

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

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Abstract. Children with autism have an affinity with technologies, which imposes the need to keep abreast of new digital technologies [1]. The benefits of mobile devices and interactive technologies in providing structure and predictability [2] and the vast variety of apps that can facilitate social communication makes it imperative to effectively incorporate iPads in the teaching of joint attention. Despite the increase use of mobile devices there is a lack of guidance for parents and teachers on how to use these devices in home and school environments for young children with autism. This study fills this gap. This paper reports on one of the final stages of the project, in which focus groups with teachers, parents, academics and children were conducted to discuss the development of guidelines on how to use the iPads with children with autism to improve their joint attention skills.

Keywords: Social communication · Joint attention · iPads · Guidelines

1 Introduction

Joint attention (JA) is described in a variety of ways in education, psychology and human computer interaction may provide different definitions. In this study joint attention is defined as the act of sharing, sustaining and shifting attention between two social partners - teachers or parents with a child with autism - and a task or toy [3]. It is achieved when the child can recognize the other's presence and intention in sharing interest with them for a task or activity they do together. Joint attention skills include the child's ability to follow gaze, point, keep eye contact, take turns and initiate or respond in social interaction. In typical development these skills are usually mastered by the age of 18 months but in children with autism these skills may be impaired or delayed [4].

The overall aim of the study is to develop guidelines on the ways in which tablet computers can be used to foster joint attention skills in children with autism based in

part on the experience and input of parents and teachers. The purpose of the guidelines is to help parents, teachers or those who work with the child to structure their 'iPad time' and provide them with more confidence to use the iPad as an education tool that can facilitate social communication and joint attention. The research is divided into five studies; interviews with teachers, observations in schools, interviews with parents, focus groups with stakeholders and an evaluation of the guidelines. This paper will present the results of the fourth study.

The results from the first three studies (i.e. the interviews with teachers, parents and classroom observations) have shown that the design of guidelines will be a useful tool for teachers and parents as there is lack of training and experience in using the iPads for learning purposes [5].

In the first study sixteen teachers were interviewed in three UK primary schools (one mainstream and two special needs) in order to examine the ways in which educational interventions, strategies and iPads are used in schools to support children with autism in the area of JA. The findings showed that teachers used a variety of evidence-based strategies in their daily teaching practice to promote JA, such as using children's personal interests as motivators, sharing and turn-taking play activities, visual prompts, social skills groups and role models. iPads were used less often to teach the curriculum and turn taking skills. The need for iPad training was considered important by all participants in terms of getting technical support and learning more about the pedagogical value of the device [5].

Complimentary classroom observations were undertaken to examine how technology was embedded in learning activities to promote joint attention skills. Twelve children with eight teachers were observed using the iPad in conjunction with visual aids and other teaching resources to teach the curriculum, sharing, eye contact and turn-taking skills. A similar set of challenges were faced by all teachers, such as children not sharing the iPad with peers or not staying on the particular app their teacher assigned them work to do [5]. Interviews with ten parents of children with autism showed that they would like to use the iPad more often with their children if they felt themselves more confident in using the device.

Current methodologies are techno-centric [6] and there is a lack of consideration in research papers of the interlink among content of technology, pedagogy and context; indeed, research papers not very often refer to interdisciplinary work [7]. This may be because a lack of communication between different disciplines such as education, psychology, computer science as well as between users (teachers/parents/therapists) and academics [8, 9].

2 Methods

As an attempt to bridge the gap between user community and academics, this study involves focus groups with teachers, parents, children and academics, where different perspectives on how the guidelines should be designed are explored. Academics from a UK Higher Education institution, primary school teachers, parents of children with a diagnosis of autism and primary school aged children were recruited. The focus group with the academics was arranged at the university grounds while the focus groups with

school staff, parents and children were conducted in the school. During the focus groups with the adults (n = 10) participants were firstly reminded of the purpose of the meeting and the definition of joint attention was discussed to reach a common understanding of the term. The main part of the focus groups considered the content of the guidelines, their format and importance. Table 1 shows the content of guidelines discussed.

Table 1. The content of guidelines

The content of guidelines	
Technical section	Educational section
• Preparations before using the iPads	• Teachers’ and parents’ attitude towards the iPad
• Checklist of criteria for choosing suitable apps	• The structure of the environment
	• Teacher’s and parent’s strategies: (a) how to overcome challenges and (b) how to promote joint attention skills

The focus groups were audio recorded and thematically analyzed. In addition to this, during the focus group with the parents, a member of the school staff was present in the room taking notes on a flipchart as shown in Fig. 1.

