A framework system for the design of a digital augmented-reality pretend play activity for children with ASD

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Abstract
Pretend play is a key educational strategy for children with Autism Spectrum disorder (ASD). Pretend play interventions lead to improvements including social skills and theory of mind. Prior research has shown benefits of using digital technologies to enhance pretend play, thereby improving skills. This article presents a framework system to support the design of augmented reality pretend play activities. The framework system emerged from a user-centred design process (with proxy users) to meet the complex developmental needs and heterogeneity of children with ASD. The system is aimed at promoting social conversation and theory of mind. It consists of an augmented-reality interactive game using features of the technology to help the child roleplay, complemented by an adult support application. The child is engaged in roleplay through embodying a character, contextualised within a familiar story. The support application allows an adult to monitor, guide and stimulate the child's progress through participating in the activity.
The design process comprised of observations, interviews and focus groups with proxy users, involving three schools who provided participants for the focus groups. Individuals with relevant expertise were independently recruited for the interviews.
The proposed system presents a novel opportunity to enhance pretend play by leveraging the unique features of augmented reality technologies and can serve as a reference for developing similar products.

Keywords: Pretend play, augmented-reality, autism, game-based learning, user-centred design

1 Introduction

Autism Spectrum Disorder (ASD) is a developmental disorder estimated to affect 1-2% of the world population, with numbers steadily growing, (Lai, Lombardo, & Baron-Cohen, 2014, pg. 896). ASD is characterised by difficulties in social communication, repetitive behaviours and co-occurring atypical language development. (Lai, Lombardo, & Baron-Cohen, 2014, pg. 896). Young adults with ASD are less likely to live independently, gain employment, maintain social contact with friends and family and have increased chances of co-occurring mental health conditions (Bishop-Fitzpatrick et al. 2016, pg. 2716).
A proven early intervention strategy for children with ASD is pretend play (Baron-Cohen, 1987; Leslie, 1987). Smith & Peter (2009) define pretend play as being 'characterized by the nonliteral use of objects, actions, or vocalizations', of which a commonly used version is roleplay. Pretend play for typically developing children occurs naturally at a predictable age but is often delayed in children with ASD (Hobson et al., 2013; Rutherford & Rogers, 2003

1.1 Interactive technologies and game-based learning

Research shows that individuals with ASD often have an affinity for technology due to its 'safe' and 'predictable' nature (Boucenna et al, 2014). A domain that shows promise in enhancing pretend play is game-based learning (GBL), delivered by means of digital interactive technology. Recent reviews demonstrated that GBL can support skill development and knowledge acquisition, and generate positive motivational, perceptual and cognitive impacts (Abdul Jabbar & Felicia, 2015; Hainey et al, 2016). This makes GBL a strong candidate for enhancing interventions for children with ASD.
An increasing body of research shows positive results in intervention for individuals with ASD (Boucenna et al., 2014). Bremner, Fabricatore and Lopez (2019) found that game technologies such as robots, augmented reality, virtual environments and interactive story books can be successfully used in pretend play interventions to promote, among other things, social Interaction, sensory processing and adaptation to change. Kientz et al. (2014) called for 'greater innovation across various technologies.' Echoing this call, Bremner, Fabricatore and Lopez (2019) highlighted that pretend play is a key area in which the application of digital game-based learning should be further explored.

1.2 Augmented Reality

Augmented reality (AR) is a technology which uses information about the existing world to intelligently 'supplement' the physical environment with additional informational or sensory contents.
AR shows potential to help children grasp the concept of pretence, due to its ability to combine real and virtual elements and its efficacy as a tool to scaffold skills learned in a virtual world for transfer into the real world (Kientz et al., 2014, pg. 73). Several studies show promising skill improvements for children with ASD, such as Chung & Chen's (2017) AR based social stories, Bai et al.'s (2015) AR system to teach representation in pretence, and Escobedo et al.'s (2012) system for teaching social skills. These studies demonstrate effective uses of AR to create enhanced representational or 'imaginary' pretend play scenarios to promote the development of skills typically targeted by pretend play interventions (e.g. social skills).

