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PARENTS' EXPERIENCES IN USING MOBILE TABLETS WITH THEIR CHILD WITH AUTISM TO ENCOURAGE THE DEVELOPMENT OF SOCIAL COMMUNICATION SKILLS: THE DEVELOPMENT OF A PARENTS' GUIDE

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Abstract

Autism is a lifelong condition that affects how individuals interact with others and make sense of the world around them. The two core difficulties associated with autism are difficulties in social communication and interaction, and the manifestation of restricted, repetitive patterns of behaviour. However, children with autism may also have many talents and special interests among which is their affinity with digital technologies. Despite the increasing use of mobile tablets in schools and homes, and the children's motivation in using them, there is limited guidance on how to use the tablets to teach children with autism specific skills. This study aims to fill this gap in knowledge by providing guidelines about the ways in which iPads and other tablets can be used by parents/carers and their child at home to support the development of social communication skills.

Semi-structured interviews with 10 parents of primary school aged children (4-11 years old) with autism were conducted with the aim to explore their experiences in using mobile devices, such as iPads and android tablets, and social activities with their children to create opportunities for social communication development. The interview involved questions about the parents' knowledge and experience in autism, their understanding of social communication skills, the use of technology at home, and their links with the child's school.

Qualitative analysis of the interviews showed that parents used a variety of strategies to boost their child's social communication skills. Among these strategies were a) the use of communication symbols, b) the use of the child's special interest as motivator to gain their attention, and c) allowing time to their child to respond. It was also found that parents engaged their child in joint activities such as cooking, role play and creating social stories together on the device. Seven out of ten parents mentioned that the tablet is a motivating tool that can be used to teach social communication skills, nonetheless all parents raised concerns over screen time and their child's sharing difficulties. The need for training and advice as well as building stronger links with their child's school was highlighted. In particular, it was mentioned that recommendations would be welcomed about how parents can address their child's difficulties in initiating or sustaining a conversation, taking turns and sharing, understanding other people's feelings and facial expressions, and showing interest to other people.

This is the first study to date that resulted in the development of a parents' guide informed by evidence-based practice and the participants' experiences and concerns. The proposed guidelines aim to urge parents to feel more confident in using the tablet with their child in more collaborative ways. In particular, the guide offers recommendations about how to develop verbal and non-verbal communication, gives examples of tablet based activities to interact and create things together, as well as it offers suggestions on how to provide a worry free tablet experience and how to connect with the school.

Keywords: autism, social communication, mobile tablets, parents, guidelines.

1 INTRODUCTION

Autism is a complex neuro developmental condition characterised by difficulties in a) social communication and interaction and b) restricted, repetitive behaviours [1]. The prevalence of autism is 1 in 100 in the UK population, which means that around 700,000 people of all ages may have autism [2]. One of the key difficulties that individuals with autism may have is the lack or impairment of joint attention skills [3].

Joint attention (JA) is a social phenomenon that refers to the ability to follow another's direction of gaze, or simply to 'look where someone else is looking' [4]. This may occur when a child turns his/her head and follows the adult's gaze when the adult points to a distant object or shows enthusiasm about an event occurring (responding to JA). Conversely, a child may point to an object of interest or show an item to the other person with the purpose to share it with them (initiating JA). In order for the attention to be truly 'joint', the child should not only follow the eye gaze or head turn of another person or show an object to an adult, but also they must know that they both attend to the same object and share interest [5]. For instance, if a child and adult hear a loud noise and both look out through separate windows they are not engaged in JA as they don't look at the same direction. Figure 1 shows an example of a child initiating JA.



Figure 1. A child is initiating JA by pointing her index finger to a distant object and the adult is following her pointing. They are both sharing interest in the object. [6]

JA behaviours entail that the child is able to share with others, keep eye contact, take turns in an interaction and understand gestures and facial expressions. These skills do not often come naturally to children with autism, who may struggle to socialise with others especially in school. The present study investigates how the JA skills are demonstrated at home according to the parents' perspectives, and how these can be developed with the use of mobile tablets. Interviews will show how JA is perceived by the participants and what strategies they use to encourage skills, such as eye contact, pointing, turn taking, sharing, which are essential skills as the children grow up and are expected to interact with others at school and the wider community.

