show and tell

Literature Review

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Introduction

The Show and Tell project takes place in a multi-disciplinary context which incorporates the arts, audience engagement, autism and technology. These individual fields of enquiry are in themselves extensive and each overlaps others beyond its discipline boundaries. This literature review is a survey of this mixed terrain and a reflection on the benefits of collaborative and transdisciplinary research in finding and expressing new ideas.

The literature review is divided into six sections. The first section *Art, Audiences and Technology* gives a brief overview of current research on the benefit of engagement with the arts, levels of audience participation and evidence that technology can have a positive effect on increasing engagement with the arts. The next section, *The Culture of Autism*, discusses the intersection of ideas in both cultural and autism research, and presents debates that form the philosophical context of the Show and Tell research project. The next two sections *Autism and Technology* and *Designing for Autism* detail the range of technologies in use and being studied in the context of autism research, and how successful app design takes place through collaboration with and awareness of the specific needs of autistic users. The next section *Visual Stories* briefly reviews the existing discussion of the benefits of pre-visualisation stories for autistic children. The final section *Other Research* reviews other research projects which touch upon the combination of topics present in the Show and Tell project.

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1. Art, Audiences and Technology

Using art as a therapeutic tool is something which has been heavily researched. The main focus of this research has been on how actively participating in the creation of a piece of artwork can benefit the creator's wellbeing. The evidence suggests that engaging in creative activity can positively affect peoples' well being and health outcomes (Roberts *et al,* 2011*).* What is now starting to emerge is research into how viewing different art forms and engaging in art as audience or 'viewer' can have a positive effect on people.

Viewing a piece of artwork provides something unique to other forms of communication such as talking, as it allows for personal metaphors and interpretations to be developed for the specific viewer allowing a wide range of different personal meanings to evolve (Leiper and Maltby, 2004 cited by Roberts *et al,* 2011).

With this in mind, research suggests that it is more beneficial to integrate the viewing of art into communities, allowing it to become a part of normal everyday society (Levine and Perkins 2005 cited by Roberts *et al,* 2001). This is particularly pertinent for people with mental health problems and their carers as it allows for more social inclusion as the experience occurs within a community setting rather than a service setting (Roberts *et al,* 2011*).*

A research study took place called '*New roles for art galleries: Art-viewing as a community intervention*'. The aim of the study was to look at how viewing art in a public art gallery could benefit family carers of people living with a mental health disability. Grounded Theory methodology, interviews and observation were used to establish the findings. The results showed that the carers became engaged on both emotional and educational levels. From this research it was suggested that viewing art within a community could be used as a low cost means in the future to support carers of people with a mental illness both socially and psychologically (Roberts *et al,* 2011*).*

The report *Audience building and the Future Creative Europe Program (2012)* identified different trends in audiences within the arts sector and found that within Europe audience numbers for arts events are decreasing. The report ascertains the need to redevelop audience bases in order to increase these numbers again. The report showed that two of the main areas that need to be addressed when building a strong audience are the creation of specific outreach programs for under represented audience groups and the use of user engagement through the use of technology. User engagement programs support the experience of arts events. These are most commonly seen in the use of digital technologies which allow the user to interact in a creation and production process (Bamord and Wimmer, 2012).

Rocco Landesman, The chairman for the National Endowment for the Arts (2012) explains how using and incorporating technology within art forms can develop and bring new audiences. There is often a reluctance to use of technology within art forms as it is seen as something that contrasts to the art

form itself and it can often be seen to hinder the experience of a live performance. However Landesman (2012) states that art needs to work with and utilize the positive properties of technology to enrich both the artworks themselves and their audiences.

A report titled *Audience 2.0,* published in 2009 was based on the NEA's 2008 survey of Public Participation in the Arts. 18000 adults were asked about their participation and engagement with the arts over the course of a year. It was found that adults who used live technologies to learn and engage with art attended live performances or art galleries two to three more times than people who did not use any technology. Using technology to engage with different types of art means that it is easier for people from diverse or hard to reach backgrounds to access different art forms. The report findings showed that pairing technology with different art forms increased audiences. People who used technology to engage with art were more likely to attend art events and to continue engaging with it (Bamord and Wimmer, 2012).

