 7-year-old girl in 2nd grade
- Isabel loves reading and math, and she likes to swim
- Isabel collects American Girl dolls and their accessories
- Isabel has high-functioning autism spectrum disorder (ASD)
 - quickly becomes angry and irritable
 - doesn’t transition well to new and unfamiliar activities
 - is comfortable with her parents and swim coach but few others



Figure 2: Personas for Greg and Isabel, as distributed to participants in the design activity.

4. INTERVENTION

To understand how the cards and techniques might be used by novice designers in an interface design situation, we asked an upper-division undergraduate human-computer interaction class to use them as part of a design activity. The activity was exploratory, seeking to understand whether and how the cards would be used, whether certain cards would be widely used and others ignored, and how the participants would engage in the design task.

To exercise our card set, the classroom study asked students to create a technological design tool that would be helpful in anger management for young people with ASD. This was an in-class activity with potential interest to the human-computer interaction research community. Teams of students in Virginia Tech’s CS 3724 undergraduate introductory human-computer interaction class used the card-based design technique described in this paper to integrate ideas from the cards into a storyboard. All the students had read about and heard in lectures about card decks, personas, and scenarios, but none had more than a few months experience with HCI-related methods. Grades were based on attendance only, not on any measure of success. Students were told about this study in class and via email, and they could opt out

of up to three activities (including this one) throughout the semester with no penalty. Approval for the study was obtained through the Virginia Tech Institution Review Board (IRB) office (13-375). Full materials are available in this paper's appendices.

4.1 Method

The activity asked computer science students to design novel technology to help young children with ASD deal with volatile emotions. The activity consisted of three phases: an assimilation and brainstorming phase in which participants looked at and read over the card set and two personas to gain ideas and inspiration, a storyboarding phase in which participants created a storyboard that described one promising technique from their brainstorming, and a reflection phase in which participants used the ideas to create a storyboard illustrating a new technology and technique.

In the *assimilation and brainstorming phase*, all participant teams were provided the card set described in the previous section, consisting of eight technique cards and eight technology cards. The participants were told that the cards were to be used to assist in the design of a new intervention technology to be used by a child, the child's parents, and/or the child's counselor. They were asked to consider what the technology might look like, and how each of these key stakeholders might interact with the technology. To encourage broad consideration of the ideas on the cards, they were distributed evenly across team members. They were asked to take a few moments individually to consider the ideas on their cards, then to think about designs that include the elements from at least 2 technology and at least 2 technique cards from the collection of cards. Then as a group, they were asked to develop a set of the most promising ideas. They were asked to come up with multiple ideas, with no upper limit on the number of ideas they developed.

In the *storyboarding phase*, each team refined their technique, describing it in a six-panel storyboard. The storyboard featured both drawings and captions for each panel. The activity asked that the students familiarize themselves with the two personas described in the previous section, Greg and Isabel, selecting one as the target for the storyboard. In completing the storyboard, students were asked to ensure that at least 3 panels show their interaction technique in use with the novel technology that were envisioned—capturing the things that people see or do with the technology.

In the *reflection phase*, teams wrote a short report in class about the decisions that they made in creating the storyboard. They were asked specifically to reflect on the inspirations gained from the cards, reasons for selecting cards or ideas for their design, and justification for why the design was promising. All materials were submitted by the end of the 75-minute class session. Grades were based on attendance only, not on any measure of success or time taken in the design process, to emphasize creativity and novel directions. Students were told that they could opt out of the activity at any time with no grade penalty.

It was suggested to students that they spend about 20 minutes on initial brainstorming phase, about 25 minutes on the storyboard creation phase, and 15 minutes on reflection and authoring the report. However, these times were only suggestions—they were not enforced in any way. The participant teams were asked to review an information sheet, fill out a 1-page brainstorming sheet, complete a blank 6-panel storyboard template, and author a 1-page final report.

Table 1. Usage of technique cards (top) and technology cards. The pairings column shows which cards were paired with the featured card across all brainstormed ideas, with frequency of pairings in parentheses. Generally participants paired technology cards with technique cards, but there are some instances of pairings within type (e.g., two techniques paired).

