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TEACHERS' CONTRIBUTION IN DEAFBLIND STUDENTS' BRAILLE LITERACY

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Abstract:
Deafblindness constitutes a dual sensory impairment that is caused by acquired or congenital factors. Assistive technology has converted learning into an approachable good for them. Based on the literature review, braille turned out the most effective assistive device that promotes deafblind (DB) children's literacy. However, education without human contribution cannot operate properly. For that reason, teachers play a vital role in children's learning development and can act as the mediators of the provided knowledge. The educational personnel has to bear in mind that every DB child has unique necessities. Consequently, it is imperative need to teach them the suitable combination of methods and techniques consolidated with their knowledge and experience. This research study will employ the methodology of qualitative research as well as the method of semi-structured interviews with teachers of DB students, in order to discover efficient strategies of teaching braille that could build children's literacy in the school environment.

Keywords: deafblindness, assistive technology, braille literacy, teaching strategies

1. Introduction

Howe initially referred to deafblindness in 1648 when he described how a deaf and blind doctor (John Bulwar) taught to speak (Das and Mishra, n.d.). An example of a talented DB individual is the renowned Helen Keller, who raised awareness and encouraged many others with visual and hearing impairments (Parker, McGinnity and Bruce, 2011). The Perkins school for the blind in Boston and the Larnay institute in France are reportedly the most noted schools for their valuable contribution in the field of blindness (Orfanos, 2004). Das and Mishra (n.d.) report that "*The breakthrough at Perkins School*

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marked the beginning of education of deafblind in the world" (p.71). From 1842 and on, DB children became accepted in the educational system at schools for the blind or the deaf in many European countries. In 1954, Margaret Brock and Peggy Freeman formed *SENSE*, the national UK voluntary organization working with and supporting people of all ages who are DB or have associated disabilities (ibid).

Despite this long history, there is very little research into the ways that DB students can acquire knowledge and the type of teacher support that helps them become active and literate members in the school environment. Therefore, this paper focuses on which teaching strategies with the assistance of braille might support deafblindness. This paper reviews concise definitions, the impact of Assistive Technology (AT), and the effectiveness of braille, whereas the focus lies on how teachers help DB children become literate. The proposed research design investigates the impact of teaching strategies on DB children's literacy outlining the methodology, approach to data collection (semi-structured interviews with teachers) analysis, ethical considerations, and the implementation for practice.

2. Literature Review

Critical literature review is about implementing and deepen the personal and public knowledge from a field of study by showing high capacity in reviewing, synthesizing and analysing the research of the literature (Bothell, 2015).

The research-based on the literature showed that deafblindness is a scarce disability and as a result, it has been under-explored (Kamenopoulou, 2012). According to the investigation, visual or hearing impairments have been debated extensively in comparison to the dual sensory children's disability. The literature, according to BERA's (2011) ethical guidelines to protect children's confidentiality and anonymity, found that the main lack was on teachers' methods of teaching braille. However, the research engines, such as NU Search, ERIC and Google Scholar came up with some information regarding the term "deafblindness". In order to find the beneficial impact of braille, the term "assistive technology" needs to be clarified first, as it includes the code of braille. The focus of my investigation was mostly made on journals and articles within the last fifteen years. Finally, my research expanded on teachers' promotion of braille literacy to deafblindness with only three articles by McKenzie ranging from 2007 to 2009 ('The use of learning media assessments with students who are deaf-blind', 'Emergent literacy supports for students who are deaf-blind or have visual and multiple impairments: A multiple-case study' and 'Unique considerations for assessing the learning media of students who are deaf-blind') from the total 15 related to the topic. These articles constituted the base of my research that created a reliable researching field, without ignoring the limitations and the small number of studies. Consequently, this lack of findings gave me the instigation to create my research question based on the teachers' strategies for building braille literacy to help DB children become educated.

2.1 Definitions of Deafblindness

It is difficult to reach an accurate and straightforward identification of what exactly deafblindness is because it compromises a heterogeneous group of individuals, who have both deaf and blind impairments but to different extents (Dammeyer, 2014). This paper will focus on the definition that will be used throughout the assignment and describes the severity of dual sensory loss concerning the adverse impact on DB children's education. The University of Southern Mississippi (2015) stressed what problems can be caused in communication and other developmental and educational skills that cannot be accommodated by special education programmes and curriculums for deaf or blind pupils. Moreover, these problems can bring learning and physical difficulties that create the need for a specially adapted education for them (Department of Health, 1997; Department for Education, 1989 cited in Sense, 2012).

