

# ICT AS AN ENHANCING TOOL OF FOREIGN LANGUAGE TEACHING CHILDREN WITH AUTISTIC SPECTRUM DISORDERS

Beáta Jelínková<sup>1</sup>

*Department of Language Pedagogy and Intercultural Studies, Faculty of Education, Constantine the Philosopher University in Nitra, Slovakia {beata.jelinkova@ukf.sk}*

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## ABSTRACT

This paper reports on teaching/learning a foreign language of children having autistic spectrum disorders (ASD), particularly Highly functioning autism and Asperger's syndrome by virtue of help of ICT. The content includes theoretical background of the strengths and weaknesses of ASD students. It also includes research on four foreign language skills – listening, speaking, reading and writing of the examined group and provides proposals for farther investigation.

## KEYWORDS

*Autistic spectrum disorders, highly functioning autism, information and communication technology (ICT), individualised educational programme, attention deficit hyperactivity disorder*

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## 1 INTRODUCTION

The number of children with various diagnoses, including Autistic spectrum disorders (ASD) - Asperger's Syndrome and Highly Functioning Autism, that are integrated into mainstream schools, specifically foreign language classes is still raising, thereupon causing worries to teachers. The occurrence of Autistic Spectrum Disorders is 1%, with prevalence of male to female 4:1 (Baron – Kohen, 1998).

The reason could lie in improved diagnostic tools, teachers are more experienced in recognition of the symptoms on autistic spectrum disorders. Equally important is the fact that parents are more informed on the issue and look for professional advice themselves. Frequently happens that the child is diagnosed with ASD before enrolling to school. The factors responsible for autism are still the matter of scientific research and thus there are not any remedies yet.

## 2 FORMULATION OF THE PROBLEM

Kanner (American psychiatrist) was the first person who described unusual behaviour of a group of children in 1945. He characterized these symptoms as a specific disorder called autism. The origin of the word autism is derived from Greek word "autos", that stands for self. In addition to the name of diagnosis, Kanner specified children suffering from autism as captured in their own world and incapable of friendship (1945, p.248-250).

Along with Kanner, Asperger (Vienna's medical doctor) also noticed symptoms of strange behaviour in a group of boys. For instance, they had limited ability to create bonds and their conversation was often without the need of response. On his honour the disorder was named Asperger's Syndrome. Since the first diagnostics of autism was made by Kanner (1945), diagnostic tools have progressed significantly. For

instance, the UK National Institute of Health recommended to use of semi-structured interviews and observation (Falkmer, 2013).

“Exceptional human beings must be given exceptional educational treatment, which takes into account their special difficulties” (Thorová, 2012, p.34). This idea could form the ground in education of the ASD students. Despite facing many challenges, children suffering from autistic spectrum disorders (ASD) can reach satisfactory educational results; however, they demand different approach and accommodation compared to the neurotypical students. Sensory abnormalities ought to be considered as the trigger of behavioural challenges (Jelínková, 2004, p.20).

As Ostatníková stated, autism is a huge challenge for everyone who has encountered it. The autistic spectrum disorders are characterized by certain common features. As it is a spectrum, there is no uniquely typical behaviour and symptoms of a disorder. Because every person is different and unique, the behaviour of children with ASD also differs (2010, p.9).

### **Weaknesses of ASD students in foreign language learning**

The results of study made by specialists in autism (e.g. Lord C. et al. 1994, Rutter M. et al. 2003, Mattila L.M. 2010), present that ASD children suffer from the higher occurrence of comorbid psychiatric disorders, such as depression, anxiety and Rott syndrome. However, the highest occurrence was ADHD (attention deficit disorder) – more specifically 31% (Toth, 2008). The diagnosis ADHD itself causes learning problems with syntax, semantics, metalinguistics, auditory processing and metacognition. These students have difficulty with problem solving, especially with audio information processing that is caused by the weakened short-term memory that affects the ability to follow instructions, namely in the disturbing environment that school is.

In addition to ADHD, anxiety, depression and behavioural problems, closely linked to their behaviour, are other frequently recorded comorbid disorders in those patients. Furthermore, ASD students can have developmental learning disabilities – dyslexia, dyscalculia, dyspraxia, secondary dysgraphia or attention deficit disorders, causing special learning needs.