Within society today, there is often a notion that contemporary art is too difficult for the general public to engage with and understand. However it is not the art form which is too difficult to comprehend it is the art theory behind it which can often make viewers hesitant to attend events, whether this is performing arts events or art galleries (Deeth, 2012). The use of technology within arts organisations bridges this gap between the art and the audience, making different art forms more enjoyable and accessible.

2. The Culture of Autism

"Autism is not written in nature; it's written in culture" (Grinker 2014)

Outsiders

Autism is most frequently defined in terms of 'otherness', as a state of being which departs from social and behavioural norms. (Grinker & Cho 2013 p.49)

...the Treasury has included circus in its tax relief for theatre. This is not just significant because of the fiscal benefits we will be eligible for, but also because it marks another step towards the legitimisation of an art form that has been on the periphery for hundreds of years and with legitimisation comes renewed possibility. (Lenkiewicz, 2014)

The predominant social and cultural influence and interpretation regarding autism is something that his hidden, lost or taken away from the person. A diagnosis of autism is conceived in terms of loss: the statement 'He was gone' encapsulates the parent's concept of their child 'disappearing' into autism and away from 'normal' social interaction (Grinker 2014).

In the Show and Tell research project we are engaged with two forms of 'otherness' – circus and autism – which are both perceived as different from

social and behavioural norms in their own way through a range of institutional, symbolic and cultural interpretations (Grinker & Cho 2013). This philosophical and ideological connection between two, at first sight, unrelatable categories means that these two aspects of the project which both speak of life on the periphery (physical, social, conceptual) create the basis for investigations in the project which hinge upon the relevance of circus for our autistic audiences. Conversations with autism professionals and feedback from Circus Starr audiences show that there is something about the liberating and unorthodox environment of the circus which resonates with autistic children, and further investigation of the impact of the specialised environment of the circus in both location and performance style will form part of the research.

'Dif-ability'

Increasingly in autism research there is an emphasis on difference rather than impediment in relation to autism:

> Autism is increasingly defined in terms of difference rather than deficit, with Simon Baron-Cohen suggesting that we redefine the terminology and refer to autistic spectrum condition in preference to autistic spectrum disorder, recognising that some of the differences which characterize the non-neurotypical individual are in fact abilities (Baron –Cohen 2009 cited in Shaughnessy 2013 p.323).

This could contribute to an interpretation of 'dif-ability' rather than 'dis-ability' in relation to autism: not an inability to do something but a different way of doing something (Blackburn 2014).

Sue Fletcher-Watson has made some interesting comments regarding her research into autism and how the 'enabling' characteristics of her research (amongst others) with its desire to provide ways for autistic children to engage in 'normal' behaviours/activities might actually be a smokescreen:

> Instead of pouring effort into getting people with autism to learn the habits of the neurotypical community, perhaps we should be thinking more about how to accommodate their alternative way of being into the world we all share. (Fletcher-Watson 2013)

Transformative technology

It is also increasingly evident that technology is playing an important role in lessening the perceived gap between neurotypical and autistic minds.

> ...as society is transformed by technology, the nature of human sociality may be scaffolded and transformed in ways that come to mirror an autistic sociality and thus reframe the disabling properties of autism itself in more positive terms. (Bagatell 2010 p.15)

The broad uptake of mobile technologies and apps by families with autistic children is evidence of how the technological interface is the primary key – as

many of the apps featured in research and advocate databases are not designed for autistic users, but are found to be eminently suited to their needs. App technologies in particular have three key features for autistic users: they are visual, consistent and predictable, thereby lessening the nuance and interpretation required in situations which autistic individuals find difficult to respond to (Lee and Lowe 2014).