1.3 Research aim

This study aimed to propose a framework system to support the design of an interactive AR application to enhance pretend play interventions for children with ASD. The proposed system focuses on leveraging facial tracking technology to enhance children's theory of mind and social conversation, through an activity involving one child and one adult proxy based on embodying a character out of a familiar story from the Oxford Reading Tree series.
Although other studies leveraged locational AR, we are not aware of any previous work using AR-based facial tracking in ASD interventions. Implementing such technology through an iPad-based AR can enhance user interaction with characters in a virtual narrative setting (Zhao, Han & Ma, 2019). This could consequently enhance the possibilities for children to learn about and from 'pretence', expanding on the findings from these studies.

Target users

- Main users/beneficiaries: children with ASD: developmental ages 4-8, with sufficient language to understand and follow simple instructions
- Proxies/enablers: adult professionals working with children with ASD who will mediate the activity

Technological Framework

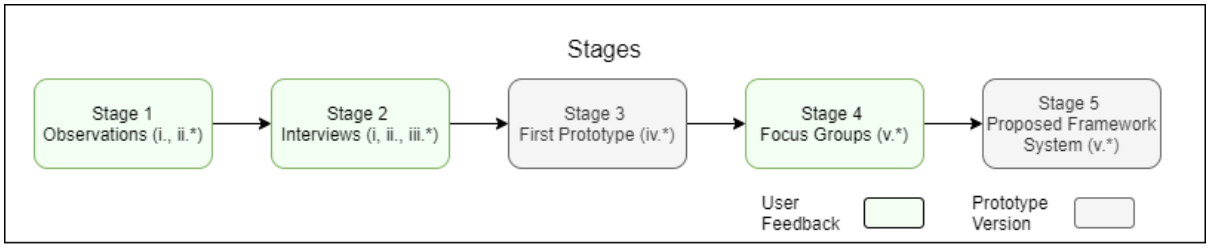
The proposed system consists of interoperating apps for the iPad Pro 2019. This platform was selected because: (i) it incorporates an advanced front-facing depth camera suitable for facial tracking; (ii) fit offers a reliable facial tracking implementation through the ARKit SDK; (iii) it is relatively small and lightweight; and (iv) it can be easily acquired.
The proposed system uses the Unreal Engine 4 integration of Apple ARKit and their ARFaceAnchor object to provide real-time facial tracking of a virtual character which mirrors the actions of the child.

2 Methodology

This study was underpinned by human factors perspectives, informed by observations and data from expert stakeholders. Data coding, analysis and formulation of the framework were informed by Activity Theory (AT), a cross-disciplinary framework for studying different forms of human practices as developmental processes with interlinked individual and social levels (Kuutti, 1995). Ethics were approved by the University of Huddersfield before commencement of the study.
In order to pursue the core research aim, the system was designed based on a user-centred design approach (UCD), a multi-stage process through which a product is iteratively developed based on inputs and feedback directly gathered from key stakeholders (Lubas, Mitchell & De Leo, 2014). UCD is increasingly used for creating accessible interactive technologies (e.g. Menzies, 2011; Lubas, Mitchell & De Leo, 2014). Our study adopted a tailored UCD approach analogous to what Robins et al. (2010) applied to design robot-assisted play scenarios for children with ASD. Similarly to these authors, our study involved target users from a conceptual design stage, before the product (or alternatives to it) existed in any form.
The aims of the UCD process were to:

i. Identify inhibitors and enablers for children with ASD in pretend play interventions.
ii. Identify strategies commonly used by professionals (proxies) to facilitate pretend play for children with ASD.

iii. Define core system requirements based on inhibitors, enablers and strategies identified by proxies.
iv. Formulate and iterate on a prototypical AR system design informed by the system requirements.
v. Formulate the proposed framework system based on the prototypical system. The UCD approach followed the process set out in Figure *1*, which highlights key stages and approaches to gather feedback/inputs from key stakeholders.



*The items in brackets specify the aim of the user-centred design process each stage was aimed at fulfilling

Figure 1

2.1 Participants

Observations – One mainstream school and one nursery school were selected using convenience sampling. Two classes were observed using an ethnographic approach including children representative of the target users.

