PALACKÝ UNIVERSITY OLOMOUC

Faculty of Education

Institute of Special Education Studies

Research on Educational Placement and School Adjustment of Children with Cochlear Implants

A dissertation presented in partial fulfillment of the requirement for

Ph.D. postgradual study programme of Special Education

by

Jiaojiao WU, ME.d

PhD study programme - Special Education Studies

Supervisor

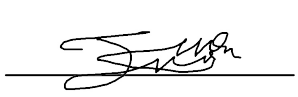
Prof. PhDr. PaedDr. Milan Valenta, Ph.D.

Olomouc, Czech Republic

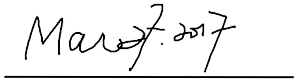
2017

Declaration of Originality

I, Jiaojiao WU (Student number D130504) declare that this dissertation entitled "Educational Placement and School Adjustment of Children with Cochlear Implants" and submitted as partial requirement for Ph.D. postgradual study programme of Special Education is my original work and that all the sources in any form (e.g. ideas, figures, texts, tables, etc.) that I have used or quoted have been indicated and acknowledged in the text as well as in the list of reference.



Signature



Date

Acknowledgements

Though it is a huge work to complete this study and dissertation writing, I love to do it. It is such a long period to finish this dissertation, teachers and friends helped me a lot, it is no exaggeration to say that without their fully support, I cannot do anything.

I am grateful to my prior supervisor Mrs. Liu Shenglin for her keen insight into this quite meaningful thesis topic and her ongoing support of this research. I have the great fortune of having Prof. Milan Valenta as my doctoral advisor when I am studying in the Czech Republic. Indeed, Prof. Valenta supported me a lot in the section of methodology and other study related activities. I am grateful to my mentor Ms. Ivana Lištiaková for her comments on the early manuscript of a pilot study, to friend Mrs Ma Lijun for her help to hand out and collect Chinese questionnaire in an institution and a helping hand to conduct field observation there. While achieving cooperation with participants in Czech, it is very helpful that Prof. Miloň Potměšil introduced an organization of families with children who have cochlear implants. With my dear friend Miss Jana Šilarová's help, the questionnaire was translated into Czech language, Prof. Potměšil further to suggest specific term uses in the questionnaire. When I was contacting with the organization to conduct questionnaire survey, Ms. Kateřina Nová suggested me to develop an electronic survey in the Czech, I am very grateful for the help from the one we had never even met. During the process of literature review, Mr. Jiří Langer's published books about deaf education provided me with valuable information about the children with cochlear implants in the Czech Republic. The literature resource for this research has been fully used with the help of Mrs. Lu Yue through literature transferring. Mr. Langer and another respectable teacher who always has gorgeous smile, Ms. Kateřina Vitásková, they offered me help in contacting with a special education center. Additionally, Ms. Jana Kvintová, as a member of thesis committee, she listed some practical suggestions for me in the defence of research topic.

Special thanks to Prof. Martin Kudlacek, we met by chance in a conference of

adapted physical education, a helping hand was offered by him to get contact with a family with children who have cochlear implants; to my friend Mgr. Kateřina Straková for her delicate translation of the abstract. In the end, I would like to give my great thanks to the children, families, and teachers who participated in this research for their help with data collection.

Abstract

This study examines the educational placement and school adjustment of children who have cochlear implants mainly through questionnaire survey and in-depth interview followed by field observation in the placement. It is a comparative study between Czech and China, a total of 43 children, specifically, 15 Czech children and 28 Chinese children with cochlear implants have been selected as participants. Through the questionnaire survey, the findings indicate the difference of children's educational placement between the two groups among a continuum of educational placement which includes regular class, resource room, deaf school, institution and home stay. The child related influencing factors as well as the family related and placement related factors contribute to the decision on educational placement. The findings suggest participant children generally adapt to the placement, which is operationalized as school adjustment in this study based on three indicators: environmental conditions, interpersonal relationship and academic study. There is statistically significant difference in overall school adjustment between the groups mainly due to the differences in adaptation to environmental conditions and to academic study. The findings indicate the significant difference in overall school adjustment of children in regular schools between the two groups, while no significant difference in overall school adjustment of children placed in deaf schools. The findings suggest participant children are receiving different stages of education in placements. Preschool children reported the highest score of overall school adjustment followed by junior high school students, primary school children and senior high school students in the Czech group, while primary school students in the Chinese group reported the lowest score. The statistic findings show several child related factors including the learning style, social skills, self-efficacy and early childhood education have significantly positive influence on school adjustment, while some other factors have been reported in this study such as multiple disabilities and parental stress are negatively correlated to the overall school adjustment. The placement related factors such as the teachers' preferred communication mode have also been

reported with a significant influence on children's school adjustment.

Respondents in the follow-up interview expressed challenges in the process of decision on educational placement and school adjustment. According to the analysis of 17 interview transcription, communication barrier with peers and poor academic performance are the common reasons for transition of educational placement being reported by both groups. A total of 9 children experienced transition of educational placements, 5 of them transferred from regular class to deaf school. Based on interview and observation, the findings indicate that especially for the Chinese participant children placed in regular classes neither receive sufficient supports nor their unique challenges or needs have been recognized. Analysis of classroom interaction suggests that for both groups, the teachers in regular class neither know sign language nor fully use basic specialized teaching skills when giving instructions, while teachers in deaf school prefer to take a bilingual approach and make the best of their skills and prior experiences in working with hearing impaired students to optimize the unique strength of children with cochlear implants. Followed the discussed challenges, this research provides glimpses of solutions have been taken by parents and teachers in improving children's school adjustment that can be helpful for other families with children who have cochlear implants and professionals who work with children who use cochlear implants to facilitate children's school adjustment. The data collected has implications for a rational decision on appropriate educational placement and achieving better school adjustment in order to support children with cochlear implants and their families.

Key words: Cochlear implants Educational placement School adjustment Czech China

Table of Contents

List of tables

List of figures

Chapter 1 Introduction

1.1 Research background

Hearing loss is the most common sensory deprivation in developed countries, with severe-to-profound Sensorineural Hearing Loss (SNHL) affecting 1 in 1,000 children born in the U.S.A. (Smith et al., 2004; Semenov & Yeh, 2013). Liu and Sun (2012) pointed that, in China, the number of under 17-year-old children with hearing impairment reaches 578,000, 137,000 of them aged from 0-6 years old. 74% of them have moderate or severe hearing impairment. In the Czech Republic, the total number of hearing-impaired people is estimated according to the Results of the Selection Examination of Disabled People (2007) carried out by the Czech Statistical Office in cooperation with randomly chosen general and children's physicians, was estimated to be 75,000, which accounts for 0.75 % of the whole population (Langer, 2013). In the past, for achieving hearing world, the people with hearing impairment would like to choose technical compensation devices such as hearing aids, however, it is ineffective for severe or profound hearing impaired people. With the development of technology, a piece of good news was soul stirring, cochlear implant brought an access for the people with severe or profound hearing impairment to a hearing world. It was one of the most important technological breakthroughs in the field of biomedical engineering in the second half of twentieth century. Cochlear implant is intended for completely deaf individuals and individuals with the practically non-utilizable remainder of the hearing, which is totally an amazement makes the deaf hear and the mute speak. The principle is based on electric stimulation of the preserved fibers of the auditory nerve, to imitate the function of non-damaged cochlea. The acoustic signal detected by the microphone is, similar to the analogue hearing-aid, transformed into a sequence of electric impulses. Multi-electrode located in the inner ear to stimulate the auditory nerve fibers and evoke auditory perceptions, thus, electric impulses which are transmitted to the implant circuit beneath the skin behind the ear where they are appropriately

processed by speech processor.

The study by Peters et al. (2010) reported that 35 well-known large scale (more than 250 cochlear implantation) cochlear implants centers in the range of Canada, the United States, Europe and Australia provided cochlear implants for a total of 23,200 users from all over the world. Among these cochlear implants users, 70% of them are children, and 33% of them aged 3-10 years old. Globally there are over 250 million persons with hearing impairment of whom 2/3rd are in developing countries (Vinila et al., 2013). Till 2012, the number of people with cochlear implants is 250,000 in the world. According to the 12th Five-year-plan (2011-2015), the Chinese government would financially support 4,000 cochlear implants surgery annually, which means till the end of year 2015, plus the population before 2011, there are more than 30,000 people with cochlear implants. Another data has shown that about 400,000 zero to six-year-old children with hearing impairment in China and 13,000 of them have cochlear implants by 2012 (Wu, 2014). Since 2011, because Chinese domestic Nurotron cochlear products came into market, more and more people with severe hearing impairment were able to afford to do the cochlear implantation surgery. In fact, the number of people who implant cochlear was increasing annually (Liu et al., 2012) in China, moreover, more and more children with severe hearing impairment got cochlear implants at much earlier ages than before. In the Czech Republic, the Ministry of Health established the Center for Children's Cochlear Implants (CCCI) in 1996 in the second Medical Faculty of Charles University. According to Langer (2013), the Teaching Hospital Prague-Motol is the only location dealing with the issue of cochlear implants, where the nucleus of the Australian company was used for children and adolescents under-18 years old. Till 2012, approximately a total of 450 children and 100 adults accepted cochlear implants across the country.

The number of children who have received cochlear implants is growing mainly because eligibility criteria have broadened (Kirk, Firszt, Hood, & Holt, 2006). In the past, it was not suggestible that children with autistic spectrum or other severe multi disabilities to implant. At the same time, the population of young children with

implants has become more diverse than before (Zeng, 2004). Children with profound hearing loss had been eligible for unilateral cochlear implants since 1990 in Canada. While in the study of Peters et al. (2010), the proportion of bilateral cochlear implant accounted for 36%, among 23,200 cochlear implant users. Because of advantages of bilateral cochlear implants, the number was expected to increase. Bilateral cochlear implants improve sound position and speech discrimination in noise environment (Sparreboom et al., 2010). More and more under 3-year-old children receive bilateral cochlear implants, and most of them receive implantation simultaneously rather than successively implantation.

It is also worth noting that children receive cochlear implants at younger age than before and the number of children with cochlear implants is increasing annually. Prior to 1985, the U.S. Food and Drug Administration (FDA) required implant candidates to be at least 18 years old. Overall, the typical implantation age is 4-year-old, from 1990 to 2000, that age requirement was lowered to 12 months of age for children with profound hearing loss and 24 months for children with severe hearing loss. A research conducted by Christiansen & Leigh (2004) about 62 children with cochlear implants, age ranging from 2 to 20 years, and the age at implantation ranging from 15 months to 17 years. In the study of Wu (2014), the youngest implantation age was 6-month-old.

