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AN EMPATHIC INTENSIVE ENGAGEMENT WITH CHILDREN WITH SEVERE AUTISM IMPROVED THEIR ICT ATTAINMENT LEVELS

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Abstract: This research was carried out over 13 months, with eight children, in a specialist school unit for children with severe autism, aged 6-10 years (7 males, 1 female). The assessment of the children's characteristics and abilities was used to establish individual performance levels (P-Levels). P-Levels are used to describe attainment levels for pupils with Special Educational Needs (SENs) working below level 1 of the National Curriculum in England and Wales, and were applied to English language skills (writing, reading, listening, speaking) and Information and Computer Technology (ICT). These P-levels acted as a baseline to assess how computer-based interventions affected the participating children's learning abilities. An empathic and ethnographic approach was adopted to observe and interact personally with each child, through the development of computer interventions based on each child's interests e.g. cartoons, singing, and drawing. Gradually, positive relationships were built and ultimately made an interestingly significant change in the behavior and learning abilities of the children. The findings suggested that the behavior and learning abilities, measured by P-levels, of children, under the umbrella of the Autistic Spectrum Disorder (ASD), are wide and varied, albeit with some similarities. A slight improvement in the children's Facial Emotional Recognition was observed, combined with a positive change in their interaction with the researcher and progress in their ICT attainment, with the biggest pre-post change recorded for ICT P-levels (p=0.026, Chi square). The level of non-cooperation in the initial study reflected the challenges faced when teaching children with severe autism, however using interactive tools tailored to the individual interests of each child was shown to make the computer technology a more enjoyable, engaging and efficient teaching tool. Further, the extensive field work yielded fascinating and intrinsically valuable and important insights into daily life in an educational unit for children with severe autism.

***Keywords*:** Severe autism, technology, p-levels, empathy, ethnography

Introduction

Autism

Autism is a complex disorder with individuals affected potentially showing a wide range of disabilities (Matson & Sturmey, 2011). They are faced with a range of difficulties in social interaction, social communications and social imagination which in turn has great impact on their learning and development (Itzchak & Zachor, 2011). Hence autism is mostly regraded as a spectrum condition that varies from mild to severe and this is often referred to as the "Autistic Spectrum Disorder" (ASD). The mild end of the spectrum is commonly known as Asperger Syndrome (AS) or High Functioning Autism (HFA) (Howlin, 2004). The Low Functioning or the severe end of the spectrum is usually known as "*atypical*" autism (Wing, 1996), or "autism with severe learning difficulties" (Jordan, 2013). According to the National Autistic Society (NAS), the complexity of the ASD means that "*the severity of impairment can only be assessed on an individual basis*" (NAS 2016). In a systematic review of

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global prevalence of autism it was found that the prevalence of autism is 62 in 10,000. It is believed that the number of children with autism is rising (Anagnostou et al., 2014).

Interventions

The complexity of the autism disorder has created challenges for scholars, doctors, teachers and parents to help people with autism. In addition, the increase of the prevalence of autism cases adds to the importance of finding appropriate educational tools to facilitate children with autism in learning. There are a wide range of social, educational, behavioral, nutritional and clinical intereventions for individuals with autism. In particular, there is an evidence that using computer-based intervention (CBI) could help the attainment of children with autism (Khowaja & Salim, 2013). One other advantage of using computer technology with children with autism is that it may also help them develop some social skills (Ramdoss et al., 2012).

One specific approach, with which this study is concerned, is the use of educational technology for teaching children with severe autism to aid their Facial Emotion Recognition (FER). A common aspiration of parents and carers of children with autism is to see their children enjoying their lives and living an independent life that suits their age (Moore, McGrath, & Thorpe, 2000). The hope is that helping such children to recognise the facial expressions of others will contribute to the achievement of this ambition. In addition, the technology could enhance their learning and other social abilities. To do this, in this study, the assessment of the children's characteristics and abilities were used to establish individual performance levels and was used to monitor the children's progress.

P-Levels

In the UK, P-Levels are or 'P-scales' are Performance levels used to describe attainment levels for pupils with Special Educational Needs (SENs) working below level 1 of the National Curriculum in England and Wales (Education, 2014). The subject specific P-levels are applied to English language skills (writing, reading, listening, speaking) and Information and Computer Technology (ICT).

P-levels are of two types:

Descriptions of general attainment across subjects from P1 to P3, and Subject-specific P-levels from P4 to P8. Originally, the three levels P1, P2 and P3 were created in 1999 by the Qualifications and Curriculum Authority and reviewed periodically until 2001 when each was split into 2 categories (i, ii) to meet the lowest cognitive skills of pupils with SENs (Ndaji & Tymms, 2009). However, only recently in 2008, were P-levels legally adopted in schools according to the Department for Children, Schools and Families (DCSF) and the QCA (Ndaji & Tymms, 2009).

