
Tingets: A System for Young Students to Communicate and Reflect

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Abstract

Engaging with emotional communication, especially for special needs students or anyone who might struggle with verbalizing certain mental states, is a crucial component to feeling safe and comfortable in classroom and home environments. Our research shows that such a skill is important for all students and that utilizing physical objects can be just as meaningful as digital versions, but that digital technologies do have the power to enhance this process, especially during reflection process. We created a three leveled character, called a Tinget, for in time emotional communication, accompanied by a digital reflection journal. Express, Reflect, Repeat. That's our motto.

Author Keywords

Emotional communication; special needs education; emotional reflection.

ACM Classification Keywords

J.4 [Computer Applications]: Social and Behavioral Sciences – Psychology.

Introduction

Tingets as a concept emerged out of personal experience working with students and children who fall under the special needs classification and who struggle to verbally communicate and express important

concepts such as their emotional state. The communication gap that emerges in this situation can and does have severe effects on a student's ability to thrive in a traditional classroom and in daily interactions. Tingets were originally designed to provide a way for certain populations to physically and visually construct their emotional state by rotating different levels of a physical character to reflect their emotional state. The project also includes a reflection component. The Tinget character is accompanied by a digital journal where, after scanning their Tinget on the computer at the end of a day, the journal provides a reflection prompt to the user. The prompt is customized based on the user's emotional state, and when contemplated and completed provides a new way for the student to answer the typical, mundane, and frustrating question of, "How was your day?" This paper presents prior research on existing solutions to fulfill the needs presented, and our project, Tingets.

Background

Special Needs Students in Classrooms

Since 1975, with the passage of IDEA (Individuals with Disabilities Education Act), there have been several different approaches to educating students with special needs. The approach that has been accepted as the most successful for everyone involved is known as Inclusion. Defined by Caroline Moore (1998), Inclusion is, "a philosophy of acceptance, belonging and community, also means that general education classes are structured to meet the needs of all the students in the class." Rather than only have some special needs students in the classroom, Inclusion preaches having all students in the same classroom full time. This approach has proved to be difficult to implement. Given the philosophical and theoretical benefits of Inclusion,

many teachers worry they cannot serve the needs of their special needs students (Knight, 1999). While there is a demand for teachers with a certification in Special Education, an even higher need, is for teachers who specialize in emotional and social development needs (Turnbull, 2013).

Technological Interventions for Special Needs Students

There have also been attempts to use technology to improve educational experiences for special needs students. An article dealing with computer technologies, Hasselbring and Glaser (2000) writes about how technologies like word processing and online communication can improve special needs education. AAC (Augmentative and Alternative Communication) devices in classrooms can also have great potential to help students who previously struggled to communicate and express themselves. However, only written five years later, Williams (2005) talks about teachers' frustration with technology's seemingly lackluster ability to actually serve their needs in the classroom. Much of the technology provided to them had either not worked, not served a purpose they needed, or didn't sustain an important role in the classroom. In more recent years, several products have been introduced and tested, with apparent more success (according to their designers and observers). One such product is called MyVoice, which is an iOS app. MyVoice teaches communication and vocabulary skills using images instead of using words, and according to Campigotto (2013), the app was successful in increasing motivation to learn and engagement in the activity. Similar to Williams, teachers sounded somewhat opposed to using the app long term, as it was somewhat tedious on their end.

Design



Figure 1: The latest version of the physical design of the Tinget.

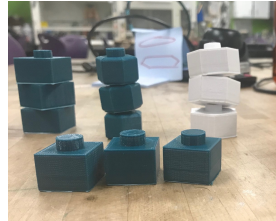


Figure 2: The physical Tinget disassembled and without the fiducials and images.

The final iteration is approximately 2.25" tall and 1.25" across (5.72cm tall and 3.18cm across). It consists of three vertical hexagon blocks, loosely connected by nubs on the top of each block and small holes on the bottom of each block. They fit together tight enough to not fall apart when lifted by just the top block, but they are loose enough for each level to be easily twisted independently. The rotational movement provides a calming and soothing sensation to the user, in addition to serving as a communicative mechanism. Our final Tinget was also produced with the 3D printer, with the different faces and fiducials stuck on as adhesive stickers.

Of the six sides that each hexagonal level possesses, only 3 contain symbolic representations. The top level is the "eye level", the middle level is the "mouth level", and the bottom level is the "arm level." Our user testing of block symbols and size showed that six symbolic representations on each block was confusing to the user and that having less than three expressive layers did not allow the users to associate their emotions with the physical Tinget as much as we liked

and four layers made the Tinget too large. The images were chosen through user testing on our end to find 3 types of each that when all possible combinations were looked at there was a spectrum of emotional states possible. In the design process, we experimented with possibly having more abstract images but decided that the cultural forms associated with the eyes, mouths, and arms effectively communicated emotions. Directly opposite of each eye, mouth, or arm image is a fiducial that is paired with that image. To use the Tinget to communicate an emotional state in present time, a user must twist each level to their desired image, creating one overall emotion.

Digital Journal

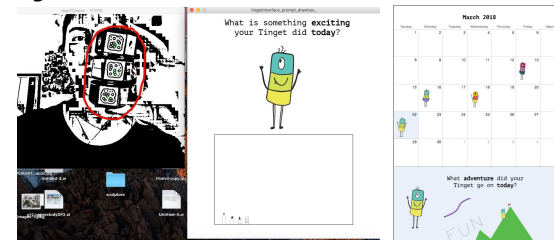


Figure 3: On the left shows the ReActiVision software reading the fiducials from the physical Tinget and translating them to create the digital version with the tailored prompt (middle) and on the right shows the calendar view where the user can look through all of their journal entries.

The physical object couldn't successfully act as both an in-the-moment communication device and a reflective tool. We created a digital journal that increased the amount of customization and personalization affordances possible.

The resulting digital journal, with the aid of ReActiVision software, reads the fiducials presented, creates and

displays the corresponding Tinget image, and asks a reflective question tailored to the Tinget's appearance. Since the corresponding QR code for each eye, mouth, or arm image is directly opposite the image, the computer reads the fiducials of the current emotional state as the symbolic representations facing the user and presents that image on the screen.

The user is given a prompt such as, "What was something that was frustrating today?" In the blank space provided the user is encouraged to fill in by either drawing or writing, an answer to the question. This task can be completed by the user alone or with a parent or guardian as a way to foster conversation between parents and children.

Next Steps

Customization of the digital journal, by adding in personalized clothing or a name, would allow for the user to increase their affinity for both the physical toy and digital journal. And more in-depth user testing will be important for future iterations.

Conclusion

Tingets started off as an idea to help students better communicate their current emotional states so that teachers and fellow classmates could better understand what they are feeling. Prior research on special needs students' emotional communication and participation in the classroom demonstrated great need, but existing solutions did not adequately address the social and emotional aspects. Towards the end, we developed a system, composed of both the Tinget and digital journal, that allows students to both communicate their emotions in present time and reflect on them later, providing the scaffolding for users to either think

through their day with the aid of a parent or guardian, or by themselves.

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