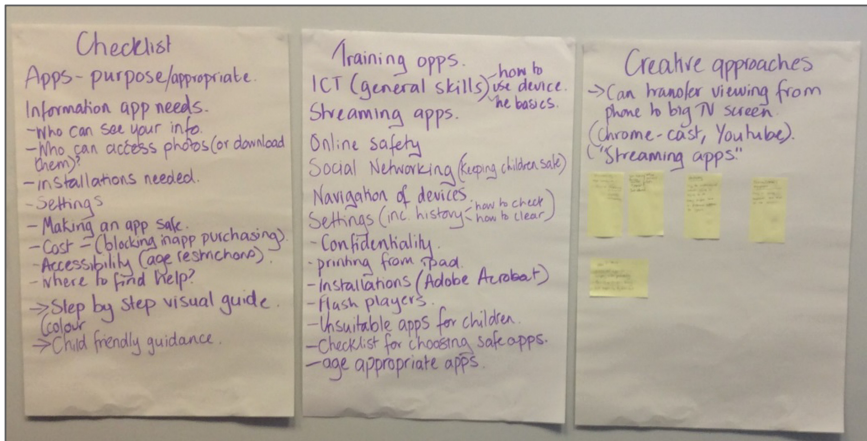


Fig. 1. Flipchart notes taken during the focus group with parents

The focus group with the children followed a more child friendly format. The children (n = 19) were aged 8–11 years old and were members of the school’s student council. The teacher who led the student council meeting was also present and contributed to the smooth running of the focus group. The researcher told the children that the meeting had been arranged to capture their voices in relation to how iPads helped

them in their learning and development of communication skills as well as how they could be improved in the future. Their teacher captured their comments while they were talking. Later, the children completed a questionnaire about their personal views and experiences as shown in Figs. 2, 3, 4 and 5. For ethical reasons, the focus group with the children was not audio recorded but the written feedback from the flipchart and questionnaires were analyzed.

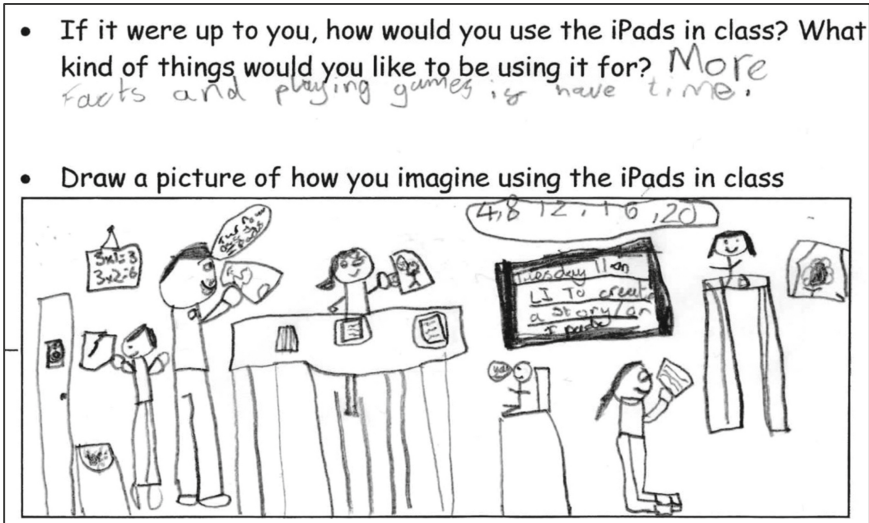


Fig. 2. Drawing showing that iPads could be used in different places in class

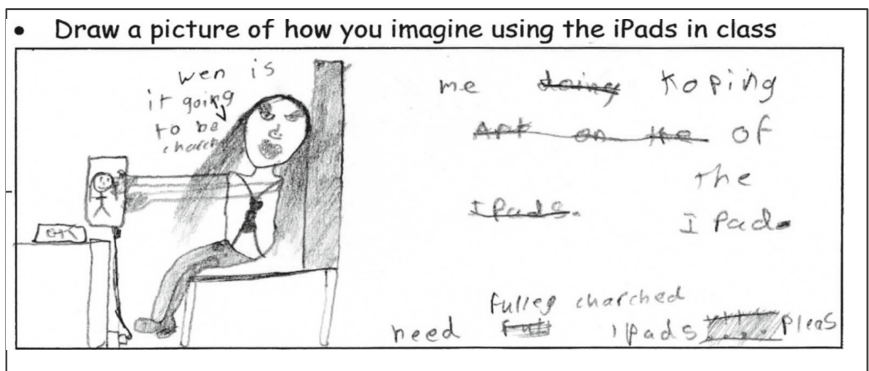


Fig. 3. Drawing showing a child wishing that the iPad had been fully charged before they used it