Commonly known feature of people with ASD disorder is their low adaptability. Moreover, sudden changes in their lives cause them not only stress but also anxiety and panic. These children enjoy prepared activities, often pre-arranged scenarios. Planning in advance and predictable activities help them overcome anxiety and lessen their frustration (Van Eylen, 2011). Many students with ASD have problems with time management and therefore need help with efficient use of time. As ICT meets the requirement on predictable changes, it is suitable an enhancing tool of foreign language teaching children with ASD.

### **Strengths of ASD students**

Researchers directed by Mottron (2011) studied images of 357 people with autism and came to conclusion that they had more activated part of brain associated with visual detection and identification. On the contrary, less activities were shown in the areas of brain responsible for planning and controlling thoughts and actions. *"Through this meta-analysis, we were able to observe that autistics exhibit more activity in the temporal and occipital regions and less activity in frontal cortex than non-autistics. The identified temporal and occipital regions are typically involved in perceiving and recognizing patterns and objects. The reported frontal areas sub serves higher cognitive functions such as decision making, cognitive control, planning and execution"*. These results explain outstanding capacities of ASD people in visual tasks.

The research proved that ASD children are visual learners, having excellent visual long-term memory. This ability is very beneficial for learning foreign languages and facilitates the process of learning.

Moreover, compared to neurotypical population, some ASD can have a lot of advantages. There were proved cases of individuals that they can decode language in early age and achieve high level in language learning by devoting a lot of time, especially if it is their interest. They are also very consistent and focused on details. They may be even precocious readers and therefore have an excellent range of vocabulary.

Most students suffering from Asperger syndrome have good memory for rote learning and some of them have a fascination for using this new code for familiar objects. Moreover, they can easily achieve functional competence also been called phatic language use, by performing language functions in communication skills such as ritual enquiries about health, weather and basic social contacts with others (Duda & Riley, 1990, p.29).

### 3 SCHOOLING OF ASD STUDENTS

Since the English language as a foreign language is a compulsory subject for all children of primary and secondary schools in Slovakia, ASD students are not an exception. The document “*Concept of foreign language teaching in primary and secondary schools*” is part of the national project Millennium, chapter 3.1, which puts priority to “*develop a system of foreign language teaching - at least from the third year of the primary school to begin teaching at least one compulsory foreign language and gradually the second foreign language as a compulsory elective*”.

The schooling of students with High function autism and Asperger’s syndrome is accomplished under terms of State educational programme guideline. As it fully specifies, teachers need professional advice from psychologists who prepare the tailored Individualised educational programme (IEP) as well as recommendations on the student’s teaching and compensational aids (Kednal, 2008). The purpose of such a document is to help both students and teachers to find the best way to make a progress in education considering the student’s needs (Zelínková, 2006, p.172-173).

#### Foreign language acquisition of ASD students

In order to learn a foreign language, one must reach certain components like memory abilities, phonetic coding ability, grammatical sensitivity and inductive learning ability. Farkašova mentioned that factors responsible for learning the foreign language are complex and the person’s individuality always needs to be taken into consideration as well as internal and external learning conditions, including the impact of modern technologies that play a very important role (In Pokrivčáková et al, 2008, p.39).

As stated by Zelínková (2005, p.161), “*Teaching foreign languages is a difficult problem to solve looking for the optimal ways of educating individuals. It comes from the logic that a student who has difficulty in acquisition of a mother tongue will have more serious problems in learning foreign languages as well*”.

Yet other important factors for foreign language learnings are motivation and willingness. The motivation for learning foreign language is greatly influenced by their interest in the subject (In Pokrivčáková et al. 2008, p.40).

Provided that students must meet a set of requirements, goals, and competencies when acquiring a foreign language. ASD students face some difficulties in foreign language learning compared to neurotypical children. ASD students do not have impaired memory and have intellect in the average range. It was also proved that ASD children have relatively intact visuospatial abilities (DeMyer 1981; Lincoln 1988; Shah 1983), good auditory short-term and rote memory skills (Bartak 1976; Hermelin 1970; Wing 1976), as well as remarkable memory for specific kinds of information (Kanner 1943; Wing 1976).

For that reason, visual aids or written word are very appropriate for ASD students. They mostly have problems with long assignments and it is appropriate to divide questions into smaller parts. Entries can be understood more easily when described in the simplest way and as one step (Zelínková, 2009, p.167).