Card	Frequency	Pairings
Feelings thermometer	6	Tablet (3), Multi (2), Keyboard (1)
A physically engaging game	5	Personify (1), Boards (2), E-game (2)
Body trace	5	Tablet (2), E-game (1), Analog (2)
Sing an upbeat and engaging song	9	Personify (2), Game (1), Multi-game (1), Analog & Digital + Keyboard(1), Questions(1), Analog (2), Keyboard (1)
Ask engaging questions	5	Tablet (1), Personify (1), Boards (2), Song (1)
Squeeze a lemon	5	Boards (1), Game (1), Analog & digital (2), Analog (1)
Breathe deeply or meditate	6	Tablet (1), Boards (1), Analog & digital (1), Analog (2), Keyboard (1)
Use tools	5	Tablet (1), Game (1), Multi-game (2), Analog (1), Keyboard (1)

Card	Frequency	Pairings
Tablet	9	Thermometer (3), Trace (2), Questions (1), Meditate (1), Tools (1), Game (1)
Personify	5	Game (1), Song (2), Questions (1)
Game boards	6	Game (2), Questions (2), Squeeze (1), Meditate (1)
Portable electronic game (e-game)	6	Game (2), Trace (1), Song (1), Squeeze(1), Tools (1)
Multi-game portable	4	Thermometer (2), Song (1), Tools (1)
Analog & digital	2	Keyboard + Song (1), Meditate (1)
Analog	8	Trace (2), Song (1), Squeeze (2), Meditate(2), Tools(1)
Keyboard	7	Thermometer (1), Song (2), Squeeze(1), Meditate(1), Tools(1)

Use of the technology cards results varied more, but that was expected as they were meant to encourage breadth of thought in a known domain rather than to encourage full coverage. Indeed the design teams identified technology-based solutions and non-technology ones, as well as ones rooted in traditional computing devices (e.g., laptops, tablets) and custom-created ones. In future iterations of the card decks, it would be useful to ensure that the technology cards represent the range of technological possibilities along multiple dimensions; e.g., digital to analog, traditional to custom, various media inputs and outputs.

Participants embraced the concept of combining ideas, though it was disappointing that very few wove together multiple techniques in their solutions. Perhaps this was a limitation from the time restriction, or perhaps the activity instructions could have encouraged such behavior more explicitly. The results suggested that participants were able to make the technique ideas their own, though many suggested that the cards became constraining as the activity progressed.

It should also be noted that all groups choose Greg over Isabel as the featured persona in their storyboards. Multiple groups indicated that they focused on Greg because his anger and frustration issues seemed easiest to address. Perhaps some unstated reasons for the choice stem from the large percentage of males in the study (83%). Perhaps some of Greg's hobbies and activities may have appealed to the participant set, or perhaps some aspect of his personality resonated with participants, such as his expressions of strong emotion.

Several general observations emerge with regard to the effectiveness of this design approach. It was encouraging that participants employed all of the techniques in their designs, with consideration for all of the technologies. Feedback from five of the reports indicated that the cards helped with early idea generation as a starting point, but several reports followed up that later in the process the cards seemed restrictive to the design. The quantity of information on each card continues to be a point of debate: too much and designers may not assimilate the most important aspects, but too little and designers may lack necessary details. For example, two group reports indicated that the lack of description for technology cards led them to off-topic discussions about their meaning. There were no comments in the reports regarding the breakdown of visual (pictorial) and textual elements of the cards; it is encouraging that the pictures did not distract from the design process, but there was no particular advantage that was noted for having them.

5. Conclusions and future work

This paper presents a new design card set and other materials targeted for the creation of new technologies to help young people with autism spectrum disorder (ASD). An investigation of the use of the materials by 24 undergraduate human-computer interaction students showed promise in helping designers brainstorm potential technological aids for young people with cognitive disabilities.

The materials described in this paper represent a starting point for a larger set of design materials, and the methods represent possible approaches in designing for ASD and other cognitive disabilities. Moving forward, the overarching task is to seek to balance what's right and best to communicate to designers, providing enough information and perhaps hiding or obfuscating less important and more detailed information through paths that

the designers can follow as needed. To accomplish this, it is valuable to consider improvements and expansions to the technique cards, the technology cards, and the persona set. As the material set expands, it is expected that the types of activities for which they are used will expand as well.