2.1.1 Congenital or Acquired Deafblindness

In order to understand the severity of this dual sensory disability, we should first look into congenital and acquired deafblindness. This will facilitate the understanding of different necessities that DB children have and the special treatment that are in need of. To begin with, congenital deafblindness is referred to individuals who have lost both their sight and hearing from birth (Dammeyer, 2012) or evolve visual and hearing impairments before the advancement of language within the first years. Dammeyer (2014) characterized Charge syndrome as the most usual factor of congenital deafblindness. In contrast to congenital, acquired deafblindness refers to someone who loses his vision and hearing at some point later in his life (CDBA - British Columbia, 2015) and after the development of language. Usher syndrome is the most important reason that leads to deafblindness according to Douglas Silas solicitors (2015). It consists of three different clinical types, from mild to severe impairments. People with type 1 are usually born deep-deaf or with hard hearing difficulties, something that causes oral difficulties and imbalance (CDBA - British Columbia, 2015). Those with type 2 seem to present bland to mediocre hearing problems, something that remains at a stable level and does not influence their balance. Lastly, individuals with type 3 can normally use their hearing and they are almost capable to keep their balance. Hearing may be aggravated, but the analogy of the vision and hearing that is impaired depends on the person (ibid).

2.2 Bonding the educational system with deafblindness through assistive technology

We march in a digital age, where AT constitutes a decisive factor in improving disabled people's lives, giving them the ability to have access to educational resources and services (Sanaman and Kumar, 2015). In general, according to Koulikourdi (2008) AT consists of appliances or equipment that can be used effectively by individuals, in order to preserve, augment or ameliorate their liturgical abilities and implement operations that could not be able to execute without it (Yadav and Vermani, 2012).

Szeto and Christensen (1988) stress that the problem with DB people is that they can only rely on their sense of touch. For that reason, technological tools must be responsible for the conversion of oral and written data into touchable information and

not only allowing the interaction of conveying messages but also developing their language skills (ibid).

The first mingling of AT with education was made with the Perkins School for the blind, which constituted the first environment in which DB children could become educated (Ingraham, 2007); a program that goes on until nowadays by offering effective educational services and methods (Perkins, 2015). In 1967, the Congress established the first enactment that addressed DB children. According to this, local centres, special programs and curriculums were created and the teaching staff was appropriately trained. Riggio and McLetchie (2008) and Wonderopolis (2015) referred to assistive technology tools as the '*golden section*' that promotes equality in a way that DB children could have access to learning, competition, communication, and education. Ludi (2002) also, emphasises DB students' acquaintance with accessibility devices and AT. Rosmaita (2006) suggests placing accessibility in the centre of the educational system through the Web design: *Accessibility First.* Southern and Drescher (2005) mentioned that technology has the perspective to be beneficial for children if assisted by human power.

2.2.1 The dominant assistive appliance: Braille

According to literature, braille and different types of braille devices can be combined with computers and create a friendly environment for DB students' education. To begin with, braille is a tactile reading system (VisionAware, 2015) and a code writing (and reading) in every language (AFB, 2014). There are six lifted buttons in each braille cell in two parallel series and each series consists of three buttons. Blind, or DB people touch them with their fingers and it is possible to make sixty-four combinations by using one or even more from the existing buttons. Each cell can symbolize a letter, a number, and a punctuation mark (AFB, 2015).

A proof that technology has been evolved radically especially, in the last decade in the field of AT, is the variety of braille devices that ranging from braille books to accessibility on the internet through computers (AFB, 2014). According to the research findings, authors, scientists, organisations, and instructors of braille based on their experience with DB students demonstrate some braille devices that have been ascertained as useful for students' literacy. One of them is braille display or refreshable braille display that complete tasks, offer straightaway accessibility to information (Yadav & Vermani, 2012), and give the possibility of recording and saving conversations for future use (Ladner, 2012). According to Berrier's (2015) personal teaching experience, refreshable braille display can be connected with the Deafblind Communicator and the smartphones and students, for example, can display a written text through refreshable braille on the Communicator. Braille note is another device, usually comprised of the word, using e-mail services (Sense, 2012), calendar, calculator, notebook, reading book (Mason, 2014) and extremely useful for keeping notes in class or for searching on the web (AFB, 2014; Wonderopolis, 2015). Ingraham (2007) and Mason (2014) refer to the use of Bluetooth or USB QWERTY keyboard which promotes the exchange of messages among students in the classroom. Finally, braille printers generate hardcopy information and DB children backdate in the printed text whenever they want (Yadav and Vermani, 2012).