All of these children would face problems of sensory device and communication mode choosing, educational placement and school adjustment as well. However, study of children with cochlear implants remains relatively new to the literature about education and school adjustment and to the caseloads, clinics, and classrooms of professionals who work with these children. According to researches (Svirsky, Teoh, & Neuburger, 2004; Connor, 2006; Marschark et al., 2007), children with cochlear implants have demonstrated benefits to hearing, language, and speech from implants, leading to assumptions that early implantation and longer periods of implant should be associated with higher reading and academic achievement. Archbold et al. (2002) and Fortnum et al. (2002) confirmed the effect of cochlear implantation on education setting in favor of mainstream placements, noting that the

shift in placement roughly equates the pupils with cochlear implants with severely deaf pupils of the same age, more school-aged deaf pupils with cochlear implants moved in the inverse direction over time (Thoutenhoofd, 2006; Marschark et al., 2007). Recent studies (Wu, 2014) reported that generally parents hold highly education expectation, although phenomena of some children with cochlear implants transferred from regular school to deaf school were found, however, on the whole, parents tend to regular school educational placement.

In this research, the author focuses on the implementation of the educational placement and school adjustment of children with cochlear implants, with making a comparison in both countries of China and the Czech Republic. China, officially the People's Republic of China, is a developing country in East Asia, with population of 1,376,073,129 (National Bureau of Statistics of China, 2016) of 56 recognized ethnic groups, covering 9.596,961 square kilometers, is the world's most populous country. The Gross Domestic Product (GDP) was worth 10.98 trillion US dollars, with a per capita 7990 US dollars in 2015. The Human Development Index (HDI) was 0.727 (United Nations Human Development Report 2015). It exercises jurisdiction over 22 provinces, five autonomous regions, four direct-controlled municipalities (Beijing, Tianjin, Shanghai, and Chongqing), and two mostly self-governing special administrative regions (Hongkong and Macau), and claims sovereignty over Taiwan. While the Czech Republic (Česká Republika) is a landlocked developed country locates in Central Europe bordered by Germany to the west, Austria to the south, Slovakia to the east and Poland to the northeast, with a proximate population of 10,557,731 until January of 2017 (United Nations Department of Economic and Social Affairs: Population Division), covering an area of 78,870 square kilometers. Czech has substantially higher rank of HDI (0.870) than China according to the 2016 annually year report (United Nations Human Development Report 2015). Czech Republic population density is 133.9 people square kilometer by calculating permanently settled population divided by total area within international boundaries and coastlines, while China population density is 145 persons square kilometer calculating only by land area. The GDP in Czech Republic

was worth USD 185.16 billion, with USD 20,955.50 per capita in 2015. Base on both countries' background, to introduce the educational or school system, as well as to compare educational placement and school adjustment of children with cochlear implants between the different social contexts, which will be interesting and meaningful.

1.2 Research aims

The purpose of the present study is to examine the implementation of the educational placement of children with cochlear implants from two different social contexts, China and Czech and to explore the process of appropriate choosing educational placement and positively adapting to placement based on protective influencing factors on educational placement and school adjustment. To be more concrete, the purpose of the study can be described as follows:

To investigate educational placement of participant children with cochlear implants from China and the Czech Republic;

To compare the difference of educational placement of children with cochlear implants between Chinese and Czech participants;

To explore influencing factors contributing to the decision on educational placement of children with cochlear implants;

To compare the difference of influencing factors contributing to the decision on educational placement between Chinese and Czech participants further to explore appropriate educational placement choice;

To investigate school adjustment of children with cochlear implants from China and the Czech Republic;

To compare the difference of school adjustment of children with cochlear implants between Chinese and Czech participants;

To explore the influencing factors contributing to school adjustment of children with cochlear implants;

To compare the different influencing factors contributing to school adjustment between Chinese and Czech participants and propose positive intervention strategies which have been shown effective in school adjustment to the children with cochlear implants, parental and school educators, practitioners and policy-makers.

1.3 Research significance

As stated above in the opening section of introduction, in recent years the number of children with cochlear implants is still rising, especially in some developing countries, for instance, China, most children face the issue of receiving education. However, as discussed in the following literature review, it is important to know that even though a great deal of efforts have been made to support medical technology of cochlear implants and followed-up rehabilitation, most literature on the children with cochlear implants focuses on their rehabilitation after implantation and their language development, a few early researches examine their educational placement, this study provides a full view on both educational placement and school adjustment that currently does not exist.

In addition, people in the worldwide might hold different views of deaf persons and sign language, as discussed in following section of literature review, some argue that deaf persons are minorities who use sign language in deaf community. Except the possible deaf culture difference, under different culture background, because of different social security system and education system, it is very interesting and meaningful to compare the educational placement and school adjustment of children with cochlear implants in China and Czech, and influencing factors contribute to them. This research has important implications for both China and Czech education for the children with cochlear implants. There is growing concern, especially in China, with a large population of hearing impaired, that more and more young cochlear implant users need to choose alternative educational placements rather than going to deaf school.

Actually, nine-year free national compulsory education had been completed in

China since 2008. With the economic growth and social development, in some autonomous regions such as Tibet, and rural counties such as in Gansu and Qinghai province, students have access to twelve-year national compulsory education for free (Ministry of Education of the People's Republic of China). According to the national policy of “Two free and one subsidy”, from the year of 2001, the government provided students in minority regions, rural areas and the students with disabilities with not only free education and free textbooks, but also monthly subsidy with an aim of equal access for all children to education. A great deal of effort has also been made by the central government in the past thirty years to improve the school enrollment of children with disabilities. A large number of students with hearing impairment, including the cochlear implant users especially in rural areas learn in regular schools (Ministry of Education of the People's Republic of China) near home, to fully support and service them, it is urgent to do researches about their educational situation.

So, this research is concerned with addressing problems under investigation as they were perceived by participants themselves and educational placements including regular and special schools, organizations. Findings are intended to have an immediate and practical value for the parents with children who use cochlear implants and/or cochlear implant users who will face decision on educational placement or will have placement transitions. The study results desirably support them to choose appropriate educational placement. Based on research findings and implications from the family experiences, recommendations of practical strategies for educational placement are stated in the last part of the paper. For those who have been in educational placement, the present study of school adjustment and its influencing factors further concrete strategies for a better adjustment. Some other profit involved groups such as policy-makers and/or teachers who work with children with cochlear implants, evidence-based indicators and associated implications for intervention are provided. Ideally it should be of consequence to researchers for further studies.

Chapter 2 Literature review

2.1 Cochlear implants

In this chapter, the author presents literature review of the children with cochlear implants and their families, the rehabilitation and assessment of cochlear implants, followed by a subsequent discussion.

2.1.1 Cochlear implants and the family

In this section, a literature review on the children with cochlear implants and their families will be discussed mainly in four parts: 1) the families' decisions on cochlear implants, 2) unequal chances for cochlear implants access; 3) deaf parents' perspectives on cochlear implants, 4) the impact of cochlear implants on deaf identity, and 5) the impact of cochlear implants on the families.

1) Families' decisions on cochlear implants

Family is the main area of daily life and activities for children, most parents were shocked when their child with disabilities was born in the family, which is similar with when a child was diagnosed with hearing impairment. The most salient family reactions to the diagnosis (Liu, 2010) were described as despair, denial, shock, grief, anger, collapsing and so forth. and some parents felt sorrowful, shameful, and helpless (Wu, 2014). Diagnosis of hearing impairment cannot be seen as a single event, on the contrary, it is a long process which may well produce marked effects on family and which may continue to challenge the family to cope with (Wu, 2014). Another challenge emerges, which means the difficulty for parents to decide whether choose cochlear implants because they were haunted by a package of problems including cochlear failure (Moores, 2009), potential surgical complications, social psychological negative impact, daily life inconvenience, the high cost of cochlear implants surgery and postoperative rehabilitation (Allegretti et al., 2008), and so forth. Parents may worry about potential risks about implantation surgery such as facial nerve injury, meningitis, cerebroposinal fluid leakage, perilymph fluid leak,

and infection. Risks may also come from the use of cochlear implants such as device fail, inability for some specific medical examinations like Magnetic Resonance Imaging (MRI) or electrical surgeries. The driving batteries for implants must be recharged regularly. Cochlear implants should be used away from static electricity and hearing strange sounds caused by magnetic fields. Moores (2009) had reservations about both the relative efficacy and advisability of cochlear implants with very young children and suggested the extent of hearing loss is not the only factor in making a decision that should be tailored to the individual child. Overall, families reported the decision making process was difficult and stressful (Wu & Liu, 2013), which was influenced by family beliefs, perspectives and economic status and even by other external factors (Li et al., 2003; Christiansen & Leigh, 2002) such as community where they lived. Hyde, Punch, & Komesaroff (2010) found that medical professionals usually had great influence on whether family made a decision of cochlear implantation. The child-centered approach to cochlear implants was suggested by Nevins (1996), to achieve the goal, a multi-disciplinary team of professionals (Langer, 2013) were involved, which includes otolaryngologists, clinical psychiatrist, speech-language specialists, clinical engineers. A successful operation must be performed by the cooperation with other specialists such as neurologists, radiologists, an anesthetists, and surgeons.

For most of the parents who choose cochlear implants, basically considering the possibility of access to the hearing world (Christiansen & Leigh, 2004; Archbold et al., 2006), which is the main decision in mainstreaming society. Followed the reason of looking forward to more employment opportunities, and the development of oral spoken language, varied, generally, parents reported a high expectation in language development. Other reasons were cited by parents including safety or environmental awareness, hearing ability, children’s expressed desire for an implant, convenience in daily activities, a better future with more opportunities and concern for child's self-image. To summarize, choosing a cochlear implant and/or a resource is a family decision, which should take into account each child's and the family's particular circumstances.

2) Unequal chances for cochlear implants access

Even though the US National Association of the Deaf decided to re-evaluate its position on cochlear implants for young children in the documentary Sound and Fury (2000), by January 2000, over 18,000 Americans received cochlear implants. In the latest twenty years, the number of children received cochlear implants is growing (Edwards,2005; Moores, 2009) mainly because eligibility criteria have broadened (Zaidman-Zait & Most, 2005; Kirk et al., 2006; McCracken & Turner,2012), and the population of young children with implants has become more diverse than before (Zeng, 2004). In another word, the assessment for suitability to proceed to cochlear implantation has been broadened for children with severe hearing impairment to deaf children and those children with other disabilities like cerebral palsy.

On another hand, not everyone owns equal chances to choose cochlear implants. Hyde & Power (2006) demonstrated in a study that the inequalities in cochlear implantation access on the basis of race, presence of an additional disability, and socioeconomic status. To be specific, there are more cochlear implants cases exist among white people than other non-white groups in the study. Additionally, the number of White and Asian American children with cochlear implants was five times higher than expected on a population proportion basis than children of Hispanic origin and 10 times higher than African American children. The study also reported that there were more cochlear implants cases among the people who live in high social economic area/status than those who live in low social economic development area/status; the children who only have hearing impairment more likely to choose cochlear implants than those who are diagnosed as multi-handicapped. Even though the selection criteria have broadened, cochlear implants recipients may also excluded some children whose additional disabilities are identified considering practical implications and future outcomes, particularly from a psychological perspective. Autistic Spectrum Disorder was regarded as the major difficulties for communicating effectively, deaf autistic children are not usually considered good candidates (Edwards L. C., 2007). for cochlear implants. Thus only diagnosed after they have received an implant is as the term ASD implies, there is a range of level of

disabilities in autistic children, with some relatively minor social communication difficulties and little or no general cognitive impairment, through to severe language, cognitive, and behavioral difficulties. Waltzman, Scalchunes, and Cohen (2000) documented the progress of 29 children with disabilities ranging from attention-deficit disorder, dyspraxia, or central auditory processing disorder to autism, learning disability, or cerebral palsy.