The technique cards were extracted from established practices that identified ways to help young people ages 5-7 manage their anger [Scarpa & Reyes, 2011; Scarpa et al, 2013]. As such, it can serve to influence directly the design of technologies to help this population, or to influence thoughts about designs for related populations (e.g., older children, people with different disabilities). Expanding the card set could draw from more proven anger management techniques from the Scarpa work, or from work by others in similar domains, or from hypothesized approaches that researchers surmise might be effective. The number and type of cards that are developed should depend on the target audience of designers, the type of design activity that is planned, and the experience level of the designers.

In expanding and redesigning technology cards, it seems important to think about the dimensions that designers should consider during the design process—e.g., high tech to low (or no) tech, desktop to ubiquitous, solo use to collaborative—that systematically encourage designers to consider the full range of technological possibilities. By so doing, designers can reflect upon how the role of technology can vary—big and small, visible and invisible—and how the best solution sometimes may not have a major technological component.

In expanding and redesigning the persona set, it is necessary to provide coverage across all personas of the many and varied ways in which ASD can present itself in young people. It was surprising that all study design teams chose the same persona, losing the opportunity to address other needs. Each persona should be compelling to designers, providing a realistic design target that has been shown to motivate designers [Cooper, 2004; Cooper, Reimann, & Cronin, 2007]. Creating a broad and complete persona library necessitates following the lessons from others who have designed personas for people with cognitive disabilities (e.g., [Wöckl et al., 2011])—surveying and interviewing the target user group, assimilating data, and testing the persona for appeal and utility.

Broader goals for both technique and technology cards seek to identify ways to capture design knowledge during the design sessions, toward creating a collection of ideas that can connect, grow, and evolve as the state of the field moves forward. Our previous research has identified an initial set of relationships to help categorize these design interactions (referred to as *claims*) based on associations between the claims [Wahid et al., 2004a]. Example relationships include generalization (enlarging the scope of a claim), specification (applying a claim within a specific context), and mitigation (using a claim to address, or mitigate, an issue with another claim). Collections of related claims will form a *claims map* of design relationships, leveraging both the simplicity of claims and the descriptive capability of selected claim relationships [Wahid & McCrickard, 2006]. To support designers wishing to take advantage of this representation, we will construct a visualization tool, highly integrated with the claims library, to allow a user to write their own claims and reuse claims from the library in maintaining a claims map. We have plans for adding categories based on user skills and limitation type, workplace context, technology platform, and more.

Human understanding seeks organization, structure and schemas upon encountering new instances of knowledge and domain spaces. Through this process, one is able to identify similarities (and differences) which can facilitate rapid search and application [Novak, 1998]. Claims and uncovered knowledge must be taxonomized to facilitate understanding, information retrieval, knowledge accessibility, and broad use. During organization several branches will emerge, each with associated sets of ‘leaves,’ and ‘trunks.’ [Novak, 1998] During this process it is imperative to remember these instances occur within a single domain, and often require re-conceptualizing certain instances, while maintaining the understanding that all classification systems are contrived [Novak, 1998]. Appropriate capture and representation of this design information can help shift the design process from a siloed environment to a more collaborative one, broadening the intellectual resources necessary to design a viable, useful, and desirable system. In addition, it can help cross over ideas that are developed target specific disabilities (e.g., aphasia [Hagood et al., 2010] and autism [Hayes et al., 2004]) to focus not on disability but on functional difficulty. For example, an older adult recovering from a brain injury may have similar memory or attentional issues to a youth with severe ADD—but the limited ways to share technological successes and failures will result in duplicated efforts, a weaker product space, and slower advancement in addressing the needs of people with cognitive disabilities. A broad, inclusive, and accessible knowledge base can help address this limitation.

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APPENDICES

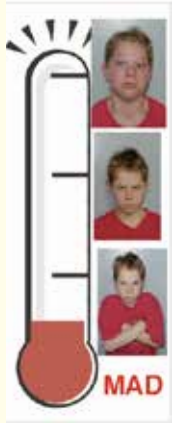
These appendices contain materials from the card development and study.