The special thing with Braille is that it is still the only system that supports both reading and writing (Tobin and Hill, 2015). Berrier (2015) as an ardent supporter of Braille claims that it constitutes one of the most marvellous and helpful achievements and Pasupathy (2006) stresses the dependence of DB children's education on braille, as well. More specifically, Ingraham and Andrews (2010) in their pilot study, with in-depth interviews in three deafblind adult readers, found the reading techniques they used at school. Based on the data, the girls used visual, auditory and tactile strategies implemented through computers. R. and A. used braille; especially A. was totally dependent on it. As she mentioned, she wanted to have her textbooks exclusively in braille, on the grounds that she could directly note down the meaning of the text without reading from the beginning. In this study, it is important to be careful about the validity of the sample, which consists of three successful American girls who have been assisted by their families at an early age to develop their reading skills. These parameters cannot represent the whole population of DB students and not all deafblind people have the same luck as they did. Nevertheless, these findings constitute a strong base for further study. Future studies must be conducted for reaping more reliable findings according to the reading strategies. Finally, additional retrospective studies can suggest some more effective ways of becoming competent readers (ibid).

2.3 Teacher's contribution in learning Braille

As previously mentioned, technology can act effectively in a child's life especially if s/he has a disability, but human involvement constitutes the most crucial factor for helping students in order to learn.

Rode's research (2011) is focused on the embodiment of braille in the school lives of students with visual impairments and the development of reading and writing skills that provide them with a successful education. Writing and reading, through braille, are essential for deafblind student's education and it is inextricably interwoven with teachers' assistance. Teachers constitute the mediators of this provided knowledge. Frederickson and Cline (2009) referred to teachers, who have encountered difficulties in teaching deafblindness, because of the dual loss impairment that does not act in favor of implementing techniques that will promote their skills by practicing one sense in order to cover the inability of the other. Rode (2011) mentioned that teachers should plan individual teaching methods that can challenge the evolution of reading and writing. Many scientific works for blind people in the sector of education have led to the acceptance of braille as a crucial and efficient program that promotes literacy (Olayi, 2013). Frey et al. (2012) tried to find how teachers teach and promote braille literacy to the visually impaired. Based on the findings of semi-structured interviews by four professional braille instructors, found that braille note is a device that facilitates pedagogic roles by serving examples that show its efficiency on students according to their experiences. However, the results would not be the same, if the sample consisted of un-experienced teachers. As Roe, Rogers, Donaldson, Gordon and Meager (2014) state, teachers need to plead the use of braille, comprehend their role, and make students feel independence by using it. Also, teachers must know to divide appropriately children's

time, in order to provide them with opportunities to deal with accessibility, learning literacy skills, and participate in group activities with their peers (Barclay, Herlich and Sacks, 2010; Roe et al., 2014). Some of the reading skills that children can develop by learning braille are the recognition of intimate words, (Adams, 1990) the articulation of unfamiliar words (Goulandris & Snowling, 1995), and the comprehension of decoding texts (Stanovitch, 2000).

There are three approaches to teach braille literacy, according to Rex et al. (1994). The first one is the *Meaning-Centered Model* that is moving from the meaning to the understanding of the braille print elements. The second one is the *Skills-Centered Model* that helps students decode the text and analyze the words so as to comprehend their meaning by understanding the grapho-phonemic relationships. The last one is the *Interactive Model* that blends elements of both aforementioned models by emphasizing the understanding of meaning and coherence of braille print material. It seems that the more inclusive model is the *Interactive* because it constitutes a common approach of braille print reading in mainstream schools. However, the level of children's knowledge plays a major role in the comprehension of these models and consequently their effectiveness on them (ibid).

Another part that teachers should include in their way of teaching is the boost of phonological consciousness which must be upgraded in accordance with children's development. Also, one more important fact that teachers should bear in mind, is the hand movements in braille reading (McCall, McLinden and Douglas, 2014). As McCall et al. (2014) mention in their project and based on another survey's findings (Wright, Wormsley and Kannei-Hannan, 2009), two-handed reading is more effective and faster than one-handing. Consequently, teachers must encourage students to choose two-handed reading because these readers have the potential to advance more profitable reading strategies and standards as they grow up. Rex et al. (1994) mention that teachers must help children develop language and tactile skills, keep in touch with book skills and understand what is happening around the world. All these surveys are useful because they present the advantageous use of braille. However, there is a possibility that these strategies do not correspond to DB children. Therefore, it cannot be certain that all students will have the same outcomes if the sample of participants was changed.