Additionally, the family with hearing impaired children urgently need of information from medical center and special education professionals, as well as experiences of other cochlear implants users because they are experiential in coping strategies to go though postoperative period. However, the family in different societies may be unequally informed information, which is really depends on the development of any specific society.

3) Deaf parents' perspectives on cochlear implants

Typically there are two primary perspectives on deafness (Edwards, 2005; Lane, 2005), which are cultural and pathological/medical perspective. Deafness is viewed as a pathological /medical deficiency and the focus is on the deficit or disability. They want hearing aids or cochlear implants to correct the hearing loss, but the cultural does not want. While from a cultural stance, being Deaf is viewed as a way of life rather than as a disability. In deaf culture, the uppercase "Deaf" is used to identify those who are members of the deaf community from the cultural perspective. Being deaf is not a deficit, but a gain that contributes to cultural and linguistic diversity in society (Bauman & Murray, 2010; Young, 1999). The Deaf identify themselves as an ethnic identity, simply a linguistic minority instead of a physical condition. Lane (2007) defined Deaf people as those in a minority group who use signed languages, calling them members of Deaf-World and identifying them as an ethnic group rather than a group of people who share a disability. In fact, Deaf-World members actually meet the characterization criteria defined by social scientists as an ethnic group. For instance (Lane, 2007), they share the same norms for behavior, values, knowledge, customs, language, and social structure.

From their point of view, the technical all forms of hearing aids erode the deaf

culture, what they need is not any kind of scientific equipment, but the universal understanding and acceptance of deaf culture in the whole society (Edwards, 2005). As King Jordan, president of Gallaudet University quoted, “Deaf people can do anything except hear.” The Deaf or some other hearing-impaired parents without cochlear implants are opposed (Peters, 2000) by some spokesman for the Deaf community to reject cochlear implants. They advocate an attitude adjustment (Moores, 2009) to avoid another lost generation of deaf children. Decision on cochlear implants in a specific context is really complicated, such as in a family with deaf parents who live in Deaf community. Humphries and colleagues (2012) argued that cochlear implants may not only cause physical harm, but also result in cognitive and linguistic deprivation of sign language for deaf generation.

It should be given notice that in some previous studies (Thoutenhoofd, 2006; Wu, 2014) of pupils with cochlear implants placed in deaf school they recognize themselves as Deaf and they use sign language as well regardless of they are being able to hear and speak. Additionally, for some persons who live in the Deaf community, their personal experience illustrate that they can also live a successful life the same as the hearing people, which brings them confidence and sets a model for their children. However, because 90% of deaf children have two hearing parents, only a minority of deaf community members acquires their cultural identity and distinctive social skill at home. Most deaf children learn deaf culture in schools for the other deaf children, teachers, and dormitory leaders. Edwards (2005) analyzed a documentary Sound and Fury (2000), the Deaf brother married to a Deaf woman and a hearing brother married to a child of Deaf adults, their different choice in cochlear implant from a historical perspective. Parents are the chief decision makers concerning cochlear implantation, most of them visit other parents who have children with cochlear implants to obtain more references and know more experiences (Nunes et al., 2005) in advance.

It is not easy for deaf parents to let their children have cochlear implants because they want their children same thing like their parents have, vice versa. Hence cochlear implant users predominantly come from hearing families in the past, and it

was not common for Deaf parents to have their children implanted. In the late 20th century, the Deaf community strongly felt cochlear implants affected Deaf culture and the cohesiveness of the Deaf community (National Association of the Deaf, 1991). Currently, the number of deaf children with Deaf parents receiving cochlear implants was gradually increasing (Dettman et al., 2012; Hardonk et al., 2011; Hassanzadeh, 2012; Hyde et al., 2010; Mitchiner & Sass-Lehrer, 2011). Some cochlear implant users reported they use both oral and sign language the same time because they want to be in both worlds of hearing and deaf. Especially for those children who have hearing families and hearing peers in addition to deaf family members and peers, the situation enables them to have the best access to both hearing and deaf worlds. That is also the expectation of their parents.

4) The impact of cochlear implants on deaf identity

Identity is vital for human development (McIlroy & Storbeck, 2011), it is a complex issue based on a set of common experiences, values, social beliefs, behaviors et cetera. People own the conscious recognition of the self as having a unique identity. Minorities use different strategies to achieve positive social identity or "individuals' affiliations with their groups" (Tajfel, 2010). Some people achieve it by mainstreaming or working with other group members in the same minority to bring about social change, or use a combination of both strategies.

Glickman (1993) modified the Deaf Identity Development Scale to examine how hearing and deaf adults identify themselves. While deaf people hold experiences in common and share a sense of belonging to Deaf, this feeling of belonging is called Deaf-identity. The Deaf identity is marked by the use of sign language and the sense of belonging to the Deaf in social relations. As discussed above, in the Deaf culture, the deaf people live in Deaf community shared common experiences that are influenced by deafness, as the means of communication, sign language represents the community. Since the language is the key factor in shaping of identity, sign language is a very important indicator to concern of Deaf identity. Bat-Chava (2000) argues that those people with stronger culturally deaf identities have higher self- esteem than those with weaker deaf identifies. While those who consider the deafness as an

audiological condition, they choose a medical treatment to receive cochlear implants. Some cochlear implant users argue that they are hearing people, since they can hear and speak (Wu, 2014). Leigh et al. (1998) studied the cultural identity paradigms and pointed out the deaf identity development is a process. Although good cochlear implant users could communicate with their hearing parents mainly in means of spoken language, it can never be as complete as for hearing people (McIlroy & Storbeck, 2011) because of affected communication with hearing people whether with individuals or in groups.

Research has found that the people who are in marginalized groups such as the person with a disability or those from Black and minority ethnic groups, benefit from the support of others who share the same experiences. Bat-Chava (2000) studied the diversity of deaf identities though the use of cluster analysis and was quoted the difference of "stronger deaf identity and weaker deaf identity". A deaf-led organization, Deaf Ex-Mainstreamers' Group (DEX) found deaf children in the mainstreaming schools tend to have a "think-hearing identity". In the study of Wu (2013), it was discerned that the cochlear implant user who has communication barrier with hearing people called himself "the marginalized". Another study of her (Wu, 2014) has shown that some children with cochlear implants have strong deaf identity, in addition to language barrier, which is the main reason cause placement transition to deaf school. There in the deaf school, with other deaf persons just like in the same boat, they benefit from the support of deaf peers and deaf teachers who hold experiences in common.

5) The impact of cochlear implants on the families

After cochlear implantation, families still face challenges from post operation, especially long term rehabilitation processes. The family members hold great expectation of effectiveness of cochlear implants, at the same time they face huge pressure from post operation. It is also a tough question for the family to have a language choice.

Family stress

The experience of having a child with cochlear implant often has a significant

impact on the family (Bailey & Powell, 2005; Zaidman-Zait, 2007). Family life circle refers to the change and transitions that confront families over time. After implantation, families regulate even some daily activities such as routinely rehabilitation in center, family intensive practice at home and so on and so forth. Family interactions, which include the marital, parental, sibling and extended family subsystems could be changed as well in order to meet the needs of each member. The maternal high stress level mainly is due to the communication difficulties and dissatisfaction relationship with professionals (Zaidman-Zait & Most, 2005; Meadow-Orlan, 1990). A family is functional when it is able to comprise the responsibilities that the family must fulfill, otherwise, it is dysfunctional. Allegretti (2002) interviewed immediate family members of a single family with hearing impaired child before, during, and after cochlear implantation, observed speech therapy session before and after implantation to evaluate the effects a cochlear implant on the family. Findings demonstrated some common themes concerning ambivalence, fear, anxiety, impatience and transformation. Usually parents individually and jointly involve in rehabilitation in different levels of action Zaidman-Zait A., Young R. A. (2008). After cochlear implantation, during process post operation rehabilitation, the family plays important role which bring them high pressure (Zaidman-Zait & Most, 2005; Liu, 2010; Zheng, 2010), specifically the main care giver usually the mother of child who simultaneously confront with the stress of . Considering the family commitment, and their sense of self-efficacy, coping strategies, families with hearing impaired child have different level or family resilience (Liu, 2010; Zheng, 2010). Beadle et al. (2000) examine the perceptions of the impact upon the family of cochlear implantation, and stressors affecting the families and about factors that help families to cope with. In another study of parental coping experience, Zaidman-Zait (2007) conducted through critical incident technique asking parents to describe significant incidents when they were parenting children with cochlear implants. Results (Beadle et al., 2000) demonstrated that the child, the parent and social contextual aspects facilitate parenting experience. Social contextual aspects may include social support, professional intervention, sharing

experience with others, extended family members and friends' consistent involvement. A comparative study (Weisel et al., 2007) of maternal stress and expectation among parents of candidates of cochlear implants, 0–3 years post-implantation, and more than 3 years later. The study has shown several interesting results, including the higher education level of parents correlated with lower stress levels; older mothers' lower level of family cohesion; less balanced adaptability and cohesion correlated with lower level of family function; additionally, however in this study the deafness is not necessarily associated with high levels of family stress and no evidence for a decrease in stress levels following cochlear implantation.

Family expectation

From the point of cochlear implants and assistive technology, there are some misconceptions exist about the benefits individuals receive from cochlear implants. Clinicians and researchers can make some generalizations about outcomes but they cannot predict the exact outcome that any individual will achieve. Parental high expectation may serve a positive function in inspiring strong motivation and goal orientation (Zaidman-Zait & Most, 2005) for parents' involvement in rehabilitation process. On the contrary, pessimistic attitude hinder motivation and action (Taylor & Brown, 1988; Bandura, 1997). Some parents hold unrealistic expectations to cochlear implants despite of child's real specific situation. Unrealistic expectations to cochlear implant or could be a detriment to the rehabilitation process. Zaidman-Zait and Most (2005) employed a questionnaire of Impact of Childhood Hearing Loss on the Family (Meadow-Orlan, 1990) to investigate maternal expectations of the children with cochlear implants and impact on the family (see family stress). The questionnaire is comprised of three subscales including family stress, communication, and relationship among family members and professionals. Results of this study has shown that parental expectations following cochlear implantation are in the areas of rehabilitation process, communication, social skills, academic achievement, future change, and overall impact of childhood hearing loss. A review of 7-year-longitudinal studies (Belzner & Seal, 2009) and the study of

Pearson correlations reported that positive correlations between communication, social skills, and academic achievement. The mother who held high expectation of communication ability also held relatively high expectation of social ability and academic achievement. In generally, professionals should focus on parental concerning the demanding post-implant rehabilitation process and try to remain nonjudgmental and lead parents to adjust for adaptive expectation.