Despite the fact that early intervention targeting JA is a widely researched area, studies using digital technologies in classrooms to support the development of JA skills are few [7]. Since the launch of the iPad in 2010, schools have increasingly used the devices and their associated applications for teaching children with developmental disabilities [8], [9]. In addition to the schools' extensive use of iPads, according to a report by [10] 54% of households in the UK have a tablet computer and 61% use their mobile phone to access the Internet. The Apple app store provides a shop window for over 75,000 educational mobile applications with over 345 apps specifically for individuals with autism [11]. It has been recognised that individuals with autism have an affinity with computers [12], and technologies in general [13] with many recent studies exploring their potential [14].

Mobile devices, such as tablets can be easy to use with additional built-in features, (such as settings to customise sound and display adjustments); they are socially accepted and less stigmatising [9]. They can also offer a structured, predictable routine of actions [15] that can help sustain children's attention [16]. Screen based technologies can be particularly motivating for many children with autism [13], [15] compared to low technological alternatives due to their predictability [17].

A systematic review of studies from 2009-2012 concluded that 'iPads are viable technological aids for individuals with autism and other developmental disabilities' which can be used to teach specific skills, such as communication, academic and transitioning skills [9]. Yet according to the authors, no studies were discovered which investigate the potential of iPads for the development of social skills such as greeting, conversation and commenting.

Current social attitudes to the use of iPads and other tablet devices for supporting children with autism are contrasting. In a study of parental attitudes to iPad use by [18], parents reported that technology

has helped their children with autism but that they were concerned about the amount of time their children spend on the device. Also, according to [19] survey of 90 parents and 31 professionals about attitudes towards iPad use, iPads were more positively perceived by parents than professionals. The authors added that both teachers and parents needed training on how to use the devices as they lacked confidence and that evidence-based research investigating the benefits of tablets for the development of particular skills was needed.

Technology is part of our everyday life and children cannot be prevented from using it. Instead adults who support children with autism should consider when, how and why the children should use iPads [8], [15]. It is recognised that there is a lack of guidance readily available on how to use iPads for JA specifically and therefore this will be addressed by this research. These gaps will be addressed in the current study.

2 METHODOLOGY

The aim of the study was to discover how parents use mobile devices, in particular iPads or android tablets, and social activities with their children with autism to create JA opportunities. In order to achieve this aim, table 1 shows the research objectives.

Table 1. Research Objectives

No	Research Objectives
1	To explore parents' experiences and opinion in the manifestation of JA skills beyond the school hours.
2	To identify the social activities parents engage their children in, with them and others.
3	To examine how tablets are used at home by the children and their parents
4	To investigate parents' attitude towards the mobile devices' effectiveness in promoting JA skills.

Semi-structured interviews were chosen as a method of collecting data to address the aim and research objectives. This study is the third out of four that have been conducted to investigate the potential of mobile tablets in developing JA skills in children with autism. Semi-structured interviews with teachers and classroom observations in three UK primary schools have shown that the tablets can be used for JA purposes as long as the adults know how to use them appropriately and create opportunities for the child to initiate and respond to an interaction while using a tablet [20].

After approval from the university ethics committee was sought and the participation information sheet along with the consent forms were generated, potential participants were approached. The inclusion criteria were: a) Parents or carers of a child with a diagnosis of autism spectrum disorder, b) participants' child is between 4 and 11 years old, and c) some use of technology, preferably tablets, at home.

Firstly, a letter was sent to the parents of the children that participated in the previous two studies via their child's school. The letter invited parents in the school to be informed about the results of the observations as well as to participate in a 60-minute interview about the use of technology at home. In addition, participants were recruited during parents' evenings and workshops in the two participating schools (one mainstream and one special school) where consent forms were signed. From these two methods, five parents agreed to participate in the study. In order to achieve a higher response rate, more parents were invited from one of the school's parent support group to take part in the study. Prior to the study contact was maintained with parents of children with autism in the mainstream primary school where I voluntarily ran a parent support group with a member of school staff. All five members of the parent support group agreed to participate in the study and further arrangements were made. In order to maximize the sample size (>10) charities and parent online forums were contacted informing them about the study and asking volunteers to complete an online survey about the use of technology at home. Flyers were also distributed in a summer event organized by the Higher Education Institution inviting local families to participate in the study. Eventually, ten participants were recruited in the study. Table 2 summarizes the participants' characteristics.