Justice & Pullen (2003) mention three factors that promote the development of literacy: the environment, the teaching tactics, and the role of teachers' attitude towards the motivation of becoming literate. In 2010, Barclay et al. examined efficient teaching methods that teachers use in order to help students become literate, including braille, as a part of general literacy. With a qualitative methodology and the method of two case studies of visually impaired students, the results presented their steady advancement in literacy accomplishments. The strategies that teachers followed reported being efficient for blind students. These teaching approaches focused on the advancement and preservation of reading and understanding the text, accompanied by background information and lexical resources and the procedure of coding and encoding skills that converted them into fluent readers. The validity of this study is based on the separate assessments and benefits that each different strategy reflected upon the children.

Students' feelings and instant reactions were also noted during the case study, although, the small number of those who participated in (ibid). Finally, we should bear in mind that these teaching techniques are reported effective on visually impaired students, something that does not cover exclusively the whole spectrum of deafblindness.

McKenzie (2007) investigated certified teacher's practices to encourage DB children's improvement in literacy. Concerning the use of literacy media, through an online survey within three cities of America, nine out of thirty-four qualified respondents, whose anonymity was maintained, mentioned that they worked with at least one student who used braille as a means to become literate. As far as their training programs are concerned, some of the top issues that came up were the assessment and deafblindness and the AT along with the literacy and braille. Moreover, as nine participants mentioned, tactile symbols can be promoted by oral activities and the braille as their literacy medium, something that will facilitate DB children's communication (ibid). Two years later, McKenzie (2009a) focused on the learning media assessment of DB student's communication. That is crucial for estimating firstly, the specific students' preferences in sensorial means such as tactile and in literacy such as braille and print; and secondly, the provision of the appropriate literacy program. Teachers of visually impaired and DB specialists should collaborate so as to assess students' learning. In the same year, McKenzie (2009b) mentioned that have been investigated nine research-based on braille literacy and six unique teaching methods and activities, through observations, interviews and reviews, in a multiple case-study of students (visually impaired or deaf-blind) and teachers. The last six teaching strategies encompassed early braille and computer activities and constituted nearly three-fourths of the classrooms examined. Teachers acted as facilitators of literacy by creating the appropriate environment and offering chances to initiate them in literacy. However, the need for more information on how to assess the learning media for DB children was noted by teachers. Finally, all teachers agreed that communication was the most important developmental trait of students. Nevertheless, the lack of braille environments and early braille activities play a major role in deafblind student's learning delays (ibid).

The three surveys of McKenzie, regardless of the limited number, constituted the base of my research evidence, on the grounds that teachers managed to find beneficial skills and strategies for DB students' communication and development of their literacy with the assistance of braille.

The literacy instructors who have contributed all these years to the American Foundation for the blind proposed some of the techniques that have been used and have been reported to be effective for braille users in the official site of AFB (2015). Some methods that match more with deafblind children's needs are the acquaintance with simple, personal, and familiar subjects that will motivate them to continue learning and formulate words. Teachers can use a braille cell to write an example and instigate them to do the same, by offering context slogans and letter clues. Another technique could be the use of playing cards and braille magazines that will be related to student's favorite areas of interest and also help them combine the meaning of symbols with their daily activities (ibid). Finally, it has to be stressed that all strategies constitute proposals.

Consequently, there is not a particular evidence base; for that reason, possible combinations and alterations may create more efficient strategies according to teacher's unique characteristics such as knowledge, flexibility, passion and enthusiasm and consequently become more constructive for children's literacy development.

2.4 Limitations

The sources that have been investigated in the literature review for the deaf and blind students have shown that there is an emergent need for further research and practice. The limited number of the studies that are presented and the encouraging results that braille has on DB students, create the necessity for extended research. This need also has been mentioned by other researchers; McKenzie (2007, 2009a, 2009b) and Parker et al. (2011), who have been probed into the field of deafblindness and children's literacy. It is important to mention that the research for the teachers' involvement in the procedure of teaching braille was mainly focused on incidents of blind or visually impaired ones. Through more in-depth research, it would be easier to distinguish which ways teachers can use effectively the technological devices that promote braille literacy. More specifically, the investigation will focus on the methods that teachers use in order to contribute to the learning procedure of braille. Therefore, my focus for the research design will be on teachers' strategies that will aid DB children familiarize with braille and use it appropriately as a mean of communication.

