

Perspective of Educators and Parents of Four European Countries on Integrating (Assistive) Technology in Inclusive Early Childhood Education and Care Settings

Tessa Delien¹, Jo Daems¹, Katerina Mavrou², Lorenzo Desideri³, Kristijan Lazarev⁴, Gordana Blagojevska⁴, Marianna Efstathiadou², Andrea Eliadou², Arianna Gherardini³, Francesca Priori³, Sofija Stojanovska⁴, Ilaria Valoti³, Bert Bonroy¹

¹ Thomas More University of Applied Sciences, Mobilab&Care, 2440 Geel, Belgium
tessa.delien@thomasmore.be
jo.daems@thomasmore.be

² Department of Education Sciences, European University Cyprus, 2404 Nicosia, Cyprus
K.Mavrou@euc.ac.cy

³ AIAS Bologna Onlus, 40134 Bologna BO, Italy
ldesideri@ausilioteca.org

⁴ Association for assistive technology Open the Windows, 1000 Skopje, Republic of North Macedonia
klazarev@openthewindows.org

Abstract. Nowadays, it is key to explore the opportunities of integrating Digital Mainstream Technologies (DMT) and Assistive Technologies (AT) into Early Childhood Education and Care (ECEC), especially for children with disabilities. In order to achieve a successful implementation into practice two main stakeholders, educators and parents, have to be actively involved in this process. Literature about the insights of parents on implementing technology for their children in ECEC is limited. Therefore, the aim of this study is to identify the conceptions and beliefs of educators and parents in inclusive ECEC in four European countries (Belgium, Cyprus, Italy, Republic of North Macedonia) in relation to the current practice, barriers and opportunities for integrating DMT and AT in inclusive ECEC. A total of 76 educators working with children 0-6 years of age in inclusive ECEC and 71 parents of children, with and without disabilities, 0-6 years of age in inclusive ECEC, participated in focus group interviews across the four countries. According to them, important barriers to integrate DMT and AT in ECEC are the lack of resources such as knowledge, expertise and budget. However, using DMT and AT as a tool for differentiation or as a support for communication are one of the many opportunities for using technologies for educational purposes and for the inclusion of children with disabilities.

Keywords: Inclusion, Early Childhood Education and Care, Assistive technology, Digital Mainstream Technology, Parents, Educators

1 Introduction

1.1 Inclusion and Technology in Early Childhood Education and Care

Infants, toddlers and pre-schoolers, with and without disabilities, nowadays grow up in an environment where technology is everywhere and use technology on a daily basis [1-2]. Although the educational potential of technology, there are also related developmental and health concerns due to excessive technology use, e.g. increased risk for obesity and shorter night time sleep duration [1]. However, embedding technology in teaching to complement and improve traditional teaching methods can help develop certain skills such as collaborative problem solving, cultural awareness and sensitivity, critical thinking, and creativity [3].

According to the UN Convention on the Rights of Persons with Disabilities [4], all children with disabilities have the right to education, more specific to an inclusive education system at all levels. Hence, in recent years more children with disabilities are included in mainstream education settings, which causes an increased demand for Assistive Technologies (AT) to meet their special needs in inclusive education [5]. Inclusive education is frequently not possible without access to fit-for-purpose AT. If AT is an enabler for learning, actions for identifying and addressing the unique AT needs of each individual child must take place as early as possible. This is to ensure that young children interact as much as possible with the world around them and that by the time the child goes to school, the use of AT is already an acquired habit and does not create an additional barrier. [6] The Convention on the Rights of Persons with Disabilities states also that the availability and use of new technologies, including information and communication technologies and assistive technologies, should be promoted [4].

The literature describes various opportunities or benefits (e.g. development of problem-solving and computational thinking, support collaborative learning and social interaction, enabling participation of children with disabilities) of incorporating Digital Mainstream Technologies (DMT) and AT into Early Childhood Education and Care (ECEC), but also several barriers (e.g. access to technology, attitudes towards technology, concerns about negative impact of technology, digital competences of educators, lack of awareness of existing technologies, financial barriers, absence of policies, legislations and/or national programmes) [6-9]. Notwithstanding the barriers, educators in ECEC explore the opportunities to integrate DMT and AT into their curriculum [2]. Therefore, they need adequate digital competence. For educators, adequate digital competence means knowing when, how and why digital tools should be used. A first important step is to examine their understandings and experiences of digital tools, but also why they are not always capable to use digital tools [10]. Parents are another important stakeholder in ECEC but literature on their conceptions and beliefs on integrating technology in ECEC is limited.