People are people

The Show and Tell research project focuses on finding a solution to enable families with autistic children to enjoy time together and facilitating a leisure time activity that others might take for granted. In this context of entertainment it is relevant to reflect on the importance of down time for autistic children. In worlds which are heavily scheduled and monitored, entertainment, play, and relaxation are often not factored in, but they are equally important (Des Roches Rosa, 2014). The culture of research into autism should remember that autistic people are not just problems to be solved, but people to be entertained and involved in all the world has to offer.

Ros Blackburn, who has lived with autism for all her life, spoke insightfully at the National Autistic Society conference in March 2014. She argued that autism is a *social* learning disability, and that social situations require a level of instinctive/reactive 'reading' which the autistic person has to process intellectually – this is much harder, slower and more prone to error. While there are differences between intellect/theoretical processing and intuition/instinctive processing she argued that there are no such things as 'autistic behaviours': there are just *human* behaviours that we share regardless of label or diagnosis.

She gave examples of how she had grown in confidence and ability (not least in delivering a keynote speech at a national conference) due to her parent's insistence on giving her opportunities to try new things, to encounter new experiences, to try and to fail and to try again. In light of her experiences she argued that autistic people are already narrowed and limited by their interests and competencies, fears and situation and she challenged those working with autistic people to broaden the autistic person's horizons, to expand their interests, to provide new sensations, new experiences and to challenge and change (Blackburn 2014)

This is particularly resonant with the Show and Tell project, which in its own small way is providing an inroad into the new experience of going to the circus for autistic children. We have hopes that encounters with the novelty and surprise of the circus art form will be both stimulating and satisfying and encourage more bravery in encountering other new and unexpected situations.

3. Autism and Technology

It is understood that the use of technology can be used to both educate and relax people with autism (Durkin, 2010, cited by Grynszpan *et al,* 2014). Children with autism often need extra prompts to be able to learn and develop skills, this may be in the way of visual aids or verbal communication (MacDuff *et al*, 2001 cited by Goldsmith and LeBlanc, 2011). Technology is able to provide the diverse range of support that a human can but with less social interaction and therefore less obtrusiveness. The appeal of technology to people living with autism is its ability to provide clear structured tasks without any social interaction, something which is often challenging for people with autism. This allows the user to become completely immersed in the work without any distraction (Grynszpan *et al*, 2014).

Technological devices are common within society. A large majority of children carry some sort of device which means that within educational and social settings devices are common occurrences. For children with ASD, this means that if technological devices are used as a therapeutic or extra supportive tool there is not as much stigma attached to them as there is other types of extra support/therapy (Goldsmith and LeBlanc, 2004).

Research suggests that the main barrier to communication for children with ASD is anxiety. The *Somantics* research project has created an app which has rhythmic and repetitive qualities. This, in addition to the touch sensitive screen, allows a tactile approach which creates a feeling of calm and relaxation for the user. The aim of *Somantics* is to help and support children with ASD in communicating and interacting. It involves gestural based interaction which gives the user a sense of play and freedom whilst also having set tasks. This gestural based interaction is maintained through the use of a 'Kinect 3d' camera which has a 'gesture recognition' function. This encourages children to move around different spaces and environments whilst creating different types of artworks. Users are able to take different images using the device's camera and then manipulate them in numerous ways using the properties of the app (Walker *et al*, 2012). Observation has been used to analyse the results of this project and showed that the app had a mostly beneficial and positive impact on the child using it.

The use of technology for people living with autism is proven to help individual's ability to participate in functional activities (Josman, 2008 cited by Grynszpan *et al, 2014*). The increased interest in the use of technology with people with ASD is reflected in a number of key projects which have taken place. An example of this is the *Hands Project*: a smart phone application which is used by teachers to work with children with ASD to help with their overall life skills and social skills. The aim of this app was to allow children with ASD to fully interact with the technology rather than a human. The app involved diary functions and allowed the teacher to upload specific support for individual children. The aim of the app was not to be used as a separate tool but to be used and incorporated into the child/ teacher relationship. Teacher's photographs and voices are used within the app to strengthen this relationship. Although this project is in its early stages, the findings show that

there is great potential for apps to be used in an individualized and flexible way to aid both the education and development of life skills of children with ASD (Grynszpan *et al*, 2014).