3. Research Design

Through further inspection of the literature review, the following question arises: "In what way do teachers contribute to deafblind students' development of braille literacy?" In order to answer this question, a research design has to be adopted that would be capable to present important components such as methodology, sampling, and methods of collecting data, piloting, and the procedure of refining and analyzing them. Lastly, ethical considerations will be discussed and some limitations regarding the method of the interview will be examined.

3.1 Methodology

In order to begin with the methodology of my research design, it is important to clarify the concept of paradigm. Paradigms constitute the stances related to the most suitable ways of thinking, defining, assigning categories, theorizing, and studying the social world. (Hart, 1998; Thomas, 2013). According to Denzin and Lincoln (2005), a paradigm connects the researcher's epistemological: "*how they know it to be real truth*", ontological: "*what real world truth is*", and methodological premises. There is a variety of views among researchers about how they examine the world. The researchers who try to investigate the regularity of standard behavior in trends, rates and associations are named positivists and conduct quantitative researches, whereas those who focus on the perceptions and experiences of others about the world are called interpretivists and conduct qualitative researches (Tuli, 2010). However, the cross of quantitative and qualitative approaches is

also feasible to be implemented and this type of methodology constitutes the mixed methods (Newby, 2010).

The methodology that will be employed for my research is the qualitative, which has been described as a deductive relationship between theory and research (Bryman, 2012). Over the years, there has been a huge controversy between quantitative and qualitative methodologies. While quantitative research has been characterized as being focused on the process outcomes and rates by generalizing the results, qualitative is more exploratory and examines how and why things occur (Newby, 2010). Another point that makes the qualitative approach more appropriate for this specific research is that interprets things that stem from a humanistic aspect. Consequently, researches can find evidence based on their subjective responses, whereas quantitative approaches are objective and experimental (ibid). The researcher of a qualitative methodology constitutes an indispensable part of the research procedure (Byrne, 2001) who examines subjects from an inside stance, whereas, quantitative creates a more distant relationship between researcher and subject, by examining subjects from the outside (Bryman and Burgess, 1999). The basis that leads to conclusions is constructed on numerical evidence. On the other hand, qualitative research emphasizes the entirety and leads to connections between emotional and cognitive procedures and the social world (Newby, 2010).

Despite the arguments between the different kinds of methodology, the specific research topic will be the decisive factor in determining the research approach (Bryman, 2004). Therefore, I intend to use qualitative methodology because it would be useful to find out teachers' perspectives about the methods of teaching braille to DB students and investigate with freedom and based on a flexible design, as Tuli (2010) mentions the original and in-depth opinions from teachers with different perceptions, experience, and educational backgrounds.

3.2 Methods

As Cohen, Manion and Morrison (2007) claim, methods are the variety of approaches used in research to collect data that constitute the basis for interpretation and explanation. The method of the interview has been chosen to examine the ways that special tutors teach braille to DB children. Therefore, interviews will help me deduce the results based on teachers' perceptions of their experience. Interviews constitute 'verbal exchanges' (p.260) among two persons, in which the interviewer tries to elicit information and comprehend the attitudes, beliefs, processes, and behaviors of the interviewee (Rowley, 2012). The participants express the way they understand conditions based on their beliefs and experiences (Cohen, Manion and Morrison, 2011). More specifically, according to the classification of their structure, the type of interview that has been selected is the semi-structured interview. The use of semi-structured interviews can be reported to be helpful in cases where the researcher has adequate knowledge about the subject to form questions but not enough to anticipate answers (Morse and Richards, 2002). This kind of interview is more 'invasive' than a questionnaire, as Newby (2010) stresses. By using semi-structured interviews, it will be easier to explore the issue, by clarifying things that have been misunderstood, through predefined-open-ended but flexible questions; and

investigate more as the interviewee responds, by collecting powerful data that will provide participants' opinions, perceptions, and experiences related to the topic, as Gillham (2005), Given (2008) and Peters and Halcomb (2015) agree. Finally, semi-structured interviews offer a flexible tool for data collection that is comprehensible, convenient and effective because it can disclose crucial and latent facets of participant's attitude (Cohen et al., 2011; Qu and Dumay, 2011 and Rowley, 2012).