Language development for bilinguals

Based on interviews (Wu, 2014) of main caregivers of child with cochlear implants, for most of families, the primary goal of cochlear implantation is to facilitate spoken language development, especially for the young implant recipient. However, it is not an easy decision on communication mode after cochlear implants, further, frequently, parents are the chief decision-makers. Language development (Archbold & O'Donoghue, 2009; Marschark, Rhoten, & Fabich, 2007; Moores, 2009; Spencer 2004a) had been a focus when consider the studies of children with cochlear implants. As most of the people may know that there are similarities and differences between first and second language learning. First and second language learners follow similar stages of development (McLaughlin, 1987); however, language acquisition in younger second language learners often differs from older second language learners (Nicholas & Lightbown, 2008). Children acquire language differently than adults until the age of seven, then, language is acquired at the same rate as adults (Genesee, Paradis, & Crago, 2004). Cummins (1979) proposed a theory of developing two kinds of language proficiency: the first kind is basic interpersonal communicative skills (BICS) and the second kind is cognitive academic language proficiency (CALP). BICS are language skills needed for social purposes and are context embedded and are not cognitively demanding. Whereas, CALP requires academic learning and the language is more cognitively demanding and the context is reduced. Cummins (1979) argued that different time periods are required to develop BICS and CALP. Typically, one may develop BICS within about two years after the second language was introduced and take around five years to catch up to native speakers in developing academic aspects of the second language.

Revisiting bilingual language policy for deaf children and language planning (Knoors & Marschark, 2012), several differences in language development between monolinguals and bilinguals cannot be neglected: 1) the amount of vocabulary in one or both languages (Nicoladis & Genesee, 1996); 2) the language transfer between the first and second languages (Yoshida, 2008); 3) the code mixing and alternating production between both languages (Genesee, 2008). Young bilinguals tend to have a smaller vocabulary in each language compared to monolinguals; however, combining the vocabulary from both languages is similar to the size of a monolingual's vocabulary. Bilinguals have the ability to transfer knowledge from their first language when learning concepts in a second language. When learning two or more languages, a natural part of bilingual development is for children to code switch between both languages, depending on the context of the conversation (Genesee et al., 2004).

Vygotsky (1986) states that learning occurs through social interaction in his socio-cultural theory. Children receive cultural beliefs and experiences mainly from families through their interaction. The cultural development in young children happened for both socially and psychologically. Similarly, children also learn from others to receive experience and knowledge. Language input, language status, access to literacy, family language use, and community support are just a few of the socio-cultural factors impacting a child's bilingual development, with language input having the greatest effect (Pearson, 2007). Children must continue to learn and use their first language in order to become proficient in their first and second languages. Having a positive attitude about bilingualism can also increase language proficiency in children's first and second languages. As a cultural-linguistic model of deafness, sign language is a natural and fully-grammatical language used by the Deaf community (Young, 1999). For deaf children, a bilingual approach, becoming bilingual in both sign language and spoken language requires hearing families to adopt the cultural-linguistic model. However, in the beginning, many hearing parents usually do not know anything about sign language or what it means to Deaf. Once they decide on a bilingual approach for their children, they should learn sign

language and maintain the bilingual environment at home. To stress the negative effects of deafness on spoken language acquisition, many clinicians advise against sign language, believing that it may slow down spoken language development. However, lots of evidences support that knowing sign language does not interfere with spoken language development (Preisler & Tvingstedtand, 2002; Yoshinaga-Itano, 2006; Jiménez et al., 2009). Alone, an auditory/oral approach may not be an optimal approach for all children with cochlear implants in all contexts. This issue causes researchers, educators, and medical professionals to debate if withholding sign language in cochlear-implanted deaf children's language education detracts from their language, communication, literacy, academic, and socio-emotional growth (Gale, 2010).

A bilingual approach supports the development of two communication modalities, visual and auditory, may scaffold (Nussbaum & Scott, 2011; Nussbaum, Scott, & Simms, 2012) the development of spoken language for children with cochlear implants. Swedish psychologist Preisler and colleague Tvingstedtand (2002) conducted a longitudinal study of deaf preschoolers with cochlear implants in Sweden that explored patterns of communication in natural interactions between children and their parents, teachers, and peers. The children in the study received their cochlear implants when they were between one and four years old. The analyses of the interactions has shown that children who had the best oral skills were also well-versed in a signed language (Preisler & Tvingstedtand, 2002). Children who used sign language in the study demonstrated an awareness of the language's communicative function by incorporating several strategies to clarify misunderstandings such as asking for repetitions or for more information. In her case study on language outcomes for deaf children with cochlear implants, audiologist and researcher Dr. Christina Yoshinaga-Itano (2006) reported that children's spoken language development benefitted from knowing sign language. Children in the study had substantial signing vocabularies before their cochlear implantation and increased spoken vocabularies very soon after their implantation. These children were able to transmit their first-language, sign, into their second language, spoken language, and

increase their spoken vocabulary in a short time. Spanish psychologists, Jiménez, Pino & Herruzo (2009) conducted a study to compare two groups of deaf children with cochlear implants on their speech intelligibility, receptive vocabulary, and psycho-linguistic skills. Children in the first group were educated in spoken English and the second group of children was educated through bilingual approaches in spoken and signed languages. It was not clear about what bilingual approaches were used, for example, whether both languages were used simultaneously or separately. The result shows the bilingual group as having better verbal and manual expressions, namely, hand gestures, while expressing in spoken language, comprehension of visual symbols, and visual fluency (Jiménez et al., 2009). They also have better results in verbal fluency and larger vocabularies than the only spoken groups. However, the spoken groups performed better in speech intelligibility, auditory reception, and grammatical closure. They also outperformed the bilingual group in pronunciation, oral comprehension, and grammatical rules. There were no significant differences in their receptive vocabulary, social and communicative skills, visual reception, auditory and visual association, visual closure, and visual or auditory sequential memory. The study found the overall differences in speech development in both groups to be insignificant; however, it recognized that the bilingual group had better verbal fluency, means that they have greater vocabularies than the spoken group (Jiménez et al., 2009). To achieve bilingualism, it is important to experience early communication through family interaction. In this sense, the infant cognitive develop, later on, they are capable to acquire world knowledge through open communication and acculturation in both languages world (Grosjean, 2010).

Decision on communication mode

Families face special challenges in making language-related choices for their deaf children due to the uniqueness of being deaf (Archbold et al., 2008; Archbold & Wheeler, 2010; Meadows-Orlans et al., 2003). The greatest challenge that families with deaf children face is to choose which method of communication is most appropriate for their deaf child (Eleweke & Rodda, 2000; Stredler-Brown, 2010). Families making decisions, like whether or not to include sign language in a deaf

child's language education, often overlook the importance of timing. Researchers investigated families with children who have cochlear implants and their communication options before and after implantation (Huttunen & Välimaa, 2010; Watson, Archbold, & Nikolopoulos, 2006; Watson et al., 2008; Wheeler, Archbold, Hardie, & Watson, 2009). Linda Watson, a teacher of the deaf and also an educational audiologist, with her colleagues (2008) performed a survey of families whose children have cochlear implants. In this study, 119 out of 142 families changed their communication approach after implantation. Before implantation, families reported to use sign language, gestures, and speech, but after implantation, most families made a complete switch led by child (Chute & Nevins, 2006; Watson et al., 2006, 2008; Archbold & O'Donoghue, 2009; Huttunen & Välimaa, 2010) from sign to spoken.

In fact, other studies (Archbold & Wheeler, 2010; Bailes, Erting, Erting, & Thumann-Prezioso, 2009; Snoddon, 2008; Young, 2010) have revealed that providing deaf children with an accessible language in a timely manner is optimal for cognitive development. Spoken language may not be fully accessible to deaf children, and that may lead to language delays. However in reality, unrealistic expectation lead some parents to subtractive signed learning situations (Skutnabb-Kangas, 2003) such as removing sign language from a family interaction or even in school. Rinaldi and Caselli (2014) conducted a longitudinal case study about an Italian child from the diagnosis of hearing loss to 6 years old. Before 2 years old, the child solely used sign language, after cochlear implantation, he switched to mainly use spoken language and use sign language as a complement only when in necessary situations. Though assessment of various aspects of linguistic skills by using age-appropriate tools, the study has shown that language development, lexical comprehension and production, and expressive skills of the given sample. Families need to consider the importance of providing deaf children with full, accessible, and natural language as early as possible in order to equip their child for academic achievement (Goldwin-Meadow & Mayberry, 2001). A variety of factors impacting a family's decision on language choices for their child after

cochlear implants (Eleweke & Rodda, 2000; Meadows-Orlans et al., 2003; Young et al., 2006; Young & Tattersall, 2007). In order to explore influencing factors of family decision on communication mode, Eleweke & Rodda (2000) interviewed two families, one of them chose British Sign Language (BSL) and the other family chose an aural/oral approach. The study has shown that three main factors influence the language choices, including available information from professionals, professional perspectives considering variety of communication modes, the availability of supports. Some medical professionals (Stredler-Brown, 2010; Hintermair & Albertini, 2005) may overly simplified decision-making process by providing the deaf or hard of hearing early access to auditory sounds but neglecting quantitative comprehensible language input during infants' critical period of language development. Study evidence demonstrates that families and medical professionals may not be aware of the benefits of using visual and sign to support communication (Archbold et al., 2008; Bat-Chava & Deignan, 2001; Hyde & Punch, 2011).

In the past, families were rarely well informed about the benefits of bilingualism (signed and spoken languages) for deaf children with cochlear implants (Hyde et al., 2010). But sign language is beneficial for children in communication, language learning, social-emotional and cognitive development (Preisler & Tvingstedtand, 2008). Nowadays, an increasing number of Deaf families desired their children to be bilingual and bimodal (Mitchiner & Sass-Lehrer, 2011; Sass-Lehrer, 2016). Mitchiner (2012) developed a theoretical framework to understand the relationship between families' beliefs and their children's bilingual development. The framework involves a variety of variables, which includes language ideologies, bilingualism, unpacking deafness as a disability, family language policy, cultural identity, language and cognitive development, and socio-cultural factors. They want their children not only to be academically successful and bilingually fluent in sign language and written English, but also to be competent in spoken language. Mitchiner (2012) revealed that for deaf families, 62.5% children with cochlear implants preferred spoken English in educational placement, which is different from the preferred language use at home. Most literature on the topic is exclusively

focused on the experiences of hearing families and the decisions and opportunities they face with a deaf child (Archbold, Sach, O'Neill, Lutman, & Gregory, 2006, 2008; Li, Bain, & Steinberg, 2003; Sach & Whynes, 2005; Steinberg et al., 2000; Watson, Hardie, Archbold, & Wheeler, 2008). In the studies, hearing families predominantly prefer for their deaf children with cochlear implants to develop spoken language skills (Archbold et al., 2008; Hyde, Punch & Komesaroff, 2010; Zaidman-Zait & Most, 2005). Some hearing families also value the use of sign language with their children who have cochlear implants in hopes that it will accelerate social, emotional, and academic development (Christiansen & Leigh, 2002; Hyde & Punch, 2011).