This use of technology within a school environment is effective in developing children's life and social skills within the classroom situation. However, it can be argued that children with ASD will find it difficult to generalise these skills once out of the classroom and in real life situations. Mobile assistive technologies which provide support to children with ASD in these real life situations are rare. However, a project called MOSOCO (Mobile Social Compass) has been developed to help children with ASD to broaden their skills and apply them in real life situations. The project consisted of children between eight and eleven being taught by teachers about six fundamental social skills; the ability to keep eye contact, understanding spatial boundaries, the ability to reply in conversations, being able to effectively reply in a conversation, sharing interest and the capability to appropriately disengage a conversation.

Each child within the study was provided with a mobile device containing the app. The app was able to connect with other users in the surrounding areas. From this the app was designed to pair children with one another, so that children would then start to communicate with one another. Whilst in conversation the children would look through the mobile device at one another. The app was designed in such a way that it was able to detect the child's specific behaviors. It had the ability to monitor the child's behavior with regards to the six fundamental social skills and inform him/her of any communicative problems. For example if the child lost eye contact during conversation the app would flag this up and remind the child to maintain eye contact. This applied to the other five essential social skills listed above. This research was taken over a seven week period and findings from semi structured interviews and quantitative analysis of the time students spent on each social skill showed that the app had a positive impact on helping children with ASD to develop their social and life skills (Escobedo *et al,* 2012).

4.   Designing for Autism

Educating children with ASD through the use of technology is something that is becoming more and more popular within society. It is important therefore to pay particular attention to the design of the technological learning environments.

Apps created for children with ASD often provide an interdisciplinary approach for the user. This includes a wide range of functions from sensory functions to gestural recognition. Through designing apps to include both these functions along with the use of storytelling, it connects the gap between the child's own individual world and the technological device. Children are able to develop their own individual thought and creativity whilst also using the technological device (Frauenbergera *et al*, 2011).

An example of this is seen in the ECHOES project which involves children with ASD participating in the design and progress of the app. The aim of the app is to aid and develop autistic children's social skills and increase their confidence. It was stressed in the design process of this app that creativity needed to be at the forefront of the design. During this process, children often did not use technology whilst developing ideas for the design of the app. It was discovered that allowing children with ASD to participate in the design of the app created a more enriched and interesting design (Frauenbergera *et al*, 2011).

The creative potential of apps and mobile technologies is important in helping autistic children to develop their social skills but to also allow them a sense of freedom and liberation. It has been shown that children on the autistic spectrum often have less freedom than other children as parents or guardians make many decisions for the child without addressing the child themselves. Interactive creativity is therefore a highly prized feature of apps as it gives the child an opportunity to express themselves freely without any constraints. (Frauenbergera *et al*, 2011). Many apps have now been created that involve this creative interaction, for example *Create a Monster HD* or *Faces iMake* where the child is provided with a clear set of instructions and tasks but is able to make their own decisions and creatively experiment with making different imagery. The possibilities for the users end outcome are endless, allowing the child to play freely for as long as s/he wishes (Autism Plugged In, 2013).

It is important that empirical knowledge is used alongside creative approaches when thinking about the design process. The use of quantitative methods such as surveys or questionnaires gives designers an overall idea of what children with ASD respond well too. However this quantitative approach does not allow for individual children's needs and emotions to be accounted for. This is why more qualitative methodologies are also needed when designing apps for children with ASD.

The use of qualitative research is seen in the research process for *ReacTickles* software. Children are able to go onto the 'Reactive Colours' website and experiment with the software. Their experimentation is logged and researchers can see the different responses to the software that different children have had. Additionally, children are informed of the value and positive effects there feedback is having (Keay-Bright, 2007).