The interview will follow a gradual pattern that will introduce the interviewees smoothly to the topic and themes will categorise the interview questions into larger sections. The themes of the interview will be: A) past experiences and basic qualifications, B) effective devices and strategies of teaching literacy, C) improvements and difficulties and D) future goals and expectations. The main focus will be on teachers' perceptions about implementing strategies and techniques that will promote braille literacy (Appendix 1). Any kind of bias and subjectivity will be avoiding, whereas ethical guidelines will accompany the interview, as is mentioned in the section of Ethics. The themes, coding and data analysis will be recorded gingerly in order to eliminate any possibility of mistake and any kind of misconception. These parameters will be also discussed in the limitations part.

3.2.1 Data Collection and Sampling

To obtain data, ten teachers will be interviewed and semi-structured interviews will be conducted. I would first contact the Headteachers of their schools to take permission so as to approach them. All of them will be teachers of special education who have dealt with DB children and they have been trained in the braille system. In order to select the sample, I will first search which schools educate them in the United Kingdom. When I get the permission of the Headteachers, I will ask each one of them if I can employ one of their special teachers that have experience with deafblindness. I would intentionally try to recruit teachers from different schools because of their dissimilar educational backgrounds and different working environments. This will be a great opportunity to examine the extent of diversity in teachers' strategies to help DB children become literate. The interviews will be conducted individually for each one of the participants. Each interview will last about 30 minutes depending on the answers and any relevant prompts. The interviews will be video recorded as the video combines voice with the image that helps observers discern the facial expressions and the movements of them; something that constitutes the missing part from audio recordings. A letter of introduction will be presented (Appendix 2) to explain the background of the research and the reason they are being asked to be involved. The interview schedule (Appendix 1) will be explained and copies will be handed out to teachers; the consent form will be examined and signed in order to confirm the participants' acquiescence in taking part (Appendix 3). I will be the person to conduct the interviews that will take place in the schools.

3.2.2 Ethics

All educational research needs to comply with BERA (2011) guidelines that all participants and researchers should bear in mind. Sensibilization, dignity and fairness

constitute the components of a successful ethical environment regardless of the differences among them. The most important responsibilities that should be taken into consideration are the consent form and the disclosure of it; the privilege to withdraw any time and the vulnerability of some people, such as children and disabled ones. Moreover, the positive motivations that encourage participation, the possible harms that come as a result during the procedure, and finally, the crucial privileges, such as the right of privacy, anonymity and confidentiality complement the list of responsibilities (ibid).

Particularly, the interviews have an ethical dimension and they are focused on interpersonal interaction (Cohen et al., 2007; Qu and Dumay, 2011). Obtaining data through interviews can pose some concerns about ethics. These concerns can be eliminated if all participants are firstly aware of the purpose of the research. Then, it comes to the completion of the consent form whereby they are dealing with their participation in the survey. Privacy is the right of protection of personal information that has been given to the participants (McNamee and Bridges, 2002; Qu and Dumay, 2011). Moreover, all data that will be provided to the interviewers should not reveal the participant's identity and must remain anonymous (Cohen et at., 2007; Newby, 2010). Confidentiality constitutes another way to protect participant's private personal information safe and interviewers must guarantee that there is no access to the public (McNamee and Bridges, 2002; Qu and Dumay, 2011). Teachers must also have the right to withdraw and disengage themselves from the interview at any question and any time, as well as to review the transcript of their interview and make any corrections if they wish (DiCrocco-Bloom and Crabtree, 2006; Newby, 2010).

3.2.3 Piloting

Before collecting the data, it is important to mention the conduct of a pilot survey, which is a conditional approach to obtain the actual data and analysis (Byrne, 2001). Additionally, it is a way to pre-test and try out the proposed method of interview, so as to find out the correlation between the vision and the reality (Chenail, 2011). The interviewers must plan carefully the pilot survey and pay attention to the selection of people. These people should constitute the appropriate sample according to the needs of the specific research (Gillham, 2005).

In this specific topic, pilot interviews will be held with teachers of special education who will not take part in the main research. The researcher should bear in mind to ask for feedback, take into consideration the video-recording time and the possibility of questions' interpretation. Moreover, the researcher should also try to evaluate the range of responses and make any necessary changes, revise or re-phrase questions that emerge from this pilot testing (van Teijlinger and Hundley, 2001; Rowley, 2012).