First is a printable card set, with front and back for technique cards followed by the one-sided technology cards. (Printing the cards two-sided will enable cutting for cards for use.) The cards are color-coded, and can be used independently or as a collection in the ways described in this document or for other purposes. (cards_v1.1)

Second is the instruction sheet distributed as part of our study. The first page provides details for study participants. The second page is a storyboard template, with space for six pictures and associated text. (instruction_sheet_v1.1)

Third is the pair of personas generated for the study. Both were generated with input from technologists, creative designers, and psychologists to act as archetypes for the behavior of young people with autism. (personas_v1.0)

FEELINGS THERMOMETER



A PHYSICALLY ENGAGING GAME



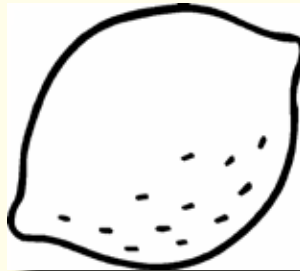
SING AN UPBEAT SONG



ASK ENGAGING QUESTIONS



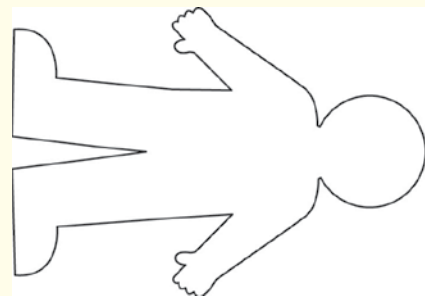
"SQUEEZE A LEMON"



BREATHE DEEPLY OR MEDITATE



USE TOOLS



BODY TRACE

<p>Singing an upbeat and engaging song like "Happy and you know it..."</p> <ul style="list-style-type: none"> + allows children to act out emotions + can be augmented with visuals of feelings (happy, mad) + can be augmented with visuals showing the next action (clapping, stomping) + can include game-like components (ie. loudest clapper) 	<p>Playing a physically engaging game like musical chairs...</p> <ul style="list-style-type: none"> + provides a way to redirect energy + lets children interact with adults and with each other + can be redefined to be rewarding and not punitive + can frustrate highly competitive children 	<p>Using a ruler or thermometer to encourage feeling reflection...</p> <ul style="list-style-type: none"> + supports creation of "anchor" pictures for feelings + makes it easier to rate feelings + can be paired with a game to understand changing feelings of anger or anxiousness
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<p>Breathing deeply or meditating when angry or anxious...</p> <ul style="list-style-type: none"> + provides a focus point that is different than the emotion + allows reflection and contemplation 	<p>Pretending to squeeze a lemon when you are angry or anxious...</p> <ul style="list-style-type: none"> + provides a physical outlet for emotions + supplies a visual image for the person to connect to 	<p>Asking engaging questions...</p> <ul style="list-style-type: none"> + redirects energy + encourages reflection + focuses on hypothetical but realistic situations + builds emotional skills + encourages looking to the future + puts a person in a different place
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By creating an outline of your body...

- + you can circle parts of your body where you feel anxious or angry (ie. lump in throat, ball in pit of stomach)

Using physical tools at times of emotional crisis...

- + can provide a 10-minute break
- + can channel physical aggression
- + may not be appropriate in populated environment

GAME BOARDS



PORTABLE ELECTRONIC GAME



MULTI-GAME PORTABLE



KEYBOARD



ANALOG



PERSONIFY



ANALOG & DIGITAL



TABLET

This activity focuses on the design of technologies to help young people with high-functioning autism spectrum disorder (ASD). This builds on a program by Scarpa, Wells, and Attwood (2013) called STAMP for helping young kids deal with their emotions. The STAMP traditionally has no role for technologies. This activity will consider how technology can play an important, meaningful role in helping young children ages 5-7 deal with volatile emotions during their weekly lives--extending and supplementing weekly sessions with the children, parents, and counselors.

The activity asks that you familiarize yourself with two child personas, selecting one as the target for your design. You will receive technique cards and technology cards to be used in the design of a new intervention technology to be used by a child, the child's parents, and/or the child's counselor. Consider what the technology might look like, and how each of these people might interact with the technology.

You will work in groups of four for this activity. To assist in idea generation, everyone in your design team will receive at least 2 technology cards and at least 2 technique cards. Assign each member of your group a number, and note your number on the back of the card. Take a few moments individually to consider the ideas on the cards and to think about designs that includes the elements on your cards. Then in pairs, work together to brainstorm designs that includes ideas from your collective set of cards. Capture your brainstormed ideas on a sheet of paper that lists one or more technology card, one or more technique card, and a brief description of your solution for as many combinations as time allows.