Parents have mixed experiences when getting information from persons who live in the deaf community. In deaf community, deaf parents mainly through sign language (Thomas Allen, 2002; Hoffmeister, 2000) pass their value and culture identity to the next generation. Language plays an important role in the development of self-identity (Fernández, 2006). While in some specific societies (Wu, 2014), families were pushed to choose English only because of mainstreaming. Deaf children with Deaf parents are provided with rich and accessible visual language after birth which can lay a foundation for learning a second written and spoken language if children are later given cochlear implants. A few researchers have explored Deaf families' experiences (Dettman, French, Constantinescu, Dowell, & Rousset, 2012; Hardonk et al., 2011; Hyde et al., 2010; Meadows-Orlans, Mertens, & Sass-Lehrer, 2003; Meadows-Orlans, Spencer, & Koester, 2004) and beliefs from a sociocultural perspective and to evaluate the role bilingualism plays in the language development of children with cochlear implants learning sign language, written and spoken English. The results have shown that deaf children who learn sign language benefit from language, educational, and communicational advantages. Baker (2011) cited a strong body of evidence, which documents the linguistic advantages of early visual language for all children, both deaf and hearing. Neuroscientific research validates that the brain has the capability of learning two or more languages as well as learning them through different modalities: spoken, visual,

and written (Petitto, 2009). Sign language is fully accessible and "exhibits same degree of grammatical complexitly. Research findings (Archbold & O'Donoghue, 2009; Preisler & Tvingstedtand, 2002; Yoshinaga-Itano, 2006) have shown that children who have cochlear implants and use sign language have positive outcomes in all aspects of development.

The Deaf population has unique linguistic needs that differ from their hearing peers, yet, even though their pathways may differ, deaf children are fully capable of academic achievement (Marschark, Convertiono, & LaRock, 2006a). The family language environment to the child development has been acknowledged by some early intervention researchers and professionals (Guralnick, 1999; Bruder, 2000). Culturally, deaf parents and hearing parents interact with their deaf children differently; therefore, they also support their deaf children's language development differently. Deaf parents of deaf children are likely to communicate visually with their deaf children and incorporate strategies to support the learning of a visual language (Harris & Mohay, 1997; Koester & Lahti-Harper, 2010; Waxman & Spencer, 1997).

All of the 10 interviewed deaf and hard of hearing families communicated with their deaf children by signed English (Liu, 2010), with very strong expectation of continuity of Deaf culture. Hearing parents usually have little experience in a visual language and tend to predominately use speech to communicate with their deaf children. For example, Loots et al. (2005) investigated the differences between early parent-child interactions with deaf children among three groups: hearing parents who use oral-aural approach, hearing parents who use total communication and deaf parents who use sign language. Results show that deaf parents are more involved in symbolic intersubjectivity through exchanging and sharing symbolic and linguistic interactions with their deaf babies than the hearing parents in the study. Hearing parents who adapted their communication to be more visual and tactile with their deaf children saw an improvement in their interactions and communication (Loots et al., 2005). However, more than 95% of deaf children are born to hearing families and, therefore, they do not share the same linguistic experiences as their family

members (Mitchell & Karchmer, 2004). Often, these children are not exposed to Deaf culture and sign language. Family members hold different perspectives of their experiences and beliefs in supporting their young children to become bilingual in auditory/oral and sign language. Occasionally, some hearing families will choose a route to enroll their children in programs promoting sign language development, requiring hearing parents to learn a new language and culture alongside their child (Meadows-Orlans et al., 2003). The remaining 5% of deaf children are born to parents who are deaf themselves and can share the same linguistic, cultural, and social experiences with their children. Support the development of communication skills through alternative and augmentative communication (McCracken & Turner, 2012) for meeting communication needs. The first year is important for establishing skills that underpin later communication and literacy skills in widely accepted. The cognitive functioning is the strongest predictor of progress in developing speech perception skills (Edwards, 2007), which is also the biggest challenge when assessing the children with hearing impairment with additional complex needs.

2.1.2 Rehabilitation after cochlear implantation

Cochlear implants had been demonstrated by many studies (Geers, Spehar, & Sedey, 2002; Wie, Falkenberg, Tvete, & Tomblin, 2007) benefits for auditory and spoken skills for deaf or hard of hearing children. However, a cochlear implant cannot guarantee the children just listen or understand auditory input the same as other hearing children (Christiansen & Leigh, 2004, 2005). In a challenging listening situation (Pisoni, Conway, Kronenberger, Horn, Karpicke, & Henning, 2008), cochlear implants do not function for highly adaptive speech perception and language processing. After implantation or even a long period of cochlear implants using, the children are still in need of a variety of supports. With an annually increasing number of children with cochlear implants in the mainland of China, more and more researchers (Wang & Chen, 2006; Guo & Qian, 2004; Li et al., 2008) concentrated on studies relate with rehabilitation, which challenge with traditional

rehabilitation idea. According to traditional rehabilitation idea, clients with cochlear implants are the same as others with hearing impairment, in that case, some specificity of clients of cochlear implants (Chen & Han, 2006) are neglected. On the contrary, some others emphasize too much on the common traits of hearing development (Xiong & Chen, 2003) between hearing children and children with cochlear implants. Actually, studies (McCracken & Turner, 2012) reported that giving parents a chance to talk and share their perspectives and experiences, a sense of connectedness and well-being is the most important outcome of a cochlear implant. Ongoing support followed by cochlear implantation, basically the children received a cochlear implant will be initially under the care of the implant center (McCracken & Turner, 2012). Speech therapy is the main process of rehabilitation and language development. For the children with hearing impairment, deprived of hearing prohibit the function of hearing nerve, gradually organs of tongue, soft palate and lip for speech become rigid, and vocal cord vibration cannot be effectively control. After cochlear implants surgery, rehabilitation given by professional registered speech therapists is necessary. It is a very long period rather than as short as one month or one year of hearing and speech training care.

However for those children with additional needs lack of support from qualified specialists. Children with additional complex needs require a high level of input from qualified specialists. McCracken and colleague Turner (2012) conducted a study for children with cognitive disability such as learning disability, profound and multiple learning disability, physical disability like cerebral palsy, hypotonia, hypertonia, sensory impairment like blind or visual impaired, named syndrome such as autistic spectrum disorder, mitochondrial ctyopathy, and medical need like chronic lung disease, kidney disease. Any of these additional situations ask for extra needs.

1) Pre-lingual deafness and post-lingual deafness

The people with profound hearing impairment can hear and react to sound once they successfully implant cochlear and get proper rehabilitation. To be more concrete, cochlear implants mean they can hear but do not mean the people who can

understand, a long period of postoperative rehabilitation and educational intervention (Wu & Liu, 2013) is very important, otherwise, cochlear implant is just a piece of expensive decoration on the head. Study of etiology of hearing loss revealed that frequently are connexin, cytomegalovirus, enlarged vestibular aqueduct, or other unknown causes. For congenital or pre-lingual deaf, namely, children who lost hearing before learning to speak are less able to benefit from cochlear implants than post-lingual deafness (Huang et al., 2004). Houston & Miyamoto (2010) pointed out early auditory experience on word learning and speech perception imply the importance of a sensitive periods of language development. The sensitive period is mainly because of development of the central auditory system (Sharma, Dorman, & Spahr, 2002; Richter, Eissele, Laszig, & Lohle, 2002), which reversely means that implant cochlear implants at an early age (Zwolan et al., 2004) is valuable for language development. Those pre-lingual deaf without hearing perception more than 10 years, their neurons spiral ganglion cells shrink significantly. While investigating the communication development of children with early implantation, research (Dettman, Pinder, Briggs, Dowell, & Leigh, 2007) has shown the potential risks for early implantation younger than 12 months. After implantation, the rehabilitation process would be different for pre-lingual deafness from post-lingual deafness. The post-lingual deaf who lose hearing ability after language development, they have already built the hearing-speech system. In general, after short rehabilitation period, they soon can understand, speak and communicate. Nevertheless, the people who were born as deaf they never have hearing experience. After cochlear implants, they just get start to percept sound, to recognize speech, then to understand language, finally build the hearing-speech system. Such a complicated hearing development process, which is similar with a baby who was just been born with cochlear implants. Lederberg and Spencer (2009) argued that lexicon size and language modality have impact on preschool children's word-learning abilities. Families recognizing the significance of bilingualism and maintaining a bilingual communication mode with children is valuable for the children's language development.

2) Comprehensive family-centered rehabilitation

The traditional medical rehabilitation based on hearing and speech pathopsychology which emphasizes the reconstruction of hearing perception and speech therapy by completing individual intervention. Nowadays the international rehabilitation trend is getting more and more popular which combines both medical and educational services (Huang, 2004; Lang, 2010). Considering the limited short time of rehabilitation services provide by rehabilitation center, these notions had led to family-centered model of intervention, which deliver services not only for the child but for the parents as well, namely, a transition from the child-centered mode to the family-centered mode. A collaborative and supportive parent-professional relationship empowers parents, thus contributing to develop competence and involvement in post-operative rehabilitation, the child's education and development (Dunst et al., 1994; Meadow-Orlans & Sass-Lehrer, 1995; Minke & Scott, 1995; Winton & DiVenere, 1995; Zaidman-Zait, 2007). Such kind of idea improves the family recognize importance of postoperative rehabilitation and teaches family members especially the main caregiver some rehabilitation skills. Especially for the infants or toddlers cochlear implant users, parents usually must be the primary component of rehabilitation. Regular lectures are the common traditional training methods and parents were given opportunities to take part in the training practice (Lang, 2010).

Have the parents attend sessions and meet other experienced cochlear implant users with their child present to model and discuss activities that can be utilized at home and be incorporated into the student's daily life. During these training sessions, rehabilitation strategies are given for the parents and/ or the adolescent implant users. Parents are encouraged to be involved with rehabilitation process such as regulate the volume, identify sounds, device checking, developing activities for auditory development. It is also important to stress to parents to supervise child wearing the device except sleeping hours, and do not involve water and so on. By examination behavioral indicators of parental involvement both before and after cochlear implantation, Spencer (2004) found that intensive parental involvement such as learning sign language, devoting time and effort to take the child to the rehabilitation

center was associated with children's language achievement. The family-centered rehabilitation mode enlarges the support resource and emphasizes the interaction among professionals and parents to ensure the rehabilitation effect.

As a summary, after implantation, timely qualitative intervention, information and supportive services to children and their families are needed. Based on Bronfenbrenner's (1979) ecological theory, researches substantiate the notion of ecological early intervention model (Zaidman-Zait, 2007), including the developmental system (Guralnick, 2001) and the support approach (McWilliam & Scott, 2001), which recognize that families need a variety of supports to address the stressors associated with parenting a child with cochlear implant. Collaborative team work between parents and professionals is especially challenging because of the range of professional involved. A complete team work involved with medical cochlear implant center, early intervention, social support and the family. Further, the collaborative team may include extended family members, social workers, audiologists, speech therapists, pathologists and teachers at school.