Colours, interaction, movements and rhythms were the key ideas whilst designing *ReacTickles*. Through using these tools within app design, it is thought that children with ASD are able to process information in a more relaxed and comfortable manner (Sherratt and Peter, 2002). Another key design element to *ReacTickles* was the use of an experimental interface, which allowed children with ASD to become accustomed to the computer or technology in a playful and unpressured way. Through allowing the children to participate in the design of the software it gave designers a more in depth knowledge of the user's needs and has allowed for new ideas and ways of

working to develop which will be able to be applied to future research (Keay-Bright, 2007).

It is believed that using appropriate design in learning environments for children with ASD can positively affect their learning and social behaviour (Khare and Mullick, 2009). The use of visual cues and visual instructions within apps allows for children with autism to have more independence by giving necessary instructions in a clear but creative way. This also again allows the child to use the app without the assistance of an adult.

When designing an app for children with ASD it is important to be aware of the language and social difficulties that they often face. The app *Autismate365* has been designed with particular regard to this by creating a simple navigational route. The app uses a GPS device, which allows the user to interact with scenes that are familiar to that specific child. This may be the child's home or another familiar environment. The app uses both visual and audio cues, for example the user will see a star on the kitchen sink. When this is clicked a phrase will appear informing the child to wash his/her hands. This will then be followed by a message that says 'I wash my hand in the sink'. The aim of the app is to increase autistic children's social and communicative skills (Special Needs Ware, 2014). It is important to be aware of the social and communicative difficulties that children with ASD often face when thinking about the navigation of the app. The design needs to be clear and simple whilst also capturing the creativity that has been previously discussed. Children with ASD often react to frustrating situations through expressing anger or feeling anxious. This therefore means that the app therefore needs to be designed with regard for preventing these circumstances.

5. Visual Stories

Navigating the terminology

What are we creating in the Show and Tell app? When we first discussed this we used the term 'social story' to describe the preparatory story that we were making.

Our NAS consultant soon corrected us – social stories are specifically those that demonstrate appropriate responses in a social situation - therefore social stores are more likely to present examples of concepts we use in social engagement (turn-taking, eye contact, waving back if someone waves at you, greetings etc) which the autistic child would have difficulty in doing.

> Social Stories were developed in 1993 by Carol Gray. They are short stories, written in the first person for children on the autistic spectrum, to aid their understanding of social situations. Whilst typically developing children may intuitively decipher what is appropriate behaviour in different social situations, children with autism often find social situations confusing. Social Stories attempt to help children with autism manage their own behaviour by explicitly describing what

should happen in a given situation, when it should happen, how it should happen, and perhaps most importantly, why it should happen as it does. (Rust and Smith 2006 p.125)

The Show and Tell app is not meant to prompt certain behaviours in the user so it is therefore not a social story. However, it is a *preparatory* story, designed to reduce anxiety by allowing the user to create a pre-visualisation of the situation they will encounter. It is a visual story, and this definition is used in the professional and family world of autism in which the distinction between social stories and visual scripts or stories is clear.

Although we're making a visual not a social story the compositional elements are the same. The key to making a useful visual story is to make it simple and clear in both language and layout, to present the sequence of events in the way that they will be experienced and to use images of things as they are (or will be) so that no disjuncture occurs between the preparation and the real event (More 2012).

Relevance of social story research

Some research has been carried out into the effectiveness of social stories in clinical literature relating to autism. Most studies conclude that the presence of 'confounding variables' (Rust and Smith 2006 p135) such as differences in the types of story, delivery of story (printed, hand drawn, electronic), environment and setting (whether at school or at home) makes it difficult to make a conclusive case for how well social stories adapt behaviour. Not least of these is the fact that all children are different and will respond differently to different situations and prompts.