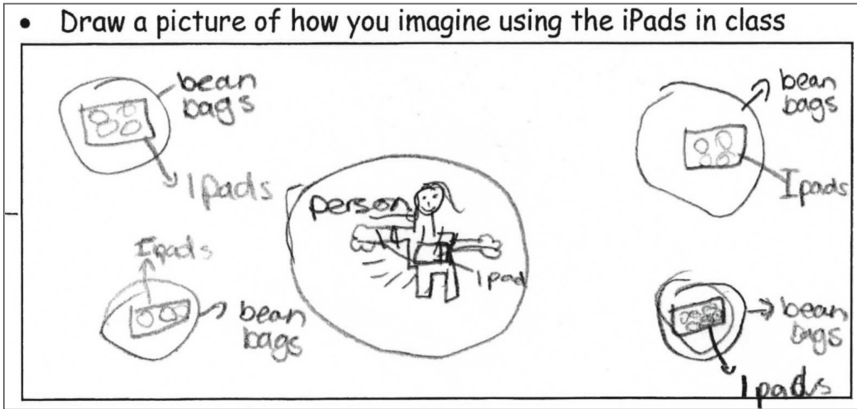


Fig. 4. Drawing showing that iPads could be used while sitting on beanbags

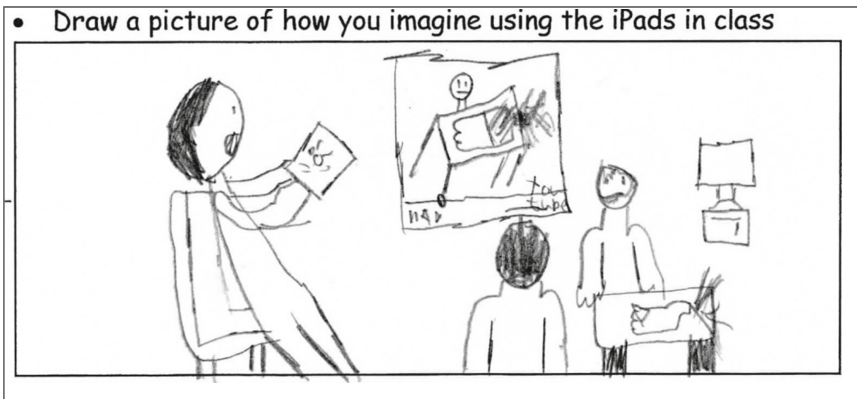


Fig. 5. Drawing showing that the iPad screen could be projected on the interactive whiteboard

3 Results

Through the analysis of the data (transcripts, questionnaires and field notes) derived from the focus groups, five major themes were developed: 'The format of guidelines', 'Technical Preparations', 'Checklist of Apps', 'Attitude to the iPad', and 'JA Teaching Strategies'.

3.1 The Format of the Guidelines

All participants mentioned that the guidelines will be an invaluable tool for teachers, parents and children that can be used as a reference point whenever they are using the iPad for learning purposes and choosing apps. In particular, it was discussed that the guidelines should be written on an A4 poster with an accompanying booklet where all

the information should be simply demonstrated with many visuals and step by step instructions. Bullet points with headings and checklists of the steps to follow were also mentioned. The language used should be simple and child friendly as well as jargon should be avoided. Participants made clear that even though they understood the term joint attention when it was explained and discussed during the focus group, the term social communication should be used instead as it is the term that teachers and parents widely use and understand.

3.2 Technical Preparations

The intersection between the technological and pedagogical aspect of the guidelines was frequently mentioned in the focus groups among participants. It was widely mentioned that it is equally important not only to use the iPad to teach joint attention skills but also to know how to use it and make necessary preparations beforehand. The children commented that the guidelines should include advice on making sure the iPad was fully charged as many of their peers were frustrated when the iPad runs out of battery. Also the parents mentioned that the reason why iPads are still not as frequently used as the laptops is the lack of printing facility. So, it was suggested that the guidelines should include step by step instructions on how to connect the iPad with the printers on the wireless network. A major concern among participants was ensuring that online safety settings are activated on the iPad before giving it to the child. Particularly, parents mentioned that it would be helpful if the guidelines included how to set up firewall filters and monitor their child's navigation history. Teachers also mentioned that online safety tips should be included as they feel that children can more easily access inappropriate content on the iPad due to its small screen size and portability.

3.3 Checklist of Apps

The selection of applications was a recurring theme in all studies and it was also thought mandatory by the participants to be included in the guidelines. The academics mentioned that even though teachers and parents would prefer to have a list of recommended apps for teaching their children joint attention and social skills, they suggested that adding a checklist on how to choose suitable apps would be better since new apps are advertised in the market daily. Teachers said that a checklist reminding them of what to look for when choosing an app would be useful. For example, all participants mentioned that the app should be linked to learning outcomes so that the teachers, parents and children know what they are using them for. There should be a purpose for choosing to use a particular app with the child, whether it is to teach turn-taking, to record their work and discuss it later or sustain their attention. Also, parents mentioned that the checklist can include some criteria, such as whether the app has in-app purchases, a user guide to refer to when needed and whether it is safe and age appropriate.