3.2.4 Data analysis

Interview data will be stored in a video recorder and they will be transcribed into a text format later. The researcher needs to be cautious, so as to use and identify every data source and activity by avoiding using information that is irrelevant to the research question (Newby, 2010).

In order to organise the data carefully, a thematic analysis will be used for recognition, analysing, and reporting patterns that would emerge from them (Braun and Clarke, 2006). First of all, data must be duplicated in written form for the conduction of thematic analysis. Themes are broad categories that come from data and constitute the main areas of the research (Rowley, 2012). The next step is the generation of primal codes. My interview themes are four: past experiences and basic qualifications; effective devices and strategies of teaching literacy; improvements and difficulties; future goals and expectations. Based on the participants' answers all these themes will be sorted into detailed codes. The procedure of coding constitutes the classification of the research questions: should be strict, clear and systematic. Along with coding is the procedure of interpretation that construes what data means (Newby, 2010). In this stage, the researcher must pay attention to speech fillers, the spoken dialect, and the manner that the interviewee uses to be expressed. Some other details that must be taken into account are the oral and facial expressions, to decipher feelings and comprehend better the meaning of their words. The pauses, emphasis and speed of speaking could be proven effective for detailed information and lastly, the use of the interviewee's own words will probably enhance the validity of the interview (ibid).

Apart from all the benefits that have been discussed above related to thematic analysis, there might arise some risks. The risk of a weak or unpersuasive analysis and the disparity and inconsistency of themes as well as the discrepancy between data and assertions and between research questions and the specific form of thematic analysis that has been used (Braun and Clarke, 2006).

3.2.5 Limitations

Apart from the benefits that an interview offers to the researcher, some limitations should be taken into account. All possible restrictions that may occur have been discussed in the previous sections. However, a short report will help us think over the potential risks that we should avoid. First of all, the researcher's subjectivity may unintentionally influence the participants' answers (Cohen et al, 2007). Also, thematic analysis and coding may be biased by the researcher's perceptions. Moreover, according to Gillham (2005), Cohen et al., (2007), and Rowley (2012), video recordings are, sometimes, reported confusing for those who analyse the data as well as time-consuming. In addition, interviewees might feel more stressed and restricted, when they are aware of being videotaped something that would probably make them act less naturally. Furthermore, there is suspiciousness for the reliability of interviewees' answers on whether they are behaving naturally or answering intentionally according to what interviewers wanted to hear from them. Moreover, the questions must be clear and avoid confusing the participants. Additionally, the combination of more than one method and a larger sample of participants could produce a broader spectrum of results about teachers' strategies for aiding DB children to succeed in braille communication. Along with that, the absence of parents' or students' viewpoints might constitute a weak facet of the interview part, as they could have contributed and altered the results of this research. My target is to gather the teachers' perceptions that help DB students ameliorate their education. At this point,

the outcome lies in the researcher's capability of examining thoroughly whether these perceptions are valid and meet the criteria of trustworthiness, in order to lean on these views and form a powerful and unwavering study.

4. Conclusion

The scope of this study focused on the beneficial impact that AT and especially braille have on DB children and in which ways teachers can assist them so as to take part in education and become literate. To find out the degree of effectiveness, it was crucial to identify first the term 'deafblindness' and what this kind of dual sensory impairment can cause to DB children, as well as the contribution of AT to them in the field of education.

Taking into account the limited research, specific methods cannot be adopted by teachers. Based on the literature, the small number of sources for the literacy of DB children and the few surveys focused on the teaching strategies constituted strong motivations that made me investigate deeper and take the chance to interview teachers about the education of DB students through the assistance of braille. To conclude, it is quite obvious that if more research is going to be conducted, more teaching methods could be identified and clarified.

Conflicts of interest
The author declares that there are no conflicts of interest.