1.2 Aim

The aim of this study is to identify the conceptions and beliefs of educators and parents in inclusive ECEC in four European countries (Belgium, Cyprus, Italy, Republic of

North Macedonia) in relation to the current practice, barriers and opportunities for integrating DMT and AT in inclusive ECEC. The outcome of this study will also contribute to the development of the guidelines and the educator training for integrating DMT and AT in ECEC, as envisioned in the Erasmus+ SKATE project (<https://skateerasmus.be/>, Project N°2020-1-BE02-KA201-074810).

2 Method

This study draws on data from multiple focus group interviews in the four European countries with (1) educators (childcare workers, classroom teachers, teacher assistants, special educators and paramedics that supports teaching activities) working with children 0-6 years of age in inclusive ECEC; and (2) parents of children, with and without disabilities, 0-6 years of age in inclusive ECEC. A well-conceived script, including an interview guide, was provided for conducting the focus group interviews. In each country, local standards on ethical approval were respected and informed consents were obtained from all individual participants.

The first country analysed their own organised focus group interviews in the local language by using intelligent verbatim transcription and thematic analysis in 6 steps: (1) familiarizing with the data, (2) generating initial codes, using a code list, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report, using a self-developed template [11].

The other countries analysed their focus group interviews following the same themes of this thematic analysis by using the summaries of their interviews. The findings were translated in English, structured and then merged into an overall report with conclusions and discussion based on the results of the four countries.

3 Results

3.1 Participants

A total of 76 educators participated in the focus group interviews across the four European countries. The educators involved had experience with children with different disabilities (e.g. attention-deficit/hyperactivity disorder, speech or language impairment, visual impairment, motor disability, intellectual disability, autism spectrum disorder, multiple disabilities) in their ECEC setting. Altogether in the four European countries 71 parents of children without ($n = 45$) and with all kinds of disabilities, such as motor disability, intellectual disability, autism spectrum disorder ($n = 26$) participated. An overview of the participants per country is presented in Table 1.

Table 1. Overview participants per country

Role	Number of participants per country				Total participants
	Belgium	Cyprus	Italy	Republic of North Macedonia	
Educators	21	20	14	21	76
Parents of children without disabilities	16	11	8	10	45
Parents of children with disabilities	4	5	6	11	26

3.2 Perspective of Educators and Parents of Four European Countries on Integrating (Assistive) Technology in Inclusive Early Childhood Education and Care Settings

Participants' views were grouped for both DMT and AT into four main themes: (1) conceptions and beliefs, (2) experiences, (3) opportunities, and (4) barriers.

Digital Mainstream Technology

In relation to DMT, in all four countries DMT are used in ECEC for education and/or play or leisure. Most commonly used DMT are interactive boards, interactive walls, (smart) TVs, smartphones and (giant) tablets. In some countries also computers, laptops, projectors, programmable robots and sound systems are used.

According to educators, DMT can create opportunities if it is used in an appropriate way for (1) supporting and encouraging language and speech development, communication and social relations, (2) learning, for example through educational games, educational software or multimedia, (3) creating quiet moments or relaxing children, (4) stimulating motor skills and exercising pre-reading/writing skills, (5) collaborative (movement) learning, (6) children to get familiar with technology, and (7) inclusion as a common language for all children, a tool for differentiation and substitute exercises, a support or stimulant for communication, a motivation for children, and a facilitator of group activities and collaborative learning. In the opinion of parents, DMT can create opportunities for (1) learning, e.g. learning and stimulating (foreign) languages, self-image, (2) exercising motor skills, (3) children to get familiar and learn to work with DMT, (4) stimulating children's curiosity and motivation, (5) children to socialise, to experiment and to become creative, (6) relaxing children, (7) remote learning and communication, and (8) inclusion through differentiation, substitute exercises, a common language for all children and supported communication.