Table 2. *Participants' Characteristics*

No	Parent/ carer	Age of parent/ carer	No of family members at home	Gender of child (F/M)	Age of child	Age of child when first diagnosed	Previous experience in autism (Y/N)
1	Father	45	4	M	11	2	Y older brother has autism.
2	Mother	30	5	F	5	3	Y older brother has autism
3	Mother	33	6	M	5	4	N
4	Mother	30	5	F	10	4	N
5	Father	40	4	M	9	4	N
6	Mother	30	4	M	6	5	Y older brother has autism
7	Mother	38	4	M	10	10	N
8	Mother	30	4	M	11	11	N
9	Mother	38	4	F	11	9	N
10	Mother	42	5	M	9	7	Y father has autism

The interview was divided into five categories: 1) biographical information, 2) knowledge and experience in autism, 3) understanding of JA skills, and 4) the use of technology/mobile devices at home, 5) links with school. The interviews last approximately 60 minutes and were conducted in a quiet room in the school during school hours in a time convenient to participants. During the interview, participants were reminded of the topic and aim of the study and their rights of full anonymity. Permission was granted to audio record the interview and take notes.

The interviews were manually transcribed so as to familiarize the author with the data [21]. In order to establish validity and reliability, the full transcripts were shown to the participants at the end of the study. The participants confirmed the validity of the transcripts. Thematic analysis was used to analyze the qualitative data. The results are outlined below.

3 RESULTS

Four themes derived for the analysis of the data; 1) 'JA difficulties are described as the child's difficulty in interacting with other people by taking turns, understanding facial expressions and showing interest', 2) 'Parents engage with their child in joint activities and follow evidence based strategies when interacting with them', 3) 'Parents have a positive attitude towards the tablets but are worried about screen time and their lack of confidence in using them', 4) 'Links with the school are important so that teachers can share with parents how they use the iPads at school'.

3.1 JA difficulties are described as the child's difficulty in interacting with other people by taking turns, understanding facial expressions and showing interest'

The two main difficulties that participants mentioned were their child's lack of interest to interact with others and understanding of other's feelings or state of mind. This is also substantiated by the literature which mentions that JA is a triadic interaction in which the child should not only be able to share attention with an adult about a toy or activity, but also to show interest in attending to another

person [22]. JA is a social phenomenon, where the child and adult know that they are both attending to the same object or point of reference [5]. This is strongly linked with the Theory of Mind [23] and social cognition [5]; two skills that are impaired in children with autism and can further cause a deficit in JA skills [22]. These difficulties were also mentioned by the children's teachers during the teachers' interviews in study 1 [20].

3.2 Parents engage with their child in joint activities and follow evidence based strategies when interacting with them

Parents mentioned examples of activities they engage their child in, such as projecting the tablet screen on TV to watch together a music video, creating social stories, finding on the map their trip destination or taking photos using the tablet's camera when they are in the countryside. In addition, they mentioned a variety of strategies which are evidence based. For instance, getting the child's attention before initiating an interaction with them is also supported by [24] who mention that children should first be engaged and then taught a skill. Also, [25] mention that in relationship based interventions the adult should ensure they have the child's attention before providing an instruction. Other strategies mentioned by the parents that are also used in JA interventions were following the child's lead, giving short instructions, using praise, and showing enthusiasm. Parent- implemented intervention studies have shown that the parent's or caregiver's behavior can influence the child's JA development. In particular, the more parents increased their JA bids, the more the children developed their JA skills [25]. The parents' guide makes an extensive reference to the activities and the strategies that the parents mentioned during the study [26].

3.3 Parents have a positive attitude towards the tablets but are worried about screen time and their lack of confidence in using them

Seven out of ten participants thought the tablet is a motivating tool that can be used to teach JA skills in children with autism. In line with [18] study, parents reported that technology can help their children with autism but that they were concerned about the amount of time their children spend on the device. In terms of screen time, there is still no evidence about its the effects on children with autism but there is a robust, evidence-based research study that investigated the effects of watching TV and playing video games on 11,014 typically developing children in the UK. The study found that there was no association between screen time (less than an hour, between 1-3 hours, and more than 3 hours per day) and prosocial behaviour, peer relationship problems or inattention from age 5 to 7 years [27]. However, in 2011 the American Academy of Paediatrics published guidelines that urged parents to avoid screen time completely in children under the age of two. However, this changed after the release of the iPads and mobile applications for children. In an updated version of the guidelines in 2013, it is mentioned that children cannot be hindered from looking or using screens in a digital world and recommend, in their amended 12 guidelines, that parents should play with their children on the device but also talk to each other face to face. They also suggest that parents should set limits and monitor what their children are watching [28]. The parents' guide offers recommendations on how to provide a worry free tablet experience to the children based on the participants' input and the background literature [26], [29].