The solution of that issue is in the use of technologies with a visual dimension – digital video, photography, video conferencing that engage students and provide a collaborative working and discussion. The great benefit of ICT is the student’s feeling of control over the technology.

#### Four languages skills of ASD students

Generally, ASD students loathe to handwrite, even though they are mostly visual learners. They show the signs of secondary dysgraphia, dyspraxia and fine motor skills deficiency. The study compared handwriting

of children with and without ASD in 5 categories: legibility, form, alignment, size, and spacing. The results show that ASD children have overall worse performance on a handwriting task. Furthermore, problems with short-term memory have direct impact on ASD students and their difficulties with handwriting. ASD students can forget spelling, capitalization, grammar rules, forget about lines and therefore dislike writing. The best accommodation for ASD children is to use a keyboard for writing (Fuentes, 2009).

Students with ASD like reading and often have broad vocabulary, especially if reading in foreign language is their hobby. For instance, they acquire vocabulary from English films and videos. They like graphic novels with illustrious characters from everyday life like "Calvin and Hobbes". Besides acquiring vocabulary in English, they are improving social skills. These findings were proved by a computer mediated interaction in Asperger's syndrome, in which four male adolescents with ASD were involved. The results of "Bubble Dialogue" induced an improvement in interpersonal understanding a social interaction (Rajendran, 2000).

Due to occurrence of spam attention disorders in ASD, listening skills in foreign language are less developed. If their subject matter does not interest them, they can refuse to do such exercises, because they do not find them important.

Impairments in social interaction are a key feature of autism and are associated with atypical social information processing. Imaging of magnetic resonance show that individuals with autism failed to activate a brain region in response to vocal sounds, whereas they showed a normal activation pattern in response to non-vocal sounds. These findings suggest abnormal processing of auditory information in autism (Gervais, 2004).

Ostaničková presents several challenges in the communication of students with ASD. One big challenge is non-verbal communication, which is often missing or inappropriate. Common language dialogues also require non-verbal communication, social interaction between a student with ASD and a teacher or his classmates, and that is precisely the area with which ASD learners have difficulty (2010, p.234-237).

In pragmatics, ASD students experience difficulties in the use of people's names or greetings, have inappropriate facial expressions and eye contact, interrupt others, do not allow others to talk, ignore their answers and talk mostly about subjects of their interest in which they have plenty of information.

### **ICT as an enhancing tool in teaching/learning of ASD students**

The analyses of 350 published papers on the impact of ICT in education proved the positive impact of implementation of ICT in modern world. The increased numbers of papers have been published on the teaching children with learning needs since 2000. The fastest escalation of studies published on ICT-assisted learning intervention was between the period 2006 – 2011. Nonetheless, the least frequent were publications on the integration of autistic spectrum disorders via ICT in mainstream schools (Starcic, 2014, p.218).

It has been proved in many publications that ICT have a positive impact on learning/teaching of foreign languages, namely they have a huge potential to adapt the teaching/learning materials according to learner's needs. They allow to blend audio and video inputs along with practicing vocabulary and pronunciation. Moreover, internet, smart phones, video games and music players are used to target language raise, by increasing the student's motivation and language awareness (Altun, 2015).

As a tool for accommodation ASD students, psychologists often recommend using laptops, iPads, smart phones in educational process. The consequent question is the reason why educational specialists advise to implement ICT as a tool to accommodate students suffering from ASD and what benefits it brings. Taken into consideration all weaknesses and strength of ASD students, it can be supposed that implementation of ICT in education process of ASD students is beneficial for them. Special educational needs of students, particularly suffering from Autistic spectrum disorders include plenty of various learning difficulties that prevent the progress in their studies without the appropriate accommodation.

Wire as an experienced teacher of Autistic spectrum disorders children gives advice on teaching and learning foreign languages (2005, p.123-128) *“Incorporate using a computer, CD ROMs and associated technology into teaching and learning as much as possible, and allow the use of a laptop where appropriate, so homework tasks, including factual investigations, could be set to be done on the computer at home”*.