A barrier to the use of DMT in inclusive ECEC, according to both educators and parents across the four countries is lack of digital knowledge, competences, skills and/or training on technology-use. Both educators and parents mention the following barriers: (1) lack of digital equipment and/or budget for the acquisition of DMT in ECEC, (2) concerns about possible negative impact of digital technologies for young

children e.g. social interaction, (3) lack of appropriate applications, software and other resources in the local language(s), (4) the vision and values of the school and/or educator about technology, (5) insufficient (technical) support, (6) lack of collaboration with experts and other educators to use technology with children (with disabilities) in ECEC, and (7) lack of time on the part of educators to search and implement technology. Parents highlighted also one additional barrier: lack of guidelines for both educators and parents.

Assistive Technology

In relation to AT, in all four countries the general conceptions and beliefs of educators and parents about the use of AT in ECEC are positive. Educators believe that the use of AT helps to achieve inclusive education by promoting interaction and making activities more accessible. AT can also be used to create interesting activities for all children and specific AT could be used to potentiate children's abilities and autonomy. Parents mentioned that it is important that AT are used in a reasoned and inclusive way to train or support specific deficits or in specific classroom activities to enhance inclusion of children with disability by a trained educator. AT provide a real tool to capture children's attention, increase their motivation during activities, expand their communication skills and prepare them for adulthood. Nevertheless, according to both educators and parents, there is limited use of AT in ECEC.

AT that are mentioned by both educators and parents are: (1) low- and high-tech augmentative and alternative communication systems, (2) (educational) software or applications for children with disabilities, (3) listening picture books, (4) adapted toys, and (5) alternative input devices, e.g. joysticks, access switches, trackballs, touch screen devices. Educators also highlighted following AT: (1) Vibrating Platform to stimulate attention to the presence or absence of sounds, (2) changing colour panels to give children feedback about the intensity of sounds in the room, (3) cinema with amplified sounds to stimulate inclusive group activities with deaf children, (4) multi-sensory stimulation room, and (5) Cause and Effect Sensory Lightbox and similar – cause-effect software and hardware.

According to both educators and parents, AT can create opportunities for (1) all children, e.g. practice motor skills with all children, (2) inclusion by supporting children with disabilities in all educational activities, supporting and stimulating language and speech development of children with communication disabilities, substitute exercises and making learning and play activities more accessible so that children with disabilities can interact, do activities with other children and grow along with their peers. In addition, educators highlighted following opportunities: AT can (1) support and stimulate language and speech development, (2) capture the attention, (3) be adapted to the needs of the child, and (4) strengthen the abilities of children with disabilities to help them to be more autonomous. Parents additionally mentioned that AT: (1) can provide additional structure for all children using pictures and pictograms, (2) can motivate children, and (3) offers various means and modes of developing children's different competences, directly or indirectly, such as specific skills, attitudes, knowledge, and enhance their learning process.

The barriers to the use of AT in ECEC for both educators and parents are (1) limited or absence of available AT and/or budget for the acquisition of AT, (2) lack of awareness, knowledge and training of educators and parents on AT, (3) lack of collaboration between educators and AT experts, (4) lack of technical and/or pedagogical support of AT experts in ECEC, (5) lack of time of the educators, e.g. to adapt learning activities and materials to individual needs, to learn to use AT, to prepare AT, (6) reluctance to use AT, (7) vision of the school or educators on AT, (8) limited portability of AT, and (9) lack of an implementation plan and follow-up procedures after the assignment of (individual or not) AT to a child or a classroom. Additional barriers mentioned by educators are: (1) lack of affordable, appropriate, adaptable software, applications and other AT resources in the local language(s), (2) fear of damaging AT, (3) the use of AT demands a lot from the educator because pre-schoolers cannot yet work with them independently, (4) sometimes there is a long wait before AT are used in ECEC, the focus is often still on stimulating and practising skills and the demand for AT for skills that are not successful is not made, and (5) children evaluation in the preschool years is of no importance for the Ministry of Education and it is also time consuming. Parents also highlighted some additional barriers to the use of AT in ECEC: (1) educators are not familiar with or afraid to introduce AT, (2) parents prefer that preschools provide tangible experience and interaction with other children, and (3) absence of appropriate legislation (and policy gaps), especially in relation to inclusive education as well as a clear legal framework for AT provision.