However, three parents also mentioned that they were not sure about the iPads' effectiveness, since their child did not like to share with others and used the tablet as a toy and a way to calm down. All participants though mentioned that they would like to receive training on how to use the tablets interactively with their child. Taking these findings into consideration, it is suggested that parents should introduce the tablet to the child as an educational and entertainment tool and engage them in motivating activities. It is also acknowledged not all children with autism may benefit of or would wish to use the tablet for JA development, but it is recommended to use any special interest a child may have to engage with them in JA.

3.4 Links with the school are important so that teachers can share with parents how they use the iPads at school

Half the participants had good links with the school while the other half did not. This finding comes into contrast to the first study, where teachers mentioned that they would like to have stronger links with the parents and have them more involved in the child's school life. This suggests that there is still more to be done to establish strong relationships between the school and home. The importance of home school links is also highly stressed in the literature. Parents should be listened to by the schools

and work with them because they are the experts in their child and can share a vital source of information and guidance [30]. The parents' guide offers recommendations on how the teachers and parents can collaborate and support the children, such as by taking photos of their child's work while they're doing their homework (e.g. how they solve a maths problem or how they make an arts project) as this can help the teacher know when and how they do their homework or where they need more help [26], [29]. The figure 2 below shows the front two pages of the parents' guide which was created based on the participants' feedback.

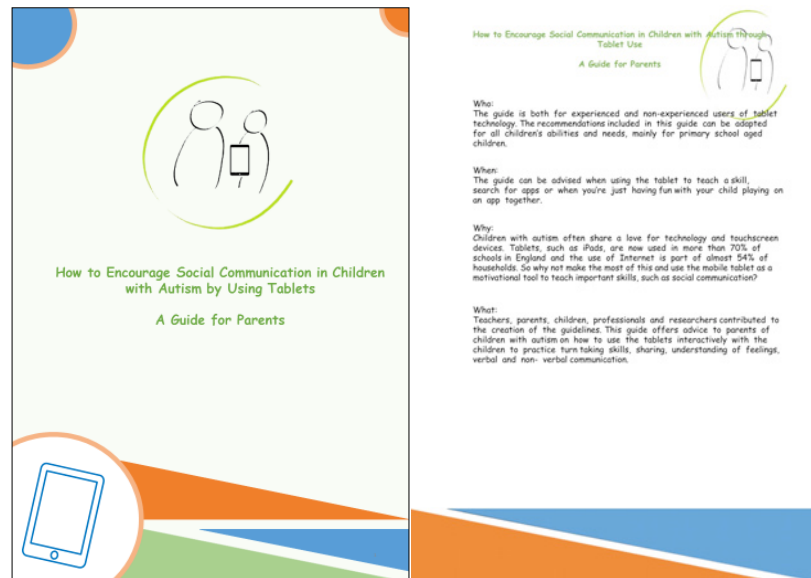


Figure 2. The parents' guide front two pages

4 CONCLUSIONS

Table 3 summarises the findings of the study substantiated with quotes from the parents' interviews.

Table 3. Summary of results

Theme	Meaning and structure of theme	Representative Quotations
1) JA difficulties are described as the child's difficulty in interacting with other people by taking turns, understanding facial expressions and showing interest.	Parents similarly described the nature of JA difficulties. They emphasized that these difficulties are caused due to the child's lack of interest in interacting with other people.	<i>'It all depends on who he is talking to. You will not get eye contact from him. His concentration is not good so when you have a conversation with him he will turn around, look around so you have to keep trying engaging him in the conversation'.</i>
2) Parents' engage with their child in joint activities and follow evidence based strategies when interacting with them.	Parents described many activities they do with their child to foster JA, such as cooking, playing puzzles and reading by using evidence-based strategies, such as getting down to the child's eye level, allowing time to respond and showing enthusiasm.	<i>'When we sit with him we use the symbols and when he makes something with the plasticine we say 'Oh wow that is amazing! Or you've done a good job! So we show enthusiasm on what he's doing.'</i>