3.4 Attitude to the iPad

The children mentioned that the iPad has helped them improve their communication skills because they can present in front of the classroom confidently, they can learn more things about their learning partner and be able to problem solve. They also mentioned that they can work better with others on the iPad rather than using other resources and they would like their teachers to use the iPads more in the classroom as they make learning more fun and interesting. On the contrary, teachers and parents said that they do not feel confident in using the iPad as they would like to receive training to learn the basics of how it operates and then its educational value. Parents suggested that their child's school could organize after school iPad clubs where parents are invited in the classroom to play with their child on the iPad while looking at the guidelines for tips.

3.5 JA Teaching Strategies

After discussing technical issues the focus groups addressed how iPads could be used to teach joint attention skills. The first issue raised was that adults need to overcome some challenges in order to be able to encourage initiation and response to joint attention. For example, children with autism very often do not like to share or have someone very close to them. In addition, researchers mentioned that the iPad was not designed to be shared due to its small screen size. Parents recommended that streaming apps and hardware can be used to project the iPad screen to the TV screen and IWB. They said that it would be useful to include in the guidelines different ways of projecting the iPad screen, such as using AirPort Express or Chromecast. This would give the opportunity to teachers, parents and children to comment on what a child is doing on the iPad and encourage joint attention opportunities. In addition, children mentioned that choosing their learning partner, who they are working with, would help them interact more and work better while on the iPad. The dynamics of peer work was also mentioned by the teachers, who said it was important to let the child with autism choose who they feel more comfortable working with. In terms of the structure of the environment, children added that they would like to share the iPad with others beyond the school desks, such as on beanbags or around the school. Finally, parents mentioned that it is essential to remind teachers and other parents that using positive reinforcement and showing interest in what the children are playing on the iPad can help children with autism boost their self-esteem and participate more in joint attention opportunities. Taking turns in educational games, sharing enjoyment and rewarding the child when completing a task on the iPad were the main strategies mentioned by participants for improving joint attention skills. Table 2 summarizes the key findings of the focus groups.

Table 2. Summary of the key findings of the focus groups

Summary of key findings	
Themes	Recommendations
The format of the guidelines	<ul style="list-style-type: none"> • A4 poster with accompanying booklet • Simple language and visuals • Headings with bullet points and step by step instructions
Technical Preparations	<ul style="list-style-type: none"> • iPads to be fully charged before use • Connect the iPad to wireless printers • Online safety settings
Checklist of Apps	To include: <ul style="list-style-type: none"> • Purpose of the app • User guide available • Block in-app purchases • Age appropriate
Attitude to the iPad	<ul style="list-style-type: none"> • iPad training • After school iPad clubs with parents
JA Teaching Strategies	<ul style="list-style-type: none"> • Project iPad screen to the TV and IWB • Dynamics of learning partners • Moving around and sitting on bean bags • Positive reinforcement and rewards • Sharing enjoyment • Taking turns in games

4 Discussion

This study was the fourth in a sequence that explored the need for guidance on how to use the iPads with children with autism to teach joint attention skills. The aim was to bring together different stakeholders with the common purpose to explore the technical and educational characteristics of the device. Focus groups with academics, teachers, parents and children were conducted to discuss the guidelines on how to use the iPad for joint attention purposes. The results showed that it is important to know how the device operates as well as how to use it for learning purposes. Participants mentioned that before giving the iPad to the child, there are a number of challenges and steps that should be addressed, such as the child's difficulty in sharing, choosing suitable apps and ensuring that online safety settings are activated. In addition, the iPad can be used to promote joint attention skills as long as parents and teachers are willing to use the device with the child by sharing with them what they enjoy doing on the device, joining in when they are playing games and providing positive reinforcement. It is suggested that the iPad's contribution in the educational process can be successful only if a holistic approach of iPad's use for JA purposes is followed not only from teachers individually, but from the whole school as an institution and the parents with their children at home.

5 Conclusion

The guidelines will inform teachers' practice and be used as material for professional development. Teachers should keep ahead of the technological and pedagogical innovations, so the guidelines can help them instil the habit of using the iPad as a teaching tool to develop joint attention skills in their everyday teaching practice. Also parents can try using the tablet in collaboration with their child in order to interact and communicate more often. This paper supports the view that the device should only be used as a facilitator in the learning process and should not overtake what the teacher or parent already have in place. What is important is the mutual understanding and sharing of interest between the adult and the child by using a medium which in this study is the iPad.

The guidelines are proposals rather than definite answers on how to use the iPad for joint attention. In order for the guidelines to be effective in promoting joint attention, researchers, teachers, parents and app developers should work in partnership. This study will be followed by the development and evaluation of the guidelines that will be created according to the results of the studies.

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