2.1.3 Efficacy and outcomes of cochlear implants

Studies reported that families frequently were encouraged to opt for cochlear implants after detection of deafness in order to correct the deficit (Hintermair & Albertini, 2005; Lloyd & Uniacke, 2007; Young, 2010; Hyde et al., 2010). However, cochlear implant cannot fully meet parents' expectations such as to fully "fix the problem" to help children the same as hearing people (Christiansen & Leigh, 2004; Weisel, Most, & Michael, 2007; Zaidman-Zait & Most, 2005). Moores (2009) held reservations about both the relative efficacy and advisability of cochlear implants with very young children and suggested the extent of hearing loss is not the only factor in making a decision that should be tailored to the individual child. He considered late age of implantation, inadequate follow-up training, and the negative impact of signing as cochlear failures. Typically, there are four levels of long-term predicted outcome after implantation: 1) the child is an auditory verbal

communicator within 3 years and is mainstreamed with speech and language support; 2) the child communicates by auditory verbal way with visual assistance for learning and placed in partial mainstream school; 3) the child mainly communicates by sign language complementary with auditory verbal way and placed in a special school/class; 4) the child does not benefit from the cochlear implant and communicates by sign language.

1) Factors influencing on cochlear implants' benefit

After rehabilitation, to achieve effective rehabilitation and to evaluate outcome of cochlear implants, many researchers from multidisciplinary had been involved in, which including audiologists, speech pathologists, social psychologists (Wu, 2014), educators so on and so forth. Studies of speech recognition, listening, speaking, reading ability were conducted a lot, despite of some other comparative studies between children with cochlear implants and hearing aids. The study conducted by Thomas P. Nikolopoulos et al. (2004) reported that a variety of factors may impact the outcome of cochlear implants, including physiology age, the age of hearing loss, age at implantation (Geers et al., 2002; McConkey-Robbins, Koch, Osberger, Zimmerman-Phillips, & Kishon-Rabin, 2004), duration of cochlear implant use, speech and language ability, multi disabilities, supportive resources, family expectation, cognitive ability (Pisoni et al., 2008). This study demonstrated that learning style is an effective predictor of speech perceptive ability. Furthermore, family function and support is another potential important influencing factor. Actually, the parents influence the communication opportunities, to strength the communicative skills, some interactive courses for parents and children with cochlear implants are designed. Research evidence also has shown that spoken language development depends on a number of factors (Fagan & Pisoni, 2010; Fagan, Pisoni, Horn, & Dillon, 2007; Marschark et al., 2007; Hawker et al., 2008; Inscoe et al., 2009; Spencer, 2004a, 2009; Kermit, 2010). Except influencing factors mentioned above like implantation age, cognitive skill, other factors may include the frequency of cochlear implants use (Geers et al., 2002; Nicholas & Geers, 2007; Wie et al., 2007; Jiménez et al., 2009), communication modalities (Connor, Hieber, Arts,

& Zwolan, 2000; Jiménez et al., 2009) and individual hearing and linguistic experiences pre-implantation (Spencer, 2004a) and the family involvement and support post-implantation (Sarant, Holt, Dowell, Rickards, & Blamey, 2009). In studies of Fagan et al. (2007) and Inscoe et al. (2009) the children with cochlear implants who performed below average on spoken language measures halved the sample. McConkey-Robbins et al. (2004) reported that the auditory skills of children who got implants at earlier ages was closer to their hearing peers than other children who got implants later. Children who received cochlear implants between 12-16 months old reached the same level of spoken language development as their hearing peers, while children who were implanted at two years old or later had difficulty catching up (Nicholas & Geers, 2007). Furthermore, implantation itself does not correlate with syntax skills for 13-38 month-old children without pre-implant hearing experience (Spencer, 2002).

To identify the educational factors most conducive to maximum implant benefit, Geers, Brenner, Nicholas, Tye-Murray, & Tobey (2003) conducted a comprehensive battery to measure 181 8-year-old and 9-year-old children who come from North America. By age of 5, all of the sample children got cochlear implants. Multiple regression technique was used to examine the effects of independent variables, which including communication method, classroom type, amount of therapy on outcome measures, specificly speech perception, speech production, language and reading by controlling for intervening variables associated with the child, the family and the implant device. Results from this study reported that children from smaller families achieved significantly higher scores in all areas but reading. All areas but speech perception were affected by gender (girls scored higher than boys) and family socioeconomic status, a combination of parents' education and income. Children with later onset of deafness tended to have better language skills, when both speech and sign were considered together and better reading scores. Reading scores were, of course, better for 9-year-olds than 8-year-olds. Other several points worth noticeable: 1) none of the categories was significantly affected by the age of implantation; 2) performance on Intelligence Quotient (IQ) tests accounted for significant variance in

all outcomes; 3) amount of time spent in a mainstream class was a significant predictor of speech production and reading outcomes; 4) emphasis on speech and auditory skill development in educational program can make a significant difference in the overall implants benefit. In a study (Tobey, 2004) of 131 congenitally 8- to 9-year-old deaf children with cochlear implant before 5-year-old reported that after implantation the children placed in the main streaming schools reported higher speech intelligibility than the children placed in partial mainstream or special education programs. In the main streaming programs, the auditory-oral environment with hearing peers emphasize oral communication than in any other total communication or sign only communication settings. However the study showed that there was no significant correlation between the communication mode before implantation and the speech intelligibility.

In a systematic review (Bond et al., 2009) of cochlear implants effectiveness, which considering variables of speech perception and production measures, educational measures, quality of life and audit of clinical practice, its cost-effectiveness for both children and adults were studied. Lenden and Flipsen (2007) conducted a research to compare the prosody and voice characteristics of 6 children with cochlear implants with another 40 children with severe to profound hearing but without cochlear implants, there were some noticeable difficulties with stress, resonance, rate, loudness, laryngeal quality, but there were no consistent difficulties with phrasing or pitch. The research result from this study has shown that cochlear implants offer some significant benefits to children with hearing impairment in terms of prosody and voice outcomes. Some other researchers (Meyer, Svirsky, Kirk, & Miyamoto, 1998; Wu, 2007; Liu, 2011) compared the people who use cochlear implants and hearing aids, for people with hearing loss of 101-110 db and cochlear implants using time longer than 3 years, they have better speech perceptive ability than those who use hearing aids. Study of comparing only side cochlear implant users and another side with hearing aid has shown that differences in speech recognition, comprehension, language learning.

2) Speech assessment after cochlear implantation

Speech assessment is one of the important indicators to assess the effect of cochlear implants. Studies on speech perception (Wei & Cao, 1999; Zhang et al., 2005; Yi, 2007; Liu et al., 2010), effect assessment (Chen & Han, 2004; Liu et al., 2007; Zhou et al., 2007; Wang et al., 2010), case studies of hearing and language development (Shen, 2008; Yang, 2010) and other relative fields（Seung et al., 2005） are abundant. A case study (Ji, 2010) of early inclusive education of a twin sibling has shown that till 41 months, comparing with the hearing sibling, the other child with cochlear implants reached the normal level of acquired vocabulary development, but delayed in the development of expressive vocabulary.

A variety of factors considered to examine auditory perception, which including telephone using, familiar speaker, conversation understanding, common phrases, speech sounds discrimination, environmental sounds recognizing, responding to speech sounds and awareness of environmental sounds. At the same time, “preverbal, sign language, unintelligible, intelligible to experienced listeners, intelligible to listeners with little experience, intelligible to all” are used for rating speech intelligibility. Hamzavi et al. (2000) used the Evaluation of Auditory Responses to Speech (EARS) battery to assess progress following implantation. This study results reported that children with additional disability obtained demonstrable benefit from cochlear implants, but the rate of development of auditory perceptual skills was slower than for other deaf children with implants. Vlahovic and Sindija (2004) described another smaller sample after their implantation, of four children with additional disabilities including communication disorder, moderate psychomotor retardation, and attention-deficit hyperactivity disorder. They used the Categories of Auditory Performance and Speech Intelligibility Rating Scales, the Listening Progress Profile, and part of the EARS test to monitor progress. They reported better than anticipated perception skills but less satisfactory speech development because of mainly unintelligible speech. Filipo et al. (2004) assessed cochlear implants outcome from a different perspective in their study that included 18 deaf children with additional disabilities or associated problems, bilingualism or family problems in 10 of the cases. They focused on psychosocial as well as audiological and/or

communication outcomes, examining the child's self-help skills along with social and family relationships by using a mixture of observation, questionnaires, analysis of drawings, and structured interviews. They reported gains in listening, communication, and self-sufficiency while family and social relationships remained stable and concluded that in such special cases cochlear implantation was a positive intervention. Wiley, Jahnke, Meinzen-Derr, and Choo (2005) also moved away from the usual methodology for assessing outcome of pediatric cochlear implantation, to examine the qualitative benefits for children with additional disabilities using a mixture of open- and closed-ended questions that were then coded by themes. Fifteen families were recruited in a study (Wiley, Jahnke, Meinzen-Derr et al., 2005) with children have used cochlear implant at least 6 months with additional disabilities including visual impairment, mild motor disabilities, cognitive disabilities like nonverbal IQ of 75 or lower, specific learning disability, and language or behavioral disorders. Some of the disabilities were diagnosed after implantation. All of the families in this study reported that their child had made progress in developing communication skills and was more attentive and interested in the world around them. And all parents felt happy with their decision on a cochlear implant. However, this study revealed that a qualitative methodology used may led to bias in reporting of skills and inconsistencies in interpreting communication behaviors.

Several other studies suggest that children who are oral communicators have higher scores on speech assessment measures (Lusk, Lai, Stroer, Fears, & Piccirillo, 1997; Meyer et al, 1998; Osberger & Fisher, 1997) and, they have more intelligible speech (Osberger, Robbins, Todd, Riley, & Miyamoto, 1994; Svirsky, Sloan, Caldwell, & Miyamoto, 1998) than children who use total communication or cued speech. Frequently for those parents who are interested in mainstreaming their children via oral communication, which presents a disadvantage of cochlear implant. Other common tools for informational purposes that can be included on a standard assessment battery can consist of Auditory Questionnaire (Kuehn-Inacker, Weichboldt, Tsiakpini, Coninx, & D'Haese, 2003), Cottage Acquisition Scales for

Listening, Language, and Speech (CASLLS) (Wilkes, 1999), Potato Head Task (PHT; Robbins, 1994), Infant/Toddler Meaningful Auditory Integration Scale (IT-MAIS; Zimmerman-Phillips, Osberger, & Robbins, 1997), Meaningful Use of Speech Scale (MUSS; Robbins & Osberger, 1990), Goldman-Fristoe Test of Articulation–2nd Edition (GFTA-2; Goldman & Fristoe, 2000) and/or Khan-Lewis Phonological Analysis (Khan & Lewis, 2002) and so on.