4 Conclusion and Discussion

This study provides a view on the conceptions and beliefs, current practices, barriers and opportunities for integrating Digital Mainstream Technologies and Assistive Technologies in inclusive ECEC from the perspective of educators and parents across four European countries. Based on the focus group interviews, AT is used less than DMT in inclusive ECEC. Important barriers to integrate DMT and AT are the lack of resources such as knowledge, expertise and budget. However, the educators and parents see many opportunities for using DMT and AT for educational purposes and for the inclusion of children with disabilities. The use of DMT and AT offers opportunities to enhance the communicational, motor and educational skills of all children, with and without disabilities, can strengthen the abilities of children with disabilities and give them the chance to grow along with their peers. It is recommended to use DMT and AT in a well-considered pedagogical way.

Due to the exploratory nature of the focus group interviews the results may not be considered fully representative for the entire population of stakeholders targeted. But the fact that similar findings could be noted in the four European countries indicates that the same beliefs and concerns are prevalent in different areas of Europe in the same way. Furthermore, the inclusion of both educators and parents of children with and without disabilities of different ages (0-6 years) in the study in all four countries is a strength and certainly because parents, an important stakeholder for successful integration of technology in ECEC, are often not involved in current literature.

Despite many opportunities for integrating DMT and AT in inclusive ECEC, we must not lose sight on the fact that every situation is different and the centre of the process for applying DMT and AT must always be the child. Therefore it is also recommended to investigate and reflect on the children's experiences and behaviour during the use of DMT and AT in inclusive ECEC in further research.

References

1. American Academy of Pediatrics: Media and young minds (policy statement). *Pediatrics* 138(5), 1–8 (2016). doi: 10.1542/peds.2016-2591
2. Lyons, C.D., & Tredwell, C.T.: Steps to Implementing Technology in Inclusive Early Childhood Programs. *Computers in the Schools* 32(2), 152-166 (2015). doi: 10.1080/07380569.2015.1038976
3. Sepúlveda, A.: The digital transformation of education: Connecting schools, empowering learners. *2020 ICT in Education*, 249-260 (2021). www.cetic.br
4. UN: Convention on the Rights of Persons with Disabilities. Article 24 (2007). <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities/convention-on-the-rights-of-persons-with-disabilities-2.html>
5. Zilz, W., & Pang, Y.: Application of assistive technology in inclusive classrooms. *Disability and Rehabilitation: Assistive Technology* 16(7), 684-686 (2021). doi: 10.1080/17483107.2019.1695963
6. Hunt, P.F.: Inclusive education: The case for early identification and early intervention in assistive technology. *Assistive Technology* 33(s1), S94-S101 (2021). doi: 10.1080/10400435.2021.1974122
7. Botelho, F.H.F.: (2021). Childhood and Assistive Technology: Growing with opportunity, developing with technology. *Assistive Technology* 33(sup1), 87-93 (2021). doi: 10.1080/10400435.2021.1971330
8. Blackwell, C.K., Lauricella, A.R., & Wartella, E.: Factors influencing digital technology use in early childhood education. *Computers & Education* 77, 82-90 (2014). doi.org/10.1016/j.compedu.2014.04.013
9. Murcia, K., Campbell, C., & Aranda, G.: Trends in Early Childhood Education Practice and Professional Learning with Digital Technologies. *Pedagogika* 68(3), 249–264 (2018). <http://pages.pedf.cuni.cz/pedagogika/>
10. Lindeman, S., Svensson, M., & Enochsson, A.-B.: Digitalisation in early childhood education: a domestication theoretical perspective on teachers' experiences. *Education and Information Technologies* 26, 4879–4903 (2021). doi.org/10.1007/s10639-021-10501-7
11. Braun, V., & Clarke, V.: Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 77-101 (2006). doi: 10.1191/1478088706qp063oa