3) Parents have a positive attitude towards the tablets but are worried about screen time and their lack of confidence in using them.	Even though 7/10 parents thought tablets is a motivating tool for JA, they all agreed that they need guidance on how to control screen time as well as advice about tablet-based activities and how the device operates.	<i>'I think these days technology is far forward and if you don't allow your children to use it then they will be back with everything. So I think it is very important for any child to use tablets and technology in general. You just need to monitor its use. And it doesn't matter whether you have autism or not.'</i>
4) Links with the school are important so that teachers can share with parents how they use the iPads at school.	Half the participants mentioned that the class teacher is supportive while the other half mentioned that they are not informed about their child's use of iPads at school.	<i>'She is so supportive. She provides him with the timetable of the week every Friday. He has given him a card to show to her whenever he wants to go outside to run twice in the playground and then continue with his work.'</i>

The findings suggested that parents similarly described the nature of JA difficulties but used terms like social communication and engagement as teachers did in the first study [20]. They are engaged in joint activities with their child with and without the use of a tablet, they use evidence based strategies, but they need guidance on how to use the device with them.

The process of recruiting parents was challenging and time consuming; nonetheless the research findings are significant since it was shown that parents use a variety of strategies and activities to engage their children in JA opportunities with the tablet. The study therefore breaks the stigma that the iPads are solitary devices that are only used for playing games.

REFERENCES

- [1] American Psychiatric Association (APA), *Diagnostic and statistical manual of mental disorders*. 5th Ed. Washington DC: American Psychiatry Association, 2013.
- [2] National Autistic Society (NAS), *Autism facts and history, 2012*, retrieved from <http://www.autism.org.uk/about/what-is/myths-facts-stats.aspx>.
- [3] A.K. Loveland, and S.H. Landry, 'Joint attention and language in autism and developmental language delay', *Journal of autism and developmental disorders*, vol.16, no. 3, pp.335-pp.349, 1986.
- [4] G. Butterworth and N. Jarrett, 'What minds have in common is space: Spatial mechanisms serving joint visual attention in infancy', *British Journal of Developmental Psychology*, no.9, pp.55-pp.72, 1991.
- [5] M. Tomasello, 'Joint attention as social cognition.' In: C. Moore and P. Dunham (eds.): *Joint attention: Its origins and role in development*. Hillsdale, N.J.: Erlbaum, pp.103-pp.130, 1995.
- [6] P. Mundy, *Autism and joint attention: development, neuroscience, and clinical fundamentals*. London: Guilford Publications, 2016.
- [7] J.P. Hourcade, S.R. Williams, E.A. Miller, K.E. Huebner, and L.J. Liang, 'Evaluation of Tablet Apps to Encourage Social Interaction in Children with Autism Spectrum Disorders'. In *SIGCHI Conference on Human Factors in Computing Systems HCI 2013 Proceedings* held 27 April-2 May 2013 in Paris: pp.3197-pp.3206, 2013.
- [8] W. Clark and R. Luckin *iPads in the Classroom: What the research says, 2013*, retrieved from <https://digitalteachingandlearning.files.wordpress.com/2013/03/ipads-in-the-classroom-report-1kl.pdf>.
- [9] D.M. Kagohara, L. van der Meer, S. Ramdoss, M.F. O'Reilly, G.E. Lancioni, T.N. Davis, M. Rispoli, R. Lang, P.B. Marschik, D. Sutherland and V.A. Green, 'Using iPods® and iPads® in teaching programs for individuals with developmental disabilities: A systematic review', *Research in developmental disabilities*, vol. 34 no.1, pp.147-pp.156, 2013.