For the evaluation of communication and expressive skills assessment, there are scales like Expressive One-Word Picture Vocabulary Test–4th Edition (EOWPVT–4; Martin & Brownell, 2011a), The First Vocabulary of the Deaf Child (Caselli & Rinaldi, 2005; Rinaldi & Caselli, 2009), The Boston Naming Test (BNT) (Kaplan, Goodglass & Weintraub, 1983; Riva, Nichelli & Devoti, 2000), Receptive One-Word Picture Vocabulary Test–4th Edition (ROWPVT–4; Martin & Brownell, 2011b) or Peabody Picture Vocabulary Test–4th Edition (PPVT–4; Dunn & Dunn, 2007). The Chinese version of the MacArthur Communicative Development Inventory (CCDI) (Tardif et al., 2008; Hao, Shu, Xing, & Li, 2008) and the vocabulary scale of the Auditory and Language Ability Evaluation Criteria and Methods for Hearing Impaired Children (Sun, 2009) either contain some items that are culturally irrelevant for Mainland Chinese children (Tardif et al., 2008), or do not report test reliability and validity (Hao et al., 2008; Sun, 2009). Due to the lack of standardized tests to measure the language development of children with cochlear implants, the Development of a Mandarin Expressive and Receptive Vocabulary Test (MERVT) for children using cochlear implants (Lu et al., 2013) could be used by combining with CCDI (Hao, Shu, Xing, & Li, 2008). Considering both of geographical regions and gender, the selected items in MERVT were expected to be appropriate for the general preschool population in mainland China. In the worldwide, there are some other assessment tool such as MacArthur-Bates Communicative Development Inventories (CDI): Words and Gestures (Fenson et al., 2007), Preschool Language Scales–5th Edition (PLS-5; Zimmerman, Steiner, & Pond, 2011) or Clinical Evaluation of Language Fundamentals Preschool–2nd Edition (CELFP-2; Semel, Wiig, & Secord, 2004). For the evaluation of lexical comprehension and production

of preschool children, The Picture Naming Game (PNG) (Bello, Giannantoni, Pettenati, Stefanini & Caselli, 2012) is available. Overall, such of these tools could be used for an initial individualized education program.

Lyxell et al. (1996) compared the verbal cognitive capacity of 11 deaf adults both before and after operation to examine predictors for successful speech understanding following cochlear implantation. Research funding demonstrated that three verbal cognitive abilities proved to be critical predictors of 6 to 8 months' postoperative outcome: internal speech functioning, speed of verbal information processing, and working memory capacity. Summerfield and Marshall (1994) reported better performance in speech understanding could be explained by short duration of deafness, usable residual hearing, and lip reading ability. Ertmer & Mellon (2001) investigated the early vocal development of a young child with cochlear implant through parent-child interactions records. Chin et al. (2000) examined how the children with cochlear implants recognize and produce spoken words. The Neighborhood Activation Model proposes that spoken word recognition occurs in the context of phonologically similar words, which means frequency of occurrence of the target word and frequency density of its phonologically similar words is important for structure of mental lexicons.

Studies of music perception and appreciation assessment have been started from the 1990s, a series of effective methods have been formulated to assess outcome of cochlear implants. Ping (2010) mentioned of some perfect designing assessment scales such as University of Washington Clinical Assessment of Music Perception, Montreal Battery for Evaluation of Amusia, and some questionnaires, including Iowa Musical Background and Appreciation Questionnaire, Appreciation of Music in Adult Patients with Cochlear Implants and Musical Background Questionnaire.

3) Psychological assessment of children with cochlear implants

A study of 22 children with cochlear implants, Anmyr, Larsson, Olsson & Freijd (2012) demonstrated that children express higher concern of mental health than their parents and teachers by self-reports of the mental health and comparing of Strengths and Difficulties Questionnaire (SDQ). On the contrary, the parents reported more

strengths than the children. The mental health in terms of emotional and behavioral strengths and difficulties include parameters of emotional symptoms, conduct problems, hyperactivity, inattention, peer problems and prosocial behaviors. For the children of implanting with additional disabilities, the clinical practice faces even more challenges. Edwards (2007) listed aims of psychological assessment as: 1) to gain an impression of the child's learning capacity and learning style; 2) to gain an impression of the child's motivation to learn and explore; 3) to assess child's ability to adapt to novel situations; 4) to assess the relationship between his/her behavior and learning capacity and learning style; 5) to attempt to establish whether there are learning difficulties. From the psychological perspective, for those providing psychosocial support to children is the importance of creating routines to identify children with difficulties by using screening instruments in the daily work, further to facilitate an evaluation based on both children and parents' needs. Individual interventions such as coping strategies and psychosocial support as well as individual education services are need as well.

A significant positive correlation was shown (Beadle et al., 2000) between the quality of life, indicators of communication, independence, happiness and satisfaction for the life and cochlear implantation outcome. Too assess the quality of life rated by both of the parents and their children with cochlear implants, a series of subscale items (Warner-Czyz et al., 2009) were considered: physical wellbeing, emotional wellbeing, self-esteem, family, friends, everyday functioning and school. Children rated overall quality of life significantly more positively than their parents. In addition, there was no significantly difference of rating of quality of life by auditory status. Warner-Czyz et al. (2009) considered several variables including age at identification of hearing loss, age at implantation, duration of implant use, current chronologic age, finally they reported quality of life was more correlated with cochlear implant using experience and chronologic age, but did not correlate with implantation age.

To summarize previous research results of the above, cochlear implants improve users' auditory and oral speaking skill (Geers et al., 2002; Spencer, 2009) further

increase the social interaction opportunities. In fact, cochlear implants bring the children into a hearing world in many ways in daily activities such as oral communication with friends, making telephone calls, watching TV independent from reading captioning, listening to music and so on. After implantation, some children's personality (Bat-Chava & Deignan, 2001) changed to be more extroverted and more confident after implantation than before implantation. However, due to the environment of athletic activities, including some static electricity from plastic may disturb the speech processing of cochlear implants and large group activities challenge the communication fluency with other participants among the group. Through parental questionnaires, Smith et al. (2008) compared the self-esteem and social well-being between 164 children with cochlear implants and 2169 normal-hearing children. Parameters of general well-being in kindergarten/school, managing school work, number of good friends indicated that the children with cochlear implants rated significantly higher on questions about well-being in kindergarten/school and boys of them appeared to manage school work better than normal-hearing boys. Children with cochlear implants were significantly more active, and they had fewer occurrence of bullying other children than normal-hearing peers, whereas no difference existed as to being bullied by other children. Similarly, no difference was obtained regarding overall self-esteem or number of friends rated by parents on various parameters of self-esteem in terms of confidence, independence, social ability, activeness and satisfaction. The two groups of children scored similarly on being confident, independent, social, not worried and happy.

4) Long-term impact of cochlear implantation on educational placement

Children with cochlear implants are educated in a variety of educational settings including fully mainstreamed schools, partially mainstreamed schools, self-contained classes of deaf and hard-of-hearing children, residential school for the deaf, private schools with minority of hearing children. Mainstream placements are the preferred (Archbold et al., 2002; Fortnum et al., 2002; Thoutenhoofd, 2006) educational placement for most children with cochlear implants. For instance, in 2002 in the United States (Sorkin & Zwolan, 2004), 53% 7- to 14-year-old children

with cochlear implants were placed in public mainstream. It was rising by 58% in 2003. The number of them placed in private mainstream was 11% and 10% respectively. While about only 30% placed in center-based, and 3% placed in deaf school and 2% in home school. However, for the deaf persons who consider deaf as a minority and consider sign language as a minority language (Peters, 2000; Moores, 2009; Humphries et al., 2012), they encourage their children to choose the deaf school as a way to continue the next deaf generation.

Studies (Thoutenhoofd, 2006; Marschark et al., 2007; Wu, 2013) have shown that students with cochlear implants transit between educational placement due to a variety of influencing factors (Wu, 2014). The most common cited problem is that school did not meet the needs of children with cochlear implants. Specifically, services may include speech, FM system, and deaf education. Other provided services reported by parents include instructional support, interpreting, audiology, captioning, and listening therapy.

5) Long-term impact of cochlear implantation on vocational outcomes

Appropriate transition program is necessary, in this case, students are able to get into these programs to improve their independence and get ready to go out into the workforce. The specialized settings could be modified to be flexible for student's apprenticeship and receiving job training. Wu (2014) investigated the occupational expectation of students with cochlear implants who were studying in a deaf school, they reported that this deaf school provides students three-year vocational education in high school if they plan to work instead of continuing tertiary education. Vocational courses such as fashion design, painting, massage and embroidery are very typical, later on, information technology, automobile repair and some other vocation training are provided.

In the study of Huber et al. (2008), 52 12- to 21-year-old cochlear implant users and a control group of 155 hearing peers were investigated. The survey results provided both qualitative and quantitative data on the long-term impact of cochlear implantation on vocational outcomes of adolescents and young adults with hearing impairment. 15 of them are adults, age of 18- to 21-year old, other 37 are pupils.

According to the survey, significantly more parents in the control group hold optimistic expectation (73%) in their children's career, while only 26% parents of children with cochlear implants reported being optimistic. In order to be employed, after elementary education, most of cochlear implant users continued education by means of apprenticeship in vocational school or receiving training position. From the analysis of survey questionnaire items of profession, permanent employment contract and job satisfaction, the study has shown that their career aspiration and employment status were not satisfied. However, it is worth noting that the relation between cochlear implantation and vocational outcome is not evidence-based. In another word, we cannot say cochlear implantation is the only factor influence on vocational outcome.

2.2 Educational placement

Placement refers to the amount of time in each school day that a student spends in the resource or in a general education classroom. Students accept structured education in the educational placement. Usually, there are assigned teams of trained teachers and aides in all types of placements. A student could be placed in a single setting all day or spend parts of the day in different settings. For example, a student in a mainstream education classroom all day might receive special education services in the same general education classroom as part of regularly scheduled instruction time. For the rest of school day, a student might go to specialized educational settings for part of school day or majority of school day to receive special education services. However, when addressing the evolution of educational placement, it is a long history.

2.2.1 Evolution of educational placement mode

In the beginning, the handicapped are mainly placed in isolated care organizations or schools for the special needs. After the Second World War, with the development of civil rights and deinstitutionalization, till the 1960s, some developed countries raised that even though the segregated mode provides professional level of special

education and sufficient special education facilities, the label of medical diagnosis destroy self-esteem and confidence of those people with special needs. The segregation mode, which only focus on the deficits and compensation, but neglect especially their social development. Then a set of new special education system based on the idea of providing the least isolated educational placement was built, which was called integration movement in the north of European countries, and mainstreaming movement in the north of America. The modes of segregation, the integration and/or mainstreaming are different in educational view and practice (Sun, 1999), to be more concrete, special institution or school is the only education and training center for the people with special needs, however it is only for those with severe and/or profound handicapped (Deng, 2004), mainly with the function of consulting, education, resource and research center. Some studies (Walter & Vinceni, 1982) have shown that advantages of mainstreaming education mode, which saves educational investment and nearby schools are available for the people with special needs. Deng (2014) put forward a "waterfall" mode, which combines seven different levels (Wyne & Connor, 1979); of educational placements, including regular class, regular class plus consulting service, regular class plus special education inspector service, resource room, special class, family education and hospital service. The segregation degree is in ascending sequence, only in the case of necessary, the people with special needs would be placed in a highly segregated educational setting, otherwise as far as possible to place in a mainstreaming setting.