While we are not creating a social story, the research into social stories is relevant to our project in that it describes the use of stories in autism settings. How changes to the individual can be measured outside of a strict clinical setting is also revealed by these studies as very difficult to measure, and it will be the same for our study. We will be asking in a follow up questionnaire whether the parent considered that the visual story adequately prepared their child for the circus and whether it reduced anxiety about going to the circus (if there was anxiety), and therefore our evidence will be qualitative rather than objective.

Technology and visual stories

To get the most out of the visual story it is important that is read and revisited– this is where the use of technology is beneficial as it enables the story to be adapted and then re-read as many times as the child likes. Technology provides interfaces which are stable, simple and attuned to repetition and which makes computers and tablets ideal formats for the delivery of a visual story (Putnam and Chong 2008)

There are other apps which use the electronic book format to create and present visual stories such as *Kid in Story* created by Locomotive Labs which

enables the creation of homemade story using images and speech bubbles by parents and children. The app *Autismate365* includes the function to 'create personalized and customized Visual Stories to help ease anxiety associated with transitions and new environments.'

It would seem, unsurprisingly, that there is a convergence between the use of apps made for all audiences and those being developed for autistic users which are picking up on and adapting existing tools, such as social and visual stories which are already widely used and perceived as useful for autism education and support.

6. Other Research

DART – Development Autism Research Technology

DART is headed by Sue Fletcher-Watson who is a developmental psychologist at the University of Edinburgh. The research focus of DART is on technology use in relation to autism. The Click East project has the most relevance to the Show and Tell project as it involved the development of an app called *Find Me* which was designed to develop social and communication skills. The app functioned as a game through which children were encouraged to practise looking and listening despite the presence of distracting information (Click East UKCRN)

> One strand of research involves exploring the uses of technology, and especially iPad apps, to support, educate and engage children with autism. A group of collaborators from across academic backgrounds developed an iPad app designed to teach fundamental social communication skills to children with autism – things like looking at people, and looking where they are looking too. This app was then evaluated in a formal trial, called Click-East, which was broadly supportive of the possibilities for using apps to deliver therapeutic support to young children with autism. (Fletcher-Watson, DART website 2014)

Early evidence suggests that the app has some beneficial use on a day to day anecdotal basis but that it doesn't have 'statistical significance' in terms of making measurable changes to behaviour (Fletcher-Watson 2013).

This type of study is relevant in that it engages families and children with technology which is used in the home with the expectation that technology use will provide another means to help the autistic child engage with the world more successfully.

App databases

There a number of app databases organised and maintained by organisations, independent autism advocates, and academic researchers which log and review apps which are used by or perceived as suitable for

autistic children and adults (Autism Speaks: Autism Apps; DART: App Reviews; Shannon Des Roches Rosa et al: Ipads and Autism Apps Recommendations). This clearly shows the importance of mobile technology in autism both in a research and practical sense and indicates the fast moving world of app development and use where new apps are rated and shared using the internet.

Many of the apps included in these databases are characterised by the different skills sets they facilitate/promote and to what degree they are autism –friendly (as not all the apps used are designed for autistic users but are found to be appropriate). The Autism Speaks website has now adopted a 'research rating' for apps with grades of 'anecdotal', 'research' or 'evidence' to indicate which apps have either purported beneficial qualities, related research that demonstrates efficacy, or tangible evidence of the app's helpfulness.

Entry into these databases is something to consider with the Show and Tell app. It's also the case that while the Show and Tell app has been designed with autistic users in mind it could be adapted 'outward' to create a more stimulating, rich pre-event experience for children at the higher end of the spectrum or for any child who wants to understand what the circus is about.

