

# A Mobile Social Proximity Compass

Research

question

How can innovative technologies

empower the Social Compass

curriculum to help children with autism

use cues for social guidance in mobile

and dynamic contexts?



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## Motivation

Children with autism often exhibit social impairment including difficulties in reciprocal social interaction, emotional expression, and emotional recognition

Social skills training is an effective way to develop age and functioning-level appropriate social skills to be used in a variety of situations

Story-based interventions go beyond basic social skills include issues related to how situational contexts evolve in ongoing social interactions. For example,

The Social Compass is a behavioral and educational intervention for group settings that uses stories and paper-based visual cues

There is currently limited support for using Social Compass outside classroom

There are open questions as to how innovative technologies provide a solution for this kind of mobile, dynamic instruction and support

Observational

study

Scenarios

## Understanding Interactions in Mobile Contexts

Relatioship and activity proximity may help a child **identify potential interaction partners.** For example, in our observations:

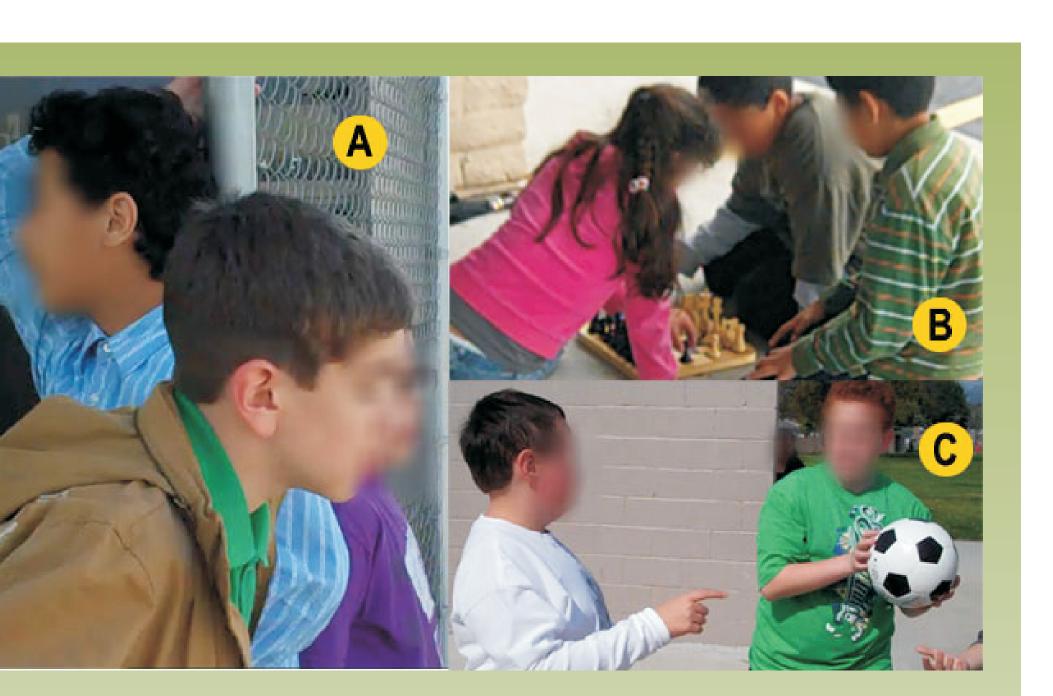
teachers translated activity preference into a physical location sensor of sorts as well, knowing for example, that a child who likes to play chess will typically be found near the board game tables where other children play chess

Proximity-based location and the temporal rhythms of an interaction help identify social missteps. For example:

While Mike was playing ball, a child close to him shouted and, as a consequence, Mike became scared and ran into the bathroom. Ian was not able to finish the game with Mike and remained confused, asking other kids about Mike's behavior. That day, Mike never got back to the playground and spent the rest of the recess walking around the school premises

Teachers use verbal prompts to help children appropiately and rapidly reply in a conversational context. For example:

Teachers sometimes followed students to provide additional instructions for avoiding such missteps or catching them before they escalate into major incidents



## Methods

- For five weeks
- Three public schools
- 14 children with autism were recorded for 15 minutes per day
- During recess and Lunch

# Proof of Concept

We evaluated our system's design and intention to use through 4 focus groups

- $\bullet$  teachers of the social compass curriculum (n=7)
- children with autism using the social compass curriculum (n=14, 3 girls) aged between 7 and 10



#### Children with autism prefer the avatar version over the picture based.

- "I prefer the avatar version because it is cooler more boyishî (Carlos, student)
- ìAutistic kids are not good at reading or recognizing people Ö but will be cool if we can switch from the avatar version to the picture-based version and then this will help us to recognize people" (Chris, student)

#### Privacy and liability concerns

- iBut isnIt this bad and could be used by stalkers?i(Chris, student)
- "Could it have a lock closed or open to found out when and what type of information I am sharing?" (Mike, student) "Mobile phones are not allowed in schools" (Meg, teacher)

### Preference for audible cues combined with visual cues

"We don't read too well and I sometimes confused the words so will be better if I have an audible cue" (Carlos, student) "Will anybody hear the social cues or phrases? ... a headset will be useful" (Ethan, student)

#### Potential for game-like interactions to earn points and rewards

"Can I have more avatars or unlock them? . . . or upload the ones I have stored in my computer" (David, student)