Interviews - A total of 12 independent interviewees were recruited through a convenience sample, and selected using the following criteria:

1. Has direct experience of teaching, supporting or caring for children with ASD
2. Has experience of developing/supporting children's language and social skills through pretend play or play-related strategies

Focus Groups – Three Schools were recruited using a convenience sampling method. To gain a sufficiently diverse sample, the schools selected consisted of one integrated nursery school (catering for able-bodied and disabled children) aged three to five; a mainstream primary school with children identified by teachers as displaying features of ASD or with diagnoses by educational psychologists; and a special school catering for children with Statements of Special Educational Needs aged five to eighteen. Between five and ten focus group members were selected from each school by headteachers to participate, using the following criteria:

1. Has experience of teaching supporting children through pretend play or play related strategies
2. Has direct experience of teaching or supporting children with ASD

2.2 Procedures

2.2.1 Data collection

Observations

- Unstructured naturalistic observations were conducted by one researcher (LB).
- An ethnographic approach was used, minimising the effect of the presence of the researcher (LB). Therefore, no video recording was taken.
- Field notes were gathered based on a template analysis coding system and temporally recorded.

Interviews

- Semi structured interviews were conducted.
- One researcher (LB) led the interviews while a second researcher (JJ) took additional notes.

Focus Groups

- Focus groups were held in each school, lasting forty minutes to one hour, led by one researcher (LB) assisted by a second (JJ).
- The focus groups were presented with a video example of a non-interactive prototype created in Adobe XD which was formulated using the framework system emerging from the interview data. The prototype consisted of:

- A roleplay/sociodramatic play-based activity using an AR character driven by the user
- A context based on a narrative from the familiar story book series 'The Oxford Reading Tree'
- Steps/sequencing to gradually extend social conversation through roleplay
- Simple choices and decision making for the child/user
- A training element for the guiding adult

- Participants were given a demonstration, on an iPad, of an example of AR Facial Tracking which will be used to drive the character in the proposed intervention.
- Questions were delivered to each group in a semi-structured format.
- Meetings and stakeholder feedback were recorded and notes taken by the second researcher (JJ).

2.2.2 Prototype Design

Goal directed design, a common method in UCD, was used to inform the prototype creation. Accordingly, key features of the prototype were designed to define the following aspects of the prototype:

- Personas, defined as a 'fictitious, specific, concrete representation of target users' (Pruitt & Adlin, 2006, pg. 11).
- Scenario where the activity takes place
- Goal of the activity

2.3 Data analysis

A framework analysis method (King, 2012) was used to code qualitative data. An activity system was designed prior to the analysis using AT and applied to the data (*Figure 2*) to identify and classify factors affecting pretend play activity systems. This was piloted and agreed by all authors. Coding categories were iteratively refined and new categories inductively formulated throughout the UCD process, based on emerging data.
The analysis was carried out by one researcher (LB) and validated by (JJ). Differences were resolved by discussion. Qualitative data sets were compiled using a coding matrix. Quantitative analyses were performed to determine how frequently inhibiting and enabling factors were mentioned. Factors were deemed important depending on the number of people/times mentioned, as well as the emphasis qualitatively placed on them.

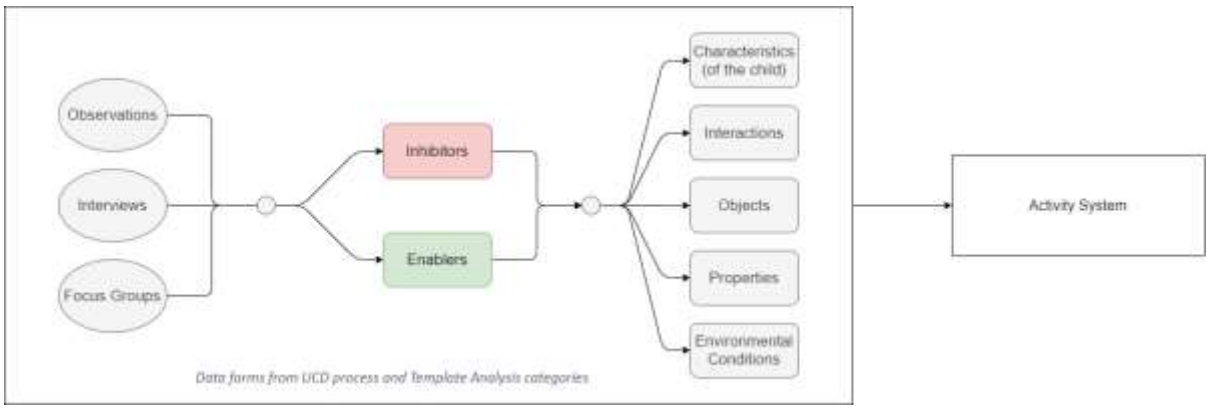


Figure 2

3 Results

Two overarching strategies were mentioned repeatedly in both the interviews and focus groups. These were roleplay, and the use of narrative (e.g. 'sensory stories' and 'social stories'). The identified inhibitors and enablers for these overarching strategies are below.

3.1 Interviews

Qualitative interview data was analysed using the process and organiser illustrated above using the schema in Figure 2. The in **Error! Reference source not found.** below illustrates the results.

3.1.1 Inhibitors

Characteristics - Overall, the set of inhibiting factors most frequently mentioned were the characteristics of children with ASD. Whilst there is heterogeneity, the inhibiting characteristic mentioned most frequently, was fixated or obsessive behaviour. Other frequently mentioned inhibiting characteristics were lack of imagination, and difficulties caused by mood, behaviour, or poor motivation.

*Interaction*s - Two factors stood out as inhibitors in interactions: children losing control, particularly as a result of 'open-endedness' (e.g. open-ended scenarios); and difficulties in relationships/interrelating with others.

Properties of activity - Task complexity was mentioned by several participants as a causal factor in relation to negative reactions. Lack of consistency was also seen as problematic.

Environmental conditions - Most interviewees explained that new or unfamiliar, busy, and/or overstimulating environments can act as inhibitors, resulting, for example, in distraction or 'melt-down'.

Inhibitors	Characteristics of the child								Interactions					Properties			Environmental Conditions		
	Fixated Behaviours	Difficulty Processing Information	Literal/comprehension skills (lack of)	Poor attention/ concentration	Poor Memory	Mood/Behaviour/ motivation	Imagination (lack of)	Sensory difficulties	Relationships / interrelating	Difficulties with loss of control	Language/ communication skills	Do not understand emotions	Do not understand reactions	Task complexity	Ease of use (Technological artefact)	Lack of Consistency	New/unfamiliar environments	Imaginary situations/contexts	Busy/ overstimulating spaces
No. of people	9	2	1	2	1	7	7	8	12	10	6	5	4	3	1	4	2	1	3
Overall Mentions	21	2	1	2	1	11	14	13	21	18	8	7	6	3	1	4	4	1	6

Table 1

3.1.2 Enablers

Characteristics – The characteristic most frequently identified by participants as an enabler was children's 'specific individual interests', which can be used as a 'hook' for further learning.

Interactions – Interactions were mentioned the most frequently as enabling factors, the most emphasised of which is adult guidance. Other enablers often mentioned were encouraging language and discussion; using prompts, cues and interaction; working with peers (children working in pairs or small groups); and using questioning to probe meaning.

Objects – Physical objects of reference were often seen as important, for example masks and dressing up (to get in character). Rewards as motivators (e.g. sounds) and technological artefacts such as iPads were identified as enabling learning activities.

Properties of activity – The necessity for routine, structure and consistency, as well as steps and sequencing were emphasised by a number of participants. The need for the use of precise language by the adult was a frequently mentioned as important, as were practice, repetition and preparation.

Environment – The importance of a sensory environment was most frequently mentioned as helpful, as well as the need for a safe, familiar environment and quiet calm spaces.

Enablers	Characteristics		Interactions					Objects						Properties									Environment			
	Interest in technology	Specific individual interest	Peer/paired work	Questioning (key/deep questions)	Language/Conversation	Prompts/Cues	Actions	Adult Guidance	Technological artefacts (e.g. iPad)	Props (Objects of Reference)	Rewards/motivators	Story books (visual)	Dressing up clothes/masks	Mirrors	Visual Aid (e.g. picture cards)	Preparation/familiarisation	Practise/repetition	Routine, structure and consistency	Steps/sequencing (prediction)	Modelling	Choice (e.g. of characters)	Levelled difficulty/appropriate	Precise language (e.g. Closed questions)	Adult training	Personalisation	Realistic environment/situation	Quiet environment/space	FAMILIAR/Safe ENVIRONMENT	Sensory
Total Person	1	7	5	4	7	3	6	9	6	6	4	3	4		6	4	4	7	6	4	1	5	7	3	5	3	5	5	8
Overall Mentions	1	14	9	7	18	6	6	23	12	9	10	5	9		10	7	7	13	13	5	1	6	12	6	6	4	10	9	25

Table 2

3.2 Focus Groups

Results from the Focus Groups broadly reflected those from Interviews.

3.2.1 Inhibitors

Characteristics – As identified in interviews, characteristics were seen as having the most overall inhibiting effect. 'Literalness' and lack of imagination as well as difficulty with understanding at a deeper level (semantics) were identified as problematic. Other frequently mentioned inhibitors were poor memory, mood and behaviour. Other issues referred to were difficulties in processing information, sequencing and prediction.

Interactions – Weak communication skills and difficulty interrelating with others were seen as contributing to poor social skills. The inability to understand the reactions and emotions of others and lack of self-awareness were also identified as problematic, impacting on social skills.

Properties of activity – Complex tasks and more difficult to use artefacts could give rise to frustrations for the child with ASD. Other factors which could act as barriers were lack of experience and the prerequisite skills to cope with learning activities.

Environmental conditions – Participants found that Imaginary situations and contexts posed difficulty for children with ASD. Small or confined spaces, busy, overstimulating environments also had a negative impact.

Inhibitors	Characteristics of the child										Interactions					Properties		Environmental conditions		
	Obsessiveness	Processing information	Literalness (/ do not understand meaning)	Lack Self-recognition	Poor attention/ concentration	Memory (poor)	Prediction/sequencing (poor)	Mood/Behaviour /motivation	Imagination (lack of)	Sensory difficulties	Relationships /interrelating	Poor social skills	Language/communication skills	Do not understand emotions	Do not understand reactions	Task complexity	Usability	Imaginary situations/contexts	Limited space	Busy/overstimulating spaces
Overall Mentions	5	6	9	3	1	3	1	6	6	1	1	1	2	4	5	1	4	4	2	1

Table 3

3.2.2 Enablers

Characteristics –Few characteristics were seen as enablers of pretend play activity, however specific individual interests, particularly in technology, were identified as potentially enabling.

Interactions – Interactions led by the mediating adult were identified most frequently as enabling. Using actions to demonstrate meaning was frequently identified as helpful, as well as the use of questioning to probe for meaning or elicit key information. Providing scaffolding such as prompts and cues was often identified as helpful. Peer work, sharing and taking turns were also referred to as positively enabling**.**

Objects – Objects of reference and/or visual aids were frequently referred to as important, enabling learning and understanding (by association) to take place. Objects helpful to pretend play and specifically roleplay, included using mirrors (to see themselves) and dressing up costumes (such as a doctor's outfit).

Properties of activity – Good preparation, familiarisation with the topic and activity, practice and repetition were often identified as beneficial. The need for routine, structure and consistency was emphasised. Also seen as important was 'personalisation' to meet the individual needs and provide incremental challenge. Modelling and giving feedback to children to help them improve were common support strategies. Some participants advised that giving a limited choice and control (e.g. which character) can satisfy some children with ASD. Technology was frequently identified as engaging and appealing for children with ASD. Participants emphasised the need for training adults to enable them to effectively use the new technologies.
Environmental conditions – As in interviews, participants identified quiet, dedicated spaces as enabling learning activities. Realistic environments were also enabled activities to take place more successfully.

	Characteristics		Interactions							Objects								Properties										Environmental Conditions		
ENABLERS FOCUS GROUPS	Interest in technology	Specific individual interest	Sharing/taking turns	Peer/paired work	Questioning (key/deep questions)	Prompts/Cues	Selecting/Matching (type of physical interaction)	Actions	Adult Guidance	Technological artefact (e.g. iPad)	Objects of reference	Rewards/motivators	Books (visual)	Dressing up/masks	Mirrors	Visual Aid (e.g. picture cards)	Language/Discussion	Props	Preparation/Familiarisation	Practice/repetition	Routine, structure and consistency	Steps/sequencing (prediction)	Modelling	Choice/Control (e.g. of characters)	Levelled difficulty/appropriate	Adult training	Engaging factors of technology	Feedback	Personalisation	Realistic environment/situation	Quiet environment/space	Dedicated space
Total for all schools	3	3	9	12	23	17	7	14	8	4	12	20	4	7	4	26	10	1	26	16	16	10	9	11	15	11	9	15	8	4	2	2

Table 4

4 Proposed Framework System

4.1 Persona

The features identified from data gathered was used to create a 'persona'. The 'typical' user then, is likely to have fixed behaviours, take things literally, lack imaginary behaviours and prefer closed-ended activities and objects that are familiar to them. The user needs consistency in their routine and familiar activities. This user is reluctant to take part in activities that do not interest them. Lack of definition in situations like play or interacting with groups of peers can create a sense of 'losing control' which may lead to adverse reactions. Overly complex tasks can hamper confidence and motivation. The user has difficulties in understanding the emotions and reactions of others or their own feelings. They may not understand social constructs such as adult authority. Social situations can be uncomfortable for them and they have a tendency to prefer solitary play. This could be compounded by difficulties in understanding imprecise language and deeper meaning such as inference. The user may have difficulties concentrating or functioning in loud, colourful or busy environments

4.2 Purpose of the system

The system should engage the target user (child with ASD) in an AR assisted pretend play activity using facial tracking technology, to improve theory of mind and extend social conversation.

4.3 Activity setting

The optimum environment for the proposed activity will be:

- familiar to the child e.g. school/nursery
- guided by a familiar adult e.g. teacher/caregiver
- in a quiet space which is calm and has low sensory input
- in a familiar play context, such as going on a school trip or a visit to the doctor

4.4 Framework System Design

The framework system was designed using the constraints outlined in the goal directed design and the outcomes of the User-Centred Design process. The proposed system includes two apps which are networked together over WiFi, and is outlined in Figure 3

- The first app is for children with ASD
- The second app is a 'support' app for a guiding adult to be used in conjunction with the child's app

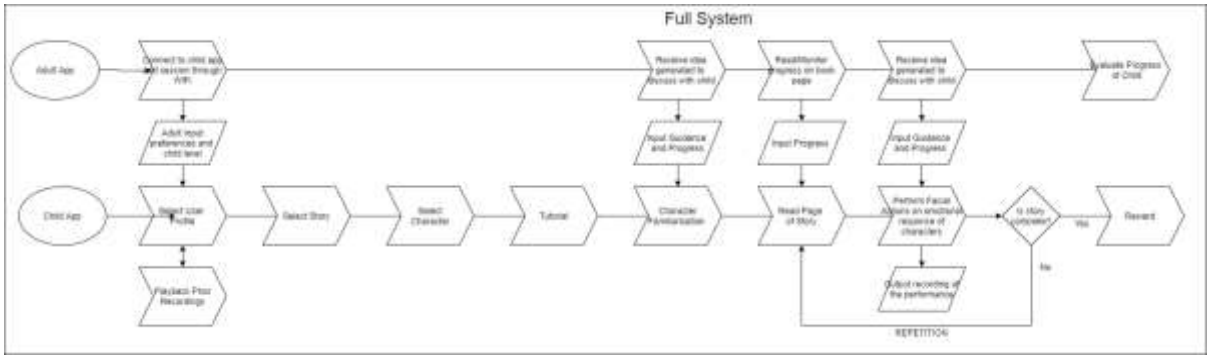


Figure 3

Child App

The app will help the child to engage in roleplay using a narrative from a familiar book or reading scheme. AR facial tracking will be used to help the child 'become' the story book character that they will 'act out'. The child will progress through the narrative step by step, whilst being given the chance to learn and 'act out', how the book character would react. Steps will be:

- A choice of interactive stories based on The Oxford Reading tree which many children are familiar with
- The child will choose the story they would like to act in and the character they want to play
- A tutorial will be available for first time users
- A familiarisation stage will be presented where the child will learn about their chosen character
- The child will be given the option to read out, and (or) listen to the audio of each page of the story
- At the end of each page, the child will have an opportunity to 'act as if' they were the character by driving the virtual character's face through AR
- The child will be asked to perform facial actions relating to the character's emotions e.g. happy or sad, which the app will be able to intelligently assess.
- Actions such as tapping can bring up objects of reference relevant to the story page to help the child to understand the context of the story.
- Through closed questioning by the adult (using ideas generated in the adult app), the child will be encouraged to put themselves 'in the shoes' of the character.
- The app will allow the child, when ready (as decided by the child or adult) to progress/navigate to the next page of the story (sequencing)
- The child or adult can choose to record their performance as the character, to watch later.

Key Features

Seque*ncing* – Sequencing will be used to build ideas and language and introduce structure and consistency to support the child's learning.

Levelled Difficulty – The app will have multiple entry points to suit the child's needs and level of skills.

Language and Questioning – Appropriate language will be built into the app to develop and extend the child's roleplay skills. Questioning will be used to reinforce their understanding of the character they play, using questions such as 'Can you show me if *the character* is feeling happy?'

Emotional Responses/Actions – When asked to show a 'happy' or a 'sad' face, the app will be able to estimate if the child is presenting the correct facial expression and send this data to the corresponding adult support app.

Calm Sensory input – As many children with ASD can be overwhelmed by bright colours and busy layouts, there will be controls for elements linked to sensory input e.g. sounds to suit the child's preference.

Prompts – A variety of aural prompts will be available, including music and sounds to signal the start and end of activities, and intelligent voice prompts when the child is disengaged.

Rewards – The child receives rewards through positive reinforcement, using sounds and music and animated voices and elements. There will be no 'fail' state.

Feedback – The child can record their performance as the animated character which they can play back.

Personalisation – Children will be able to create a user profile and save their preferences.

Adult Support App

The Adult support app will help adults to guide the child through the experience. They will have control over progression, be offered ideas of what to say to the child to encourage consistency and be able to change any settings such as level of difficulty and volume in order to personalise/suit the app to the child's needs.

Key Features

Adult Training – The adult will be offered training on the app and running the intervention successfully.

Idea Generation – At key points, the app will offer language options and ways to extend the play. The suggestions will intelligently use the inputs of the child app (e.g. if the child is not completing actions such as presenting a 'happy face' at the correct time, the adult app may suggest continuing to probe the child about feelings).

Child Progression – The adult will report whether the child has succeeded in order to track progress and keep maintain data. The adult will be able to access the recordings of the child 'driving' the animated character.

Settings Controls e.g. difficulty level/volume – As each child with ASD has different abilities and preferences, adults will be able to access and change these to suit the child on a saved 'profile'.

5 Discussion

This framework system builds on an increasing set of applications focusing on the design of AR applications to aid children with ASD. The proposed framework system can support the design of similar applications. For example, Chung & Chen's (2017) and Escobedo et al. (2012) use AR to give cues of social behaviour to model through either stories or the practice of real-world situations offering a different approach to using AR than this study. Bai et al. (2015) focus on symbolic play (an aspect of pretend play). There are several key differences which set our proposal. The main focus of Bai et al.'s study is to substitute objects with imaginary content to elicit object substitution e.g. a block becomes a plane, whereas our study looks at transforming the child into an imaginary character in a story using features of AR. This gives the proposed system the unique focus of provoking roleplay activities within pretend play. Whereas these three papers propose specific applications, our study proposes a framework system comprising of multiple features established through a user-centred approach to help children successfully engage in the activity.

5.1 Contribution

At the outset of this research, there was compelling evidence to support that a digital pretend play system could enable children with ASD to improve their pretend play skills, particularly enhancing recognition of facial expressions to enhance children's theory of mind and social conversation. Having employed a user-centred design approach with proxy users, the proposed framework system takes account of the needs and requirements of the primary target group (children with ASD) and their adult guides (proxies). The process led to a design tailored to user needs, using the potential of AR technology to enhance pretend play interventions.

5.2 Limitations

Our study has, so far, focused on proxy users given the young age and particular challenges faced by the primary user group. Full implementation of an application based on the proposed framework system, and investigation of direct use by the primary user group will lead to a better understanding of how the user will interact with the system. Future investigation of usability issues would lead to a more robust framework system.

5.3 Future research

Following the creation of the framework system, usability studies will be conducted and further feedback from the process will be integrated into the final framework system. A fully featured system will be designed and implemented based on this, and its effects on the primary and secondary users will be investigated.

The proposed framework system can be used by other researchers as a reference to develop similar products/build onto the current base of research into the use of digital technology to support ASD intervention in general and specifically with pretend play.

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