- [10] Ofcom, *The Communications Market Report*, 2015, retrieved from <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr15/> .
- [11] S. Fletcher-Watson, 'A targeted review of computer-assisted learning for people with autism spectrum disorder: Towards a consistent methodology', *Review Journal of Autism and Developmental Disorders*, vol. 1, no.2, pp.87-pp.100, 2014.
- [12] J. Brown and D. Murray, 'Strategies for enhancing play skills for children with autism spectrum disorders', *Education Training in Mental Retardation Developmental Disabilities*, vol.36, pp.312-pp.317,2001.
- [13] H. Sampath, B. Indurkha and J. Sivaswamy, 'A Communication System on Smart Phones and Tablets for Non-verbal Children with Autism', *Lecture Notes in Computer Science*, vol. 7383, pp.323-pp.330, 2012.
- [14] K. Porayska-Pomsta, C. Frauenberger, H. Pain, G. Rajendran, T. Smith, R. Menzies, M.E. Foster, A. Alcorn, S. Wass, and S. Bernadini 'Developing Technology for Autism: An Interdisciplinary Approach', *Personal and Ubiquitous Computing*, vol. 16, no.2, pp.117-pp.127, 2012.
- [15] S.Fletcher-Watson and K. Durkin, 'Uses of New Technologies by Young People with Neurodevelopmental Disorders', In *Neurodevelopmental Disorders: Research, Challenges and Solutions*. Ed. by Herwegen and Riby, London: Psychology Press, pp.243-pp.267, 2015.
- [16] N. Aresti-Bartolome and B. Garcia-Zapirain, 'Technologies as Support Tools for Persons with Autistic Spectrum Disorder: A Systematic Review', *International Journal of Environmental Research and Public Health* vol. 11, pp.7767-pp.7802, 2014.
- [17] W. Farr, N. Yuill and H. Raffle, 'Social benefits of a tangible user interface for children with autistic spectrum conditions', *Autism*, vol.14, no.3, pp.237-pp.252, 2010.
- [18] S. Fletcher-Watson, 'Evidence-based technology design and commercialisation: Recommendations derived from research in education and autism', *TechTrends*, vol. 59, no.1, pp.84-pp.88, 2015.
- [19] M.L. Clark, D.W. Austin and M.J. Craike, 'Professional and parental attitudes toward iPad application use in autism spectrum disorder', *Focus on Autism and Other Developmental Disabilities*, vol. 30, no.3, pp.174-pp.181, 2015.
- [20] C. Mangafa, L. Moody, A. Woodcock and A. Woolner, 'Teachers' Experiences of Developing Joint Attention Skills in Children with Autism Using iPads'. In *the 7th Edulearn International Conference on Education and New Learning Technologies*, pp. 6170-pp. 6179 ISBN: 978-84-606-8243-1. EDULEARN Press, Barcelona, Spain, 2015.
- [21] M. Denscombe *The Good Research Guide for Small-scale Social Research Projects*. 2nd edn. Mainhead: Open University Press, 2003.
- [22] S.R. Leekam, B. López, and C. Moore, 'Attention and Joint Attention in Preschool Children with Autism', *Developmental Psychology*, vol. 36, no.2, pp.261-pp.273, 2000.
- [23] S. Baron-Cohen, *Mindblindness: An essay on autism and theory of mind*. Cambridge: Bradford/MIT Press, 1995.
- [24] L. Ruble, A. McDuffie, A.S. King and D. Lorenz 'Caregiver responsiveness and social interaction behaviors of young children with autism', *Topics in Early Childhood Special Education*, vol. 28, no.3, pp.158-pp.170, 2008.
- [25] M.L. Rocha, L. Schreibman, and A.C. Stahmer 'Effectiveness of Training Parents to Teach Joint Attention in Children with Autism', *Journal of Early Intervention* vol. 29, no.2, pp.154-pp.172, 2007.
- [26] C. Mangafa, L. Moody, A. Woodcock and A. Woolner, 'The Design of Guidelines for Teachers and Parents in the Use of iPads to Support Children with Autism in the Development of Joint Attention Skills'. *Lecture Notes in Computer Science, 18th International Conference on Human-Computer Interaction*, Toronto, Canada, 2016.

- [27] A. Parkes, H. Sweeting, D. Wight, and M. Henderson, 'Do television and electronic games predict children's psychosocial adjustment? Longitudinal research using the UK Millennium Cohort Study.' *Archives of disease in childhood*, doi: 10.1136/archdischild-2011-301508, 2013.
- [28] J. Shapiro, *The American Academy Of Pediatrics Just Changed Their Guidelines On Kids And Screen Time*, 2015, retrieved from <http://www.forbes.com/sites/jordanshapiro/2015/09/30/the-american-academy-of-pediatrics-just-changed-their-guidelines-on-kids-and-screen-time/#4ee39b9f137c>.
- [29] C. Mangafa, L. Moody and A. Woodcock, 'Navigating the Digital Wild West of Apps: How Can Teachers and Parents Find Suitable Apps for their Children with Autism to Improve their Social Communication Skills?' *In the 3rd International Conference on Innovative Technologies for Autism Spectrum Disorders (ITASD 2017)*, Valencia, Spain, 2017.
- [30] S. Parsons, K. Guldberg, A. MacLeod, G. Jones, A. Prunty, and T. Balfe, 'International review of the evidence on best practice in educational provision for children on the autism spectrum', *European Journal of Special Needs Education*, vol. 26, pp.47–pp.63, 2011.