Finally, you will be asked to come together in your group of four to discuss your ideas, to merge common ideas, and to identify the most promising idea. Your assessment of "promising" can be based on things like "most viable", "most lucrative", "most helpful", or any others. You should capture your idea in a 6-panel storyboard, for which each panel has a picture with descriptors underneath it. A storyboard should be character-focused, centering on the experiences of ONE of the personas you are given. Your storyboard will describe a temporally ordered experience of your selected persona, showing a problem and how your technology can help with a solution. In completing your design, make sure that at least 3 panels show interactions with the novel technology that YOU envision--the things that people see or do with your technology.

As an example solution and storyboard, your problem might be that Greg is angry that he can't do what he wants on the soccer field, with the solution focusing on singing a song with Elmo that he completes on an iPad on the sidelines. Or that Isabel is frustrated at having to share her dolls and works with her father to complete an emotion assessment game on her father's mobile phone.

We will spend 20 minutes on initial reflections and paired brainstorming, 25 minutes on your group storyboarding, and 20 minutes on a handwritten report detailing the inspirations you gained from the cards (focusing on at least one technology card and at least one technique card), your reasons for your selection of personas and ideas, your justification for why your solution is "promising", and your reflections on how the card set was helpful, useful, overly restrictive, and other thoughts.

By the end of class, place all materials in your envelope and turn them in to the GTA.

PERSONA 1- GREG

Greg (6-year-old boy, grade 1, older brother in 5th grade whom he adores, does some reading, likes Curious George and trains, TV, video-games, 4-on-4 soccer league)

-- augment with "high-functioning autism spectrum disorder" (since DSM-5 is removing the Asperger's diagnosis, all will be called ASD)

(characteristics: quickly becomes angry or irritable, does not like change or transitioning to new activities, does not make friends easily, may not use words to ask for help)

PERSONA 2-ISABEL

Isabel (7-year-old girl, grade 2, loves reading, likes American Girl dolls, enjoys math, enjoys swim lessons and coach but doesn't connect with other kids at all)

-- high-functioning ASD, does not like kids at all, is comfortable with parents and swim coach

SUBMIT

6-panel storyboard (see back)

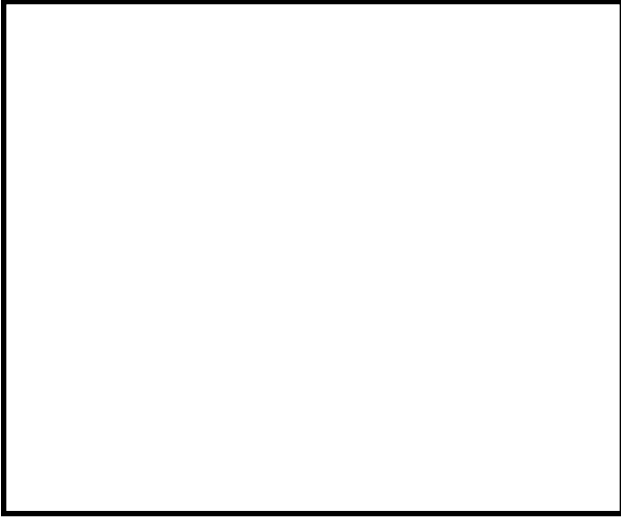
1-page group report includes:

- 1-2 sentences on which persona you picked and why
- 3-4 sentences on which 2 technology and technique cards did you pick and why?
- reflect on the process: how did you use the cards, what did they inspire, how did the cards help you, how did they "get in the way", did they inspire new ideas, were they overly restrictive, etc.