Integrated education was mainly implemented in two ways, the independent educational place or the special class affiliated with regular schools (Langer, 2013). Effective and beneficial integration is dependent on the full cooperation of all involved stakeholders such as the parents of the child with hearing impairment, the teachers and the leaders to meet the individual child's unique needs in school day. Daniel (1997) suggested that regular classroom may be appropriate for a limited number of students with special needs. As much of school day, activities might include academic, nonacademic, curricular, and extracurricular activities. In this case, the educational placement is called Least Restrictive Environment (PSEA, 2016)

which avoids the use a “one size fits all” approach to educating children who have disabilities. However, soon after the mainstreaming movement, it was found that actually many students with special needs who did not benefit from the reform. Some north European counties such as Denmark and Norway initiated the principle of normalization. In 1994, the concept of “inclusive education” was commenced in the World Conference on Special Needs Education: Access and Quality by the United Nations of Education, Scientific and Culture Organization (UNESCO) in Salamanca, a university town in the northwest Spain. This statement based on the equal right of everybody to get access to education, transit the focus from educational placement for special needs to national education right. From the view of constructing national education system based on considering the openness of education and school, to emphasize the important role of special education resources including the teachers and school facilities. From then, inclusive education become the international ideological trend that significantly influences the educational placement for the children with special needs.

Different countries and researchers understood and interpreted the term “inclusive education” differently. It was defined (Huang, 2006) as “with appropriate support, the handicapped children and adolescents study in regular school and/or regular class with other students who do not have disabilities”. Inclusive education implies to respect the unique of children and make full use of their ability to empower them in study and their daily life. Specialist Tony Booth was quoted by “inclusion is a process to strengthen students’ participation in school culture, courses, and group activities, and reduce the exclusion.”

From the 1980s, the Chinese government advocated the policy of students with special needs to study in regular school and regard it as one the main educational placement for the special needs. Educational legislation is the most effective guarantee to support the implementation of inclusive education. To guarantee the rights for the person with disabilities, in 1990 the law for the people with disabilities was issued (the second revised in 2008), further in the Regulations of Education of the People with Disability issued in 1994 to implement the policy of learning in

regular school (Dong, 2010). Special education was included in the nine-year compulsory education and employed in the national wide, to enhance the entrance rate of students with special needs. In the United States, the federal special education law, Individuals with Disabilities Education Act (IDEA) has remained unchanged since its original passage in 1975. Then the Least Restrictive Environment Section was enacted, which lists detailed requirements of LRE. For example, if a student needs extensively modified materials or a helping teacher to continuously prompt to do work or make progress on the individual educational goals. It is necessary to do accommodations and/or modifications to make the students successful in the regular school.

Review the history of educational placement for the people with special needs, it is obvious to see that the tendency of educational placement of children with special needs transits from segregation to the openness. However, in reality the educational placement was largely influenced by many factors which including the social economic, culture background, social values, educational legislation system and even some contingency factors (Ge, 2006). Educational placement should be flexible and dynamic enough to meet the needs of children with special needs. Only the appropriate placement for a specific child with special needs is the best.

For the people with mild sensory organs handicapped in the United States, they were mainly placed in mainstreaming schools. Special class and resource room serviced for those with severe handicapped and profound mental retardation. In China, a large percentage of children with mental retardation accounts for 65% among the total population with special needs. In the end of 1980s, an educational policy of learning in regular classes was adopted by Chinese government for solving the enrollment of children with special needs. Subsequently, the number of children with mental retardation in regular school has risen perpendicularly (Jin & Song, 2007; Yu et al., 2001). With the rapid development of social economy, educational placement of children with moderate or profound mental retardation transit to schools for the special needs the rise of special schools.

Preschool children with autistic spectrum disorder who were mainly placed in

kindergartens, rehabilitation centers (for the person with a disability) or organizations (Gao, 2005). For those school aged children with autistic they are placed in three different kinds of educational placements, namely the regular class, resource room in regular school and special school. Teachers hold different point of view on a controversial issue about the acceptance of autistic children learning in regular class or school. Wang (2007) conducted a survey about 4 to 16 years old children with autistic spectrum disorder in Beijing and Guangzhou, which demonstrated that in some developed areas in China, parents and professionals took the preschool education for autistic children seriously but ignoring educational placement for the teenagers. Some studies (Cheng, 2009; Li, 2007; Zhou, 2005) about the development of autistic children in inclusive educational settings indicated that inclusive education is beneficial especially for social development.

The blind and those children with visual impairment or multi handicapped, to provide them with the least limited educational environment by taking full advantage of educational resources and increasing communication opportunities considering the reality of the children and their parents (Zhou, 2010; Zou et al., 2010). From 1980s, the local Taiwan authorities for those profound handicapped children who cannot go to school were educated at home by teachers (Dong & Zan, 2011). The mainland of China subsequently put forward the policy of home education services for individuals with special needs. The home education services involve with special education, medical rehabilitation, the welfare, family supports and so on. The educational placement for the talented children was mainly in regular class but rarely in the class for the talents (Hua, 1994). The gifted children are very different from each other, even though they are gifted in specific areas, for many of them, the psychological development is immature.

2.2.2 Educational placement options

Special education was thought as a place for education, however, in fact it refers to services that are used to meet the learning needs of students with disabilities.

Schools for children with disabilities are called special education school in China. While in the Czech Republic, according to the Education Act (No. 561/2004), “special” had been removed from school names within new characteristics of the educational system (Langer, 2013), which specifies schools for the people with hearing-impaired through implementation Decree No. 73/2005 Coll. in Section 5 b) and c) include the following levels: 1) kindergarten for the hearing-impaired; 2) elementary school for the hearing-impaired; 3) high school for the hearing-impaired (professional apprentice schools for the hearing-impaired, practical schools for the hearing-impaired, grammar schools for the hearing-impaired, high technical schools for the hearing-impaired); except these educational system for the hearing-impaired, there are kindergarten for the deaf and blind and elementary school for the deaf and blind. The US federal special education law, IDEA requires each public agency to ensure a continuum of alternative placements. The list of these alternative placements includes, but is not limited to, instruction in regular classes, special classes, special schools, instruction in hospitals and institutions, and instruction in the home. As the list above, each is considered to be more restrictive than the one before it. The continuum of alternative placements could be divided as three main types: the mainstreaming setting, the resource room and the self-contained. In the mainstream settings, students with disabilities receive special education and related services in a regular class (general education classroom) where peers without disabilities also spend their days. Some supplementary aids and services that a student might receive in a mainstream setting include: an interpreter, adapted materials and/or curricula, a personal care assistant or aide and the like. Another type is resource room, it is a class, without certain class size, for students with disabilities (special class) who receive special education services to keep up with grade-level work. The services students receive based on their unique needs. Usually the placement is set on right of regular school, the student with a disability may receive in a combination of environments, for example, half day in regular class and half day in special class. Students may benefit more from assistance for some certain subjects than in the regular education classroom. As needed, based on the Individualized

Education Program (IEP), services and supports will follow the student in both settings. The third type is called self-contained for which students receive services outside of the general education classroom for the majority of school day. It is a general term for placements based on students' unique needs, not only on the disability. There are many different specialized settings considered as self-contained, for example, special school, homebound and/or hospital and /or institutions. In specialized schools do not have typical peers, which make them one of the most restrictive environments. They are placed with other students with severe and/or profound disabilities. These classes are taught by special education teachers who had specialized teaching training in working with students with disabilities. Usually specialized settings are smaller than mainstreaming schools. There are assistant teachers or aides to help, who have more experience with students with disabilities than their counterparts in mainstreaming school. Some students, particularly those with self-esteem issues and severe disabilities may benefit from attending a school where all students have specialized needs. Unlike the other placements, the children who are served in either a home received special education or related services provided by a professional or paraprofessional who visits the home on a regular basis. For example, a child development worker and/or speech service staff visit the child at their home. Similarly, the children receiving special education or related services in hospital settings, include children who receive services as in-patients or as out-patients.

To ensure the implement of the education for students with disabilities, the section of Least Restrictive Environment states education in the regular class being the least restrictive among these placements. It is worth noting that the point of decision on educational placement is in sequence of make placements in the least restrictive environment. In this way, students with disabilities have opportunities to interact with other students in the regular education environment. Firstly, decision-makers, usually the parents should ask whether these educational services can be provided in a regular classroom in its current form. If the answer is "yes," that is the educational placement; if the answer is "no," they should ask whether these services can be

achieved in a regular classroom if supplementary aids and services are delivered in that classroom. If necessary until an affirmative answer is reached, move to the next slightly more restrictive or a more segregated setting along the continuum of alternative placements.

2.2.3 Cost-utility of educational placement

Francis et al. (1999) conducted a retrospective study about 27 school-aged children with cochlear implants in Maryland public school system, in collaboration with outpatient pediatric cochlear implant program. Both of educational placement and intensity of special educational support were checked. The study shows the negative correlation between the length of implant experience and the number of special educational support, the positive correlation between the length of implant experience and the rate of full-time mainstreaming placement. The study also indicated the children with implant experience were mainstreamed at twice rate or more of peers without implants. Based on conservative cost-benefit analysis of educational expenses from kindergarten to 12th grade, the study shows a cost saving of cochlear implantation and appropriate rehabilitation. Semenov and colleague jointly conducted a study (2013) of age-dependent assessment of cost-utility and educational placement outcomes of 175 children with severe-to-profound hearing impairment recruited from 6 centers between November 2002 and 2004. Three group of children with different period of age at implantation, younger than 18 months of age, between 18 and 36 months and older than 36 months of age. After incorporating lifetime educational cost and savings, cochlear implantation led to net societal savings of $31,252, $10,217, and $6,680 for the youngest, middle, and oldest groups, respectively, over the child's projected lifetime. During the follow-up period after implantation, considering a variety of possible variables including discount rate, direct medical cost, frequency of lifetime audiology, re-implantation cost, extended warranty, frequency of device upgrade, total lifetime medical cost, time off work and parental salary, the medical and surgical complication rates were not significantly

different between three age groups. While the annually educational costs reported by classroom placement among full mainstream, partial mainstream, self-contained in a regular school, and school for deaf placement increased in sequence.

With the international background of inclusive education, which has got universal approval that inclusive education build a good foundation for those children with cochlear implants who will live in a mainstreaming society in the near future. Inclusive education is an effective mode to ensure equal access of education for students with special needs, and in the long run, which also provides children equal opportunities to be successful. Furthermore, inclusive settings provide students many opportunities to help each other, especially the inclusive preschool education is beneficial for both the children with special needs and their peers. Even though some other parents reported that they worried about whether their children be influenced by children with severe special needs, studies show that children in inclusive settings tend to be more helpful for others and more prosocial. Thoutenhoofd (2006) pointