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# Designing for Social Connectedness in Shyness, Schools and Stroke Patients

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**Abstract**

Social connectedness has been a re-occurring theme in a number of recent and divergent projects, from technologies to support social interaction in shy people, through to technologies for stroke rehabilitation. In this position paper I consider issues around the need to support social connectedness within these contexts and the technologies thus far designed to support this need. I postulate that supporting social connectedness is not just an issue for technologies within the virtual worlds, but also one that can be necessary in our face-to-face social interactions.

**Introduction**

Social connectedness can have a great impact on people's day-to-day lives, impacting on the effectiveness of distance and face-to-face social and learning interactions, and most strikingly recovery from serious health conditions such as a stroke or heart attack. My involvement in a number of divergent projects has indicated that appropriately designed technologies may play a vital role in supporting social connectedness in face-to-face interactions, as well as those at a distance. Here, I describe these projects and our use of technology to support social connectedness.

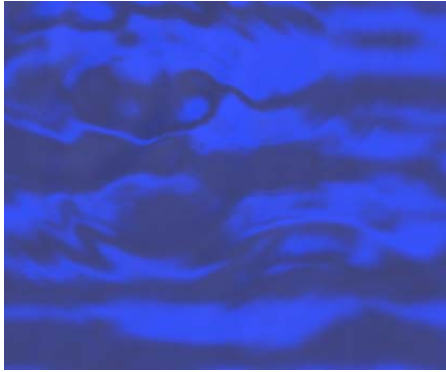


Figure 1: HandWave visualisations - drops fall onto a dark blue surface as dyads mirror one another's behaviour, or move in-sync with one another

## Designing for Social Connectedness in Shyness

Rapport is a rather mysterious concept, but it is nevertheless thought to be integral to feelings of social connectedness which leads to successful relationships and interactions [8]. Studies show that rapport is displayed through non-verbal behaviour [2]. Research has suggested a number of non-verbal behaviours indicate rapport within a social interaction, for example reduced posture shifts, mirrored and in-sync movements, and animated and expressive behaviours. However, when we make judgments about the level of rapport experienced with another, we often only focus on the expressivity of an individual, an aspect of behaviour that might be closely tied to the level of extraversion in an individual's personality [2]. But, what if you are shy, introverted, or socially anxious? How do these preferences for extroverted behaviour in the development of rapport impact on the social interactions that a shy user can take part in?

Recent developments in ubiquitous computing applications have explored how technology might support face-to-face interactions [for example 3, 4, 5]. A primary example of such an application is Ticket2Talk [5]. This application, designed for use at conferences gave attendees the opportunity to start conversations with those queuing for coffee by displaying pre-defined information about those in the queue. Such information included the name of the attendee and also some personal or professional interests. These technologies often require quite extrovert behaviour in order to take part in the social interaction. In the case of Ticket2Talk one must feel willing to have information about oneself presented to others, and then in order to take advantage of the system fully, willing to begin a

conversation with others. Both of which might be quite challenging for shy or social anxious users.

In this project we are exploring whether technology might be developed to subtly support the development of rapport in social interactions. HandWave is the first point in this user-centred design cycle exploring whether subtly amplifying behaviours that are thought to be linked to the development of rapport might improve social interactions, and provide a non-threatening means for shy users to contribute to social interactions. HandWave, developed using the LilyPad Arduino toolset, is a wearable technology that monitors and represents the hand and arm gestures of individuals during social interactions. When used in pairs or larger groups HandWave creates visualisations (currently a water-like effect of drops and ripples on a dark blue surface) that represent the hand gestures of the group, amplifying in particular instances of mirroring and in-sync movements. We hypothesise that these visualisations and amplifications may support groups as they develop rapport. In addition, we propose that this technology may help particularly shy people contribute to social interactions and develop rapport with conversational partners.

## Designing for Social Connectedness for Stroke Patients

Social connectedness and group life is highly connected to wellbeing in general and specifically the ability to recover after a stroke [9]. Feelings of social connection is also a key factor in Ryan and Deci's self determination theory of motivation [7]. However, talking on the phone, writing letters, going for walks, and generally getting out and about post-stroke can be very difficult, leading to a feeling of social isolation. In



Figure 2: The Ball FUNnel

Sophie and her child can play together pushing balls through the funnel. When a ball passes through the funnel sounds are played.

the Motivating Mobility project we are working with four stroke patients to design technologies that motivate these participants to rehabilitate function in the arm and hand that was lost due to stroke. In general the approach has been to design a technology which allows the participant to do something that they like to do whilst exercising their hand or their arm. For example, in the case of Solomon (not his real name) we have designed a tangible interface which allows Solomon to practise opening hand whilst playing chess.

During design interviews with Sophie, our second participant who had a stroke in her thirties, Sophie expressed a real sense of social isolation both from her peers and from her two-year old son, who received a lot of care from her mother. Sophie wanted to be able to interact and play with her son without intervention from carers and other people. Sophie also reported that she didn't feel she had any friends any more, and didn't have anyone of her own age to talk to about what she was going through. In our design for Sophie we are creating a game that Sophie and her Son can play together which attempts to be fun for them both, whilst also supportive of the exercise Sophie needs to do in order to bring her right arm back into daily activities. The game (called Ball FUNnel) involves Sophie using her right hand to bat a ball down a funnel through a box (see Figure 2). As the ball passes through the funnel a funny sound is played. Sophie's son is then encouraged to catch or chase the balls before passing them back to his Mum to start again.

In addition to this we wanted to create some sort of ambient social connection between Sophie and another participant involved in the project. Due to communication difficulties, as well as ethical and

technological constraints we were unable to connect two of our participants directly. Instead, the Ball FUNnel contains LED light strips which light up in time with log data indicating when Solomon, our chess playing participant, used his rehabilitative chess game in the previous week. We hope with this very ambient connection we are able to give Sophie a sense that someone else is going through a similar experience. We have not yet deployed these technologies so are unable as yet to examine whether such a social connection impacted upon Sophie's rehabilitation, or motivation to rehabilitate. However, given the strong evidence that suggests that social connection is critical to wellbeing and rehabilitation post stroke we believe exploration of technologies to aid social connection amongst stroke patients may prove critical.

### **Designing for Social Connectedness in the School**

Previous research in formal educational settings has indicated that teacher's have difficulty understanding the emotional experiences of their students [1]. Given, the importance of emotions to effective teaching and learning interactions [6] a technology was designed and deployed to facilitate emotional communication in the classroom.

The Subtle Stone is a handheld orb covered in ribbed rubber containing 6 LED lights and a switch that is operated through a squeeze. At present the Subtle Stone displays seven separate colours: blue, green, red, purple, light blue, yellow and white. Each student creates their own colour:emotion language, by deciding for herself which colour communicates which emotion to her teacher, such that when a student decides to communicate an emotion to her teacher, she simply



Figure 3: A Subtle Stone

selects the colour associated with that emotion in her own colour:emotion language through squeezing her Subtle Stone until it displays the colour she requires. The colour continues to be emitted until the student decides to change the colour (and hence the emotion communicated) by squeezing the Subtle Stone or by switching it off. A tablet PC supports the teacher in interpreting the students' communicated emotional experiences.

The main function of this technology is to help students actively reflect on their own emotional experiences, and provide teachers with information about students' emotional experiences and the impact teaching strategies may have on these emotional experiences. However, in addition to this, the Subtle Stones also proved useful as a device that facilitated social connection within student – teacher relationships. For example, the information gleaned from the students' Subtle Stone use allowed the teacher to provide a greater amount of pastoral care to his students. The Subtle Stones meant that the teacher could identify students who were having particularly negative experiences in the classroom. This information often prompted conversations between a student and the teacher, providing the teacher with a more holistic understanding of his students (times when issues outside of the classroom might be impacting on performance) and opportunities for students to confide in their teacher.

### Conclusions

This position paper has described three contexts for which technologies to support social connectedness have been designed. Our reviews of literature, and early design work have suggested that technologies to

support social connectedness have a place both within the digital and physical world. Over the next few months data will be collected and analysed to begin to understand the impacts of these technologies on feelings of social connectedness.

### Citations

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