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About the Author

Konstantina Spyropoulou was born in Volos (Greece). She studied at the Faculty of Preschool Education at the University of Thessaly where she received her Bachelor's Degree in 2015. She did postgraduate studies in the United Kingdom, where she got her Master of Arts Degree in the field of Special Education (2016) and she also got a Master in Education in the field of Intercultural Education (2018). Moreover, Konstantina is an undergraduate student at the National and Kapodistrian University of Athens in the sector of French Language and Literature. She obtains a qualified teacher status (QTS) in

order to teach in a maintained school or non-maintained special school in England. She has worked voluntarily as a teacher/teaching assistant in the United Kingdom both in Special and Mainstream schools. In addition, she has been working in Greek public schools, as a Special Education Teacher, at the Ministry of Education since 2017, by supporting students with Special Educational Needs and behavioral problems with one-to-one teaching or/and group sessions. Moreover, Konstantina has been providing professional teaching support since 2015 to children with or without special needs as well as bilinguals, aged from 4 to 12 years old. She fluently speaks Greek, English and French. She possesses Braille certification and she knows the Greek Sign Language. She has participated in many seminars, conferences and educational programs. She has also gained many certificates of specialization in relevant educational sectors. Her research interests focus on the following: Teaching Methods in Preschool and Primary Education, Interventions in Special Education, Behavioral Management of students with autism, ADHD, psychological and social difficulties as well as Adaptation of bilingual students.

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Appendixes

Research question: In what way do teachers contribute to deafblind students' development of braille literacy?

Appendix 1: Interview Schedule

a. Past experiences and basic qualifications

1. Tell me about your experience of teaching deafblind students: For how long did you do this? How many students do you usually have? Did you teach them at the same or different places?
2. Could you tell me about the training you received in teaching deafblind students? How did training courses help you with your professional development?
3. Was using braille part of your training and in which ways did you find it beneficial for your job?
4. Could you tell me about your cooperation with other specialist teachers/braille instructors? How did they support you with your teaching methods and how did you find it?

b. Effective devices and strategies of teaching literacy

5. Based on your experience, could you tell me one or more braille device(s) that you consider to be the more efficient and reliable for a deafblind child's literacy? Please clarify the reasons that support your view.
6. Could you tell me in which ways students can have access to the aforementioned devices? Which kind of techniques would you implement to teach them how to use them?
7. Could you mention the strategies and activities that you can perform in the classroom to promote the development of literacy in students with deafblindness?
8. Can you refer to a specific method of teaching braille that you have used in your classroom and turned out to be successful? Does existing one that hasn't? How could you justify that?

c. Improvements and difficulties

9. How could you evaluate your students' progress in literacy through braille devices?
10. Are there any challenges in teaching braille? Did you ever encounter any of those during your course as a special teacher and in which ways would you overcome those challenges?

d. Future goals and expectations

11. What would you like to have in place in the future to further enhance the learning of braille? What would you help you materialize your vision for deafblind children's improvement in the field of education?

Appendix 2: Letter of introduction

I am Konstantina Spyropoulou and I am studying for a Master's in Special Needs Education at the University of Nottingham. I am currently studying for the disability of deafblindness and especially for the teaching methods that promote braille literacy to deafblind students. I would be very interested in your thoughts and beliefs on this issue. I would like to ask you a few questions relating to this topic that should take about 30 minutes of your time. You have the right to withdraw from the interview at any time and you are not obliged to answer all of the questions.

I will video the interview and I will copy it, in order to reclaim it for my research topic. I am hoping that you will consent to this and fill in the accompanying consent form providing my assistance whenever you need it.

Everything that you say will remain confidential and the only ones who will have access to the transcript will be my Master's supervisor and I. In this way, we will protect your anonymity and won't refer to your name in the research paper.

I will send you a copy of the transcript in advance so that you can provide us with any corrections and alterations you would like to make. Please do not hesitate to contact me if you have any queries about the completion of the interview. My contact details will be left in the Head Teacher of your school, as well as, the details of the University Research Ethics Coordinator whether you wish to make any questions regarding the ethical content of this research. I honestly appreciate that you are offering your time for this interview.

Thank you in advance

Appendix 3: Participant Consent Form

Project title: Teachers' contribution in deafblind students' braille literacy

- I have read the Participant Information Sheet and the purpose of the research project has been explained to me. I agree to participate in that.
- I understand the purpose of the research project and my involvement in it.
- I understand that I have the right to withdraw from the research project at any stage and this won't affect my professional or social status now or in the future.
- I understand that any information that will be gained from this study may be published, but I won't be identified and my personal results will remain confidential and anonymous.
- I understand that I will be videotaped during the interview.
- I understand that data will be stored on the hard-drive of a secure personal laptop and only the researcher and the supervisor will be the persons to have access to it.
- I understand that I may contact the researcher or supervisor if I require further information about the research and that I may contact the Research Ethics Coordinator of the School of Education, University of Nottingham if I wish to make a complaint relating to my involvement in the research.

Signed: ……(research participant)
Print name: …….
Date: ……