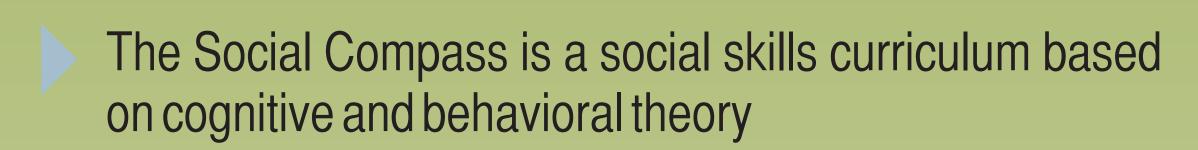
Overall the application was perceived to be efficient and useful to improve the quality of interactions held by children with autism

# Prototype Design

## Problem Context

Prototype Design

Proof of concept Product -



The Social Compass curriculum includes 26 lessons divided into 4 modules:

- Nonverbal Communication

The materials for each lesson include:

- Instructions
- a story a visual support
- a reading comprehension worksheet
- a self-monitoring data sheet

Each lesson is composed of eight steps

Step 1. The goal. The teacher introduces the goal of the lesson and its importance when developing Step 2. Visual gear. The teacher demonstrates the visual gear of the lesson through an image that

illustrates the key points of the lesson **Step 3. Social story.** The teacher and students read a social story and engage in a discussion of the

story to ensure comprehension. **Step 4. Model.** The teacher uses physical objects or her own body to demonstrate the skill.

**Step 5. Rehearse.** The teacher and students stand in a circle to rehearse the model in pairs. **Step 6. Role Play.** Each student chooses a peer to rehearse the social skill of the lesson in front of the

Step 7. Reinforcement and feedback. After the role-playing session, the students rate themselves

# The Social Compass Curriculum

Social Problem Solving. The 4 modules, like a compass serve to

"steer the child in the right direction"

The social stories



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- The system provides a child audio and graphical tools
- A child configuring her profile selecting intersts and an avatar The system s gives a "thumbs
- down" to a child who was engaged in a social misstep VA child consulting detailed information of a visual gear

While walking around the playground, he receives a sound alert from the Social Compass system running in his mobile notifying him that potential interaction partners are nearby After hearing the alert, David consults his mobile and realizes that some students are playing chess and others are swinging. The system uses arrows to direct David to the location of his potential interaction partners. Arrows' width indicates to David the more compatible group. The most compatible group is suggested based on its integrants' interests compatibility and relationship with David. David decides to join the group of students playing chess by selecting the wider arrow from his Mobile

David is a nine year-old child with autism who sometimes likes to swing

or play chess during recess. Most of the time he prefers to play chess.

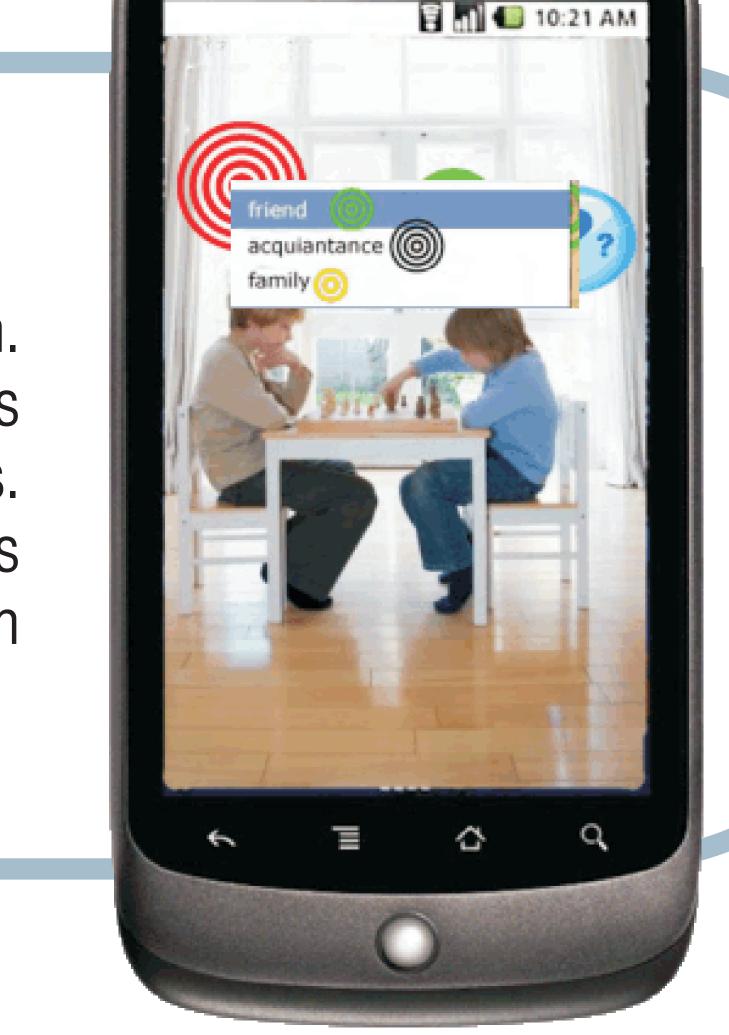
Detecting potential interaction partners

## Prompting conversations

When David arrives to the location of the students playing chess, his Compass points to his friend Alex and a stranger (i.e. lan), who are playing chess. This augmented digital visual gear corresponds to the visual gear David learned to use during his Social Compass therapy. Two gears appearing in the scene suggests to David initiate an interaction with Alex by asking him if he can join the gam. David presses the "questions bubble gear" to review a set of example questions associated to that gear. David presses the audio icon of one question from the available list and listens the cue. After asking Alex, David joins the game.



After a while, when David finishes playing with Alex and Ian. David tags the scene in her mobile to remember this interaction later or share it with his teachers and parents. First, David selects lan's proximity gear changing his relationship with lan from a stranger to a friend and then expands his interests in his profile



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