There is no standard or single protocol to apply P-levels or to ensure reliable judgements to pupils' work (Ndaji & Tymms, 2009). However, an established method endorsed by the Qualifications and Curriculum Development Agency (QCDA) is the "best-fit approach". In this approach, the assessors decide on a child-by-child basis what evidence is available to support a secure judgment (Ndaji & Tymms, 2009), (Education, 2014). An essential part of the judgement process is the dialogue between the assessors, e.g. teaching assistants and classrooms support adults who work closely with the pupils (QCDA, 2011), (Ndaji & Tymms, 2009). Any emerging attainment they observe in pupils' everyday work is encouraged and shared, where a variety of evidence can be used to inform judgement, aid progress and improve provision for pupils with SENs who are working under level 1 of the National Curriculum (QCDA, 2011).

P-levels are not related to age and sometimes different levels might be given to same pupils by different assessors. Therefore, judgements should be based on 'day-to-day' monitoring of the pupils or on assessment at intervals (QCDA, 2011). More importantly, for pupils with SENs who are working at P1 to P3 levels, classroom activities and real-life examples, together with recognising their strengths and weaknesses are more valuable to consider in the judgement process than assigning levels to their academic work (QCDA, 2011). Although P-levels do not meet all assessment needs they provide a useful means of summarising levels of attainment of pupils at the end of an academic year.

Aim

This study was part of a programme of research that aimed to investigate the effect of computer-based individualised intervention to teach children with severe autism FER, using an appropriate methodological approach (Elzouki & Cooper, 2011). In this article, the focus is to report how this intervention enhanced the children's learning attainments measured using P-levels.

Methods

Participants

The research was carried out over 13 months, with 8 children, in a specialist school unit (in West Yorkshire, UK) for children with severe autism, aged 6-10 years (7 males, 1 female). Each child's general characteristics, their relationship with computers as well as their relationship with the first author who conducted the research within the school environment was observed. These observed characteristics of the children were important to understand the nature of the children's social communication abilities and behaviours. In summary, some of the children found it hard to cope even within the predictable environment of their specialised unit in the school. Most of them seemed to live in their own world or "*agenda*" as the head teacher of their school described them. They did not seem to empathise or sympathise with the staff or with their peers. Regarding their relation to computers, some were interested in computers while others had never used one before.

There were differences in their learning abilities, behaviours, interests, communications and needs. Some of their general characteristics were: pointing rather than talking when they needed something, humming and singing, playing alone, flapping around, spinning and rocking, screaming and crying, slapping and scratching each other or staff members, and making incomprehensible noises. Seven out of 8 children qualified for the diagnosis of having severe autism with learning difficulties while one child (a female identified with the pesudonym of Nahla) was wrongly diagnosed with autism but has an attachement disorder.

Methodology and Design

The Ethnographic Approach

An empathic, ethnographic approach was adopted to observe and interact with each child, which involved the development of computer interventions based on each child's interests e.g. cartoons, singing, and drawings. Gradually, positive relationships were built and ultimately made an interestingly significant change in the behavior and learning abilities of the children, enabling them to efficiently contribute to the valuable findings of the current study.

Nonequivalent Dependent Variables Design (NEDV)

The appropriate design for this type of study can be best described as Pattern Matching Nonequivalent Dependent Variables Design (NEDV) (Trochim, 1985). NEDV is one type of quasi-experimental design which can be weak with respect to internal validity because it has a single group of participants and one variable or two investigated. However, in its pattern matching variations, it can be made considerably stronger by adding multiple outcome variables which act as controls. These additional variables should be similar enough to the investigated variable and should be affected by the same threats to validity (Trochim, 1985). The investigated variables are interaction with the computer measured as changes in P-level in ICT and other subjects.

P-Levels of the Participants

In this study, the assessment of the children's characteristics and abilities was used to establish individual performance levels (P-Levels) prior to the CBI taking place. These P-levels acted as a baseline to assess how the intervention affected the children's abilities.

Following the (QCDA 2011) recommendation that judgements on children's abilities should not be made individually, P-levels for the participants were assessed by two authors (SYAE and OAT). Both used the 'best-fit-approach' when considering the following information:
Field notes; the first author observations of the children.

Transcripts; teacher accounts recorded during interviews.
Artworks or written materials by the children.
Witness statements from other people (e.g. parents).

Any discrepancy between the two was then resolved by further discussion with reference to the criteria given in QCDA (2011). For each participant, the two types of P-levels i.e. general attainment across subjects (from P1 to P3) and subject specific (from P4 to P8) attainment, were assessed. The subject specific P-levels were applied to English (writing, reading, listening, speaking) and ICT.

Results and Findings

Table 1 below shows the estimated P-levels of the 8 participating children at the start of the study. The P-levels of the 8 participants at the start of the study ranged from P1(i) to P3 (ii). Unsurprisingly, Nahla was the only child who had the highest P-level of P3(ii). This highlights the discrepancy in the children's abilities and behaviours.