Putman (2008) in her study described the view of software developers, designers and researchers looking for a help how to educate children with ASD via software and technologies. Between 1st October and 15th November 2007 anonymous on-line surveys on open-ended questions aimed at strength and weaknesses of ASD children and their use of ICT in education were collected. Totally she received 114 submission concerning people with ASD, from which 102 ASD children the age 0 – 18. The questionnaire included 5 questions on the type of used technology, experience with their use, missing software, attitude towards technology and interests in ICT, and were asked to scale from 1-5, based on their effectiveness.

**Table 1** shows purpose of ICT use by ASD

Use of ICT	Results
reading	28
socialising	14
watching films	29
sci-fi stories	7
writing	36

Parents of ASD children reported mainly positive experience with used technology as the ICT taught them social communication and provided academic help.

Swettenham (1996) sees computers as an ideal educational tool for ASD students for many reasons. For instance, computers provide social interaction, accommodate the autistic need and allow the student to take control and work at your own pace.

## CASE STUDY RESEARCH

The aim of the case study was to compare students having ASD with neurotypical population aged 10-15. The research sample included 51 students, diagnosed with ASD and 59 students without ASD. The questions were aimed at identifying four language skills of ASD students – speaking, writing, listening and reading. The same questionnaires were given to primary school children at the same age without ASD. The answers were scored from 1 to 5. The score 1 means the least points and 5 the most.

Research question: Do you like speaking in English?

**Table 2** Speaking in English languages

Answers Number of students	Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree	Sum	Average
with ASD	14	11	11	0	15	51	45 %
without ASD	12	15	16	9	7	59	41 %

As the results show the students with ASD do not have more troubles with speaking in foreign language than the neurotypical counterparts.

Research question: Do you like writing in English?

**Table 3** Writing in English language

Answers Number of students	Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree	Sum	Average
with ASD	34	10	4	1	2	51	16 %
without ASD	25	11	10	4	9	59	26 %

It was proved that ASD children do not like writing in foreign language, however, very similar results were observed in students without ASD.

Research question: Do you like listening in English?

**Table 4** Listening in English language

Answers Number of students	Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree	Sum	Average
with ASD	8	10	14	15	4	51	50 %
without ASD	8	16	18	11	6	59	46 %

Research question: Do you like reading in English?

**Table 5** Reading in English language

Answers Number of students	Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree	Sum	Average
with ASD	8	12	10	10	11	51	52 %
without ASD	10	20	12	11	6	59	42 %

The results are depicted in tables and show that ASD students do not have significant differences in examined language skills than students without ASD. The biggest challenge of ASD students is writing, however, the other skills do not fall behind the neurotypical children.

Moreover, many respondents from both groups claimed that they like listening to songs in English, watching videos, films and online games and they gain vocabulary from those activities.

## CONCLUSION

The occurrence of ASD children among the neurotypical population has steadily increasing tendency. For that purpose, teachers need to find out the approach to accommodate the ASD children's needs. Because of integration of ICT in educational process is commonly known as beneficial for students and teachers, it is enhancing for ASD students.

Although the teaching ASD children a foreign language via the help of ICT was not extensively researched, some results were proved by 43 teachers from eight schools and 85 students, 37 were diagnosed with ASD. Virtual reality and video modelling, implemented in lessons proved that the integration of ICT enhances social communication skills, and consequently the ability to interact socially (Weiss, 2017, p.115-119).

Moreover, the study made by Harrison (2002) found that ICT use promoted greater student's engagement with the subject. In addition, the use of word processing accelerated and enhanced writing development.

Equally important results justified that ICT technologies empower children to be actively involved in the process of education. The inclusion of ASD in mainstream classes via ICT was proven in HANDS project

– Helping Autism Diagnosed Navigate and Develop Socially in three mainstream UK secondary schools in 2011, in which eight ASD students participated. The results show the huge potential for ICT, namely smart phones to develop ASD students' social skills (Mintz, 2013).

ASD students have a highly positively approach to the use of technologies in teaching/ learning languages. In addition, ICT can be used for not only language teaching but also to train ASD students' social competencies as they have problems with the understanding of social goals in foreign language teaching. It is related directly to their disorder, they have the same problem with learning mother tongue. Nevertheless, more research should be done on the impact of therapeutic and educational interventions for children with ASD and language learning via the use of ICT.

ASD students spend plenty of time playing games, watching videos, listening songs, however, further research ought to be done on that issue.

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