Imagining Autism

> Imagining Autism is a collaboration between the disciplines of drama and psychology that seeks to remediate the difficulties that autistic children have with communication, social interaction and imagination. It is funded by the Arts and Humanities Research Council and is based at the University of Kent. Imagining Autism is a collaboration between the School of Arts, the Tizard Centre, the School of Psychology and the Gulbenkian Theatre. (Imagining Autism website 2014)

The study worked with 22 children with autism who engaged in a series of interactive sensory environments such as 'outer space', 'under the sea' and 'the arctic'. Each environment was designed for them to encounter a range of stimuli and respond to triggers created through lighting, sound, physical action and puppetry. Each environment used trained performers and in each activities took place which aimed to promote communication, socialisation, playful interaction, and creative engagement. The research found changes in children's behaviour, including changes in several areas identified as deficits in autism, such as social interaction and emotion recognition. The severity of autistic symptoms displayed by the children, which were rated by their parents and teaching staff were also found to decrease significantly. All of the children who took part in the research showed at least some improvements on at least one of the measures used to monitor change during the research, with over three quarters of them showing changes to more than one. (Newton 2014)

It is highly relevant that engagement with these theatrical/immersive installations has created a positive change in the autistic children who took part. The types of scenarios used in the study (with activities modified depending on the abilities of the participants) and the focus on social interaction and engagement might suggest that these types of activities would be beneficial for all children regardless of disability. This project is relevant to Show and Tell in that it relates to the potential of engagement with the arts as life enhancing/changing. The level of participation in the arts event in this case is far greater than our study; however there are useful parallels to be drawn in terms of engagement in an immersive environment (in our case the Big Top).

The lead researcher on the Imagining Autism project has written a particularly interesting article which looks beyond the clinical facts of the study toward the cultural/theoretical aspects of the research. This is relevant in the case of the Show and Tell project, which must resist being framed solely as a clinical study (or framed within autism research solely). It's interesting to see how interpretations of the research are elaborated in different types of output.

> Drawing upon my experience of a research project exploring the potential of drama as an 'intervention' in autism, I am seeking to de-mythologize the condition by challenging stereotypes, by suggesting that the multimodalities of performance offer an appropriate space for 'encounters' with autistic states of being whilst also questioning the dualisms which distinguish between the aesthetic and non-aesthetic. (Shaughnessy 2013 p.322)

Somantics/Reactickles – Wendy Keay-Bright

These creative/interactive apps have been developed by Wendy Keay-Bright as part of collaborative research projects. The ethos of the apps is that they are enabling – they have a creative aspect which is purposeful in the development of 'self awareness, confidence and independence' (Somantics website)

Somantics in particular is about individual creativity and as such has the most to say about how arts can be beneficial to personal development for those with autism. The emphasis of both apps is on the creation of visual representation of concepts which are immediately engaging and simple enough to understand without language or complex instruction.

> Somantics has been used in a variety of settings, therapeutic and educational, as a method of eliciting non-formal, user-led interaction. This is in contrast with many information technology interventions that target specific behaviours via structured tasks. Moreover, they are often conducted in controlled environments. By investigating behaviour 'in the wild' we offer a genuine alternative to traditional paradigms in understanding ASD. (Walker et al 2012 p.319)

What's relevant here is the exploration of technology as a creative tool rather than as an instrument for learning. A lot of existing research into autism and technology (Grynszpan et al 2014) is focussed on educative tasks which are designed to improve or modify some behaviour. While the Show and Tell visual story could perhaps be seen as engaged in modifying behaviour (anxiety behaviours) the app is envisaged as a way to get children to engage with an exciting and unpredictable art form. The notion of investigating behaviour 'in the wild' is relevant to the scope of the Show and Tell research project which is attempting to get input from a diverse range of users in a variety of geographic locations in real world environments.

The power of words

In amongst the clinical studies and statistics our project sits. Most research involving audiences for the arts and almost all research involving autism is mainly generated through qualitative approaches: large numbers, big analyses and concrete data.

We already know that trying to understand our research project through numbers alone will not work, which is why we are employing a mixed methods approach – to capture some statistics but to have plenty of conversations too. A hybrid approach is the best method for a hybrid project such as this which crosses over distinct subject areas. The case study, dialogical and interpretative approaches used in art research contexts, driven by qualitative methodology, will hopefully reveal more of relevance, in this case, to the arts and autism community than statistics alone (Bolte 2014).

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