Table 1. Estimated P-levels of The Participants at The Start of The Study

Pupil*	Across subjects	Speaking	Listening	Reading	Writing	ICT
Kareem	P2(ii)	**	P4	P4*	P4	P5
Moftah	P2(ii)	P5	P4	P5	P4	P5
Nahla	P3(ii)	P8	P8	P7	P7	Below P4
Nasser	P1(i)	Below P4	Below P4	Below P4	Below P4	Below P4
Jamal	P1(ii)	Below P4	P4	Below P4	P4	Below P4
Nabeel	P3(i)	P6	P6	P6	P6	P6
Yazan	P1(ii)	Below P4***	Below P4***	Below P4***	Below P4***	P5
Tarek	P1(i)	Below P4	Below P4	Below P4	Below P4	P4

* All names are fictional to hide the children's identities. ** Kareem: had difficulties with pronunciation, he generally found it hard to speak
*** Yazan: English was a second language to Yazan

The above P-levels acted as a baseline to assess how CBI affected the participating children's learning abilities. This understanding of the context of the participants and their P-levels was necessary to understand the nature of, and the results from, the FER study conducted. The estimated changes in P-levels after the CBI are presented in Table 2 below.

Table 2. Estimated changes in p-levels of participants at the end of the study

Pupil	Across	Speaking	Listening	Reading	Writing	ICT
Kareem	P3(ii)	P4	P5	P6	P5	P6
Moftah	P3(ii)	P6	P6	P6	P6	P6
Nahla	≥ P3(ii)	P8 or above	P8 or above	P8 or above	≥P8	P5
Nasser	P1(ii)	P4	P4	Below P4	Below P4	P4
Jamal	P2(ii)	P4	P5	P4	P6	P5
Nabeel	Above P3(ii)	P7	P7	P7	P7	P7
Yazan	P2(ii)	P5	P6	P4	P5	P6
Tarek	P2(ii)	P4	P5	P4/ P5	P4	P6

The changes in the children's attainment and abilities, measured as P-levels, after the CBI are presented graphically in Figure 1 below.

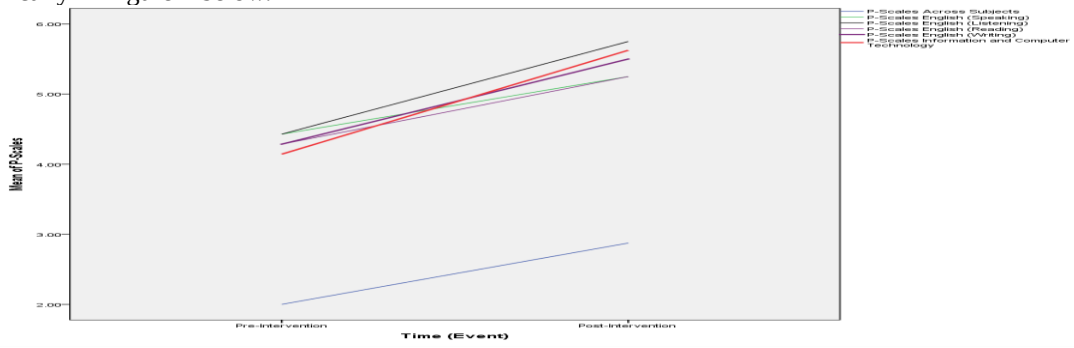

Figure 1. The p-levels before and after the CBI

It is clear that the change in ICT P-levels was significant (p=0.026, Chi square) as it was the most likely to be affected by the CBI. Changes in English (speaking, writing, listening and reading) P-levels however were, although promising, not statistically significant (P>0.05).

Conclusion

The results strongly suggest improvements in achievement (measured as P-levels) for all the children. Evidence, from the changes in P-level and ethnographic data collected during the study support the fact that all the children had a beneficial and rich experience as a result of the intervention, even in the case of 3 of them who had never been exposed to computers before this research started. Overall, there were improvements in ICT skills and language learning. The changes in academic achievement with ICT, in particular, significantly enhanced. ICT improvement of the participants is undoubtedly the result of intensive interaction with both the researcher and the technology. Intensive and empathic interaction with children with severe autism was also found to improve other untargeted skills of the children (Elzouki & Cooper, 2011).Although P-levels are widely used in most Special Needs Educational settings in the UK since their introduction in 2009, to our knowledge this study is the first reported research findings on applying P-level estimation on children at the severe end of the autism spectrum. The analysis and estimation of P-levels in this study suggested that a more holistic approach in investigating children at the lower end of ASD can be more valuable if both targeted (FER) and untargeted (P-levels) outcomes are investigated. The biggest change was recorded for ICT P-levels (p=0.026, Chi square), which the intervention was more likely to affect, suggesting that the maturation of the children and other threats to internal validity were less likely to exert an effect on the children thus strengthening the study design. The threats to internal validity of the findings presented here might stem from the duration of the experiment and maturation of participants. This, however, was alleviated by looking at writing, reading, speaking and listening skills which the intervention was not designed to affect. They thereby act as control variables of the ICT findings.

Recommendations

Findings of this study lead us to recommend that computer-based teaching of children with severe autism can be successful if it is based on their interests, individualized, and carried out in an empathetic approach with the aim to enrich the living experience of the children.

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