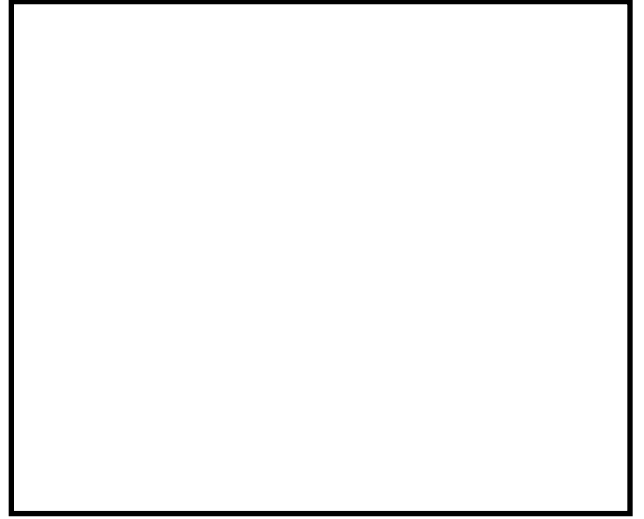
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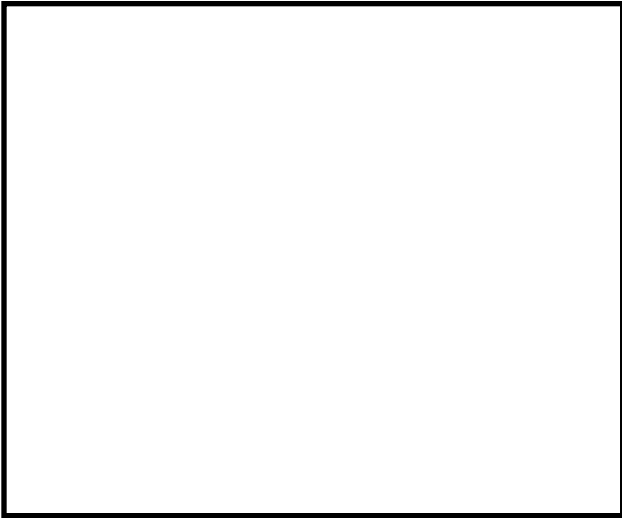
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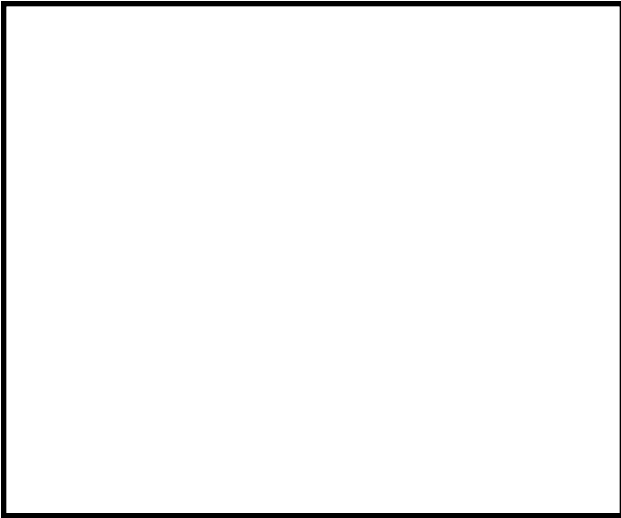
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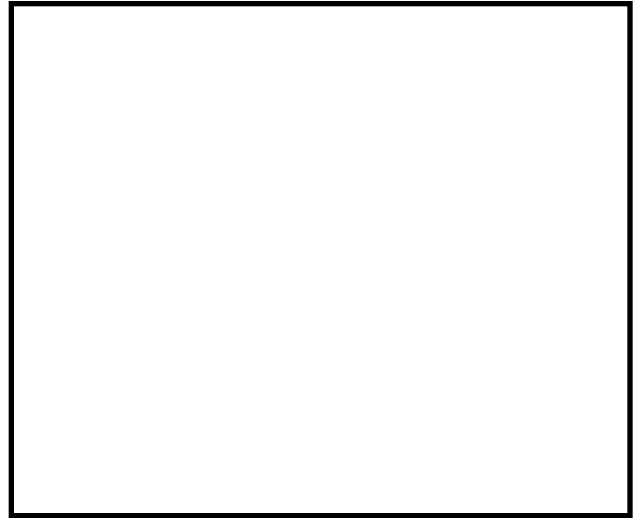
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5



6



Greg Martin

- 6-year-old boy in 1st grade
- his older brother Jeff whom he adores is in 5th grade
- Greg likes Curious George, trains, playing videogames, watching TV, & being in a 4-on-4 soccer league
- Greg has high-functioning autism spectrum disorder (ASD)
 - quickly becomes angry and irritable
 - has a few friends but does not like to meet new people
 - communicates readily with his parents and brother but few others



Isabel Ramirez

- 7-year-old girl in 2nd grade
- Isabel loves reading and math, and she likes to swim
- Isabel collects American Girl dolls and their accessories
- Isabel has high-functioning autism spectrum disorder (ASD)
 - quickly becomes angry and irritable
 - doesn't transition well to new and unfamiliar activities
 - is comfortable with her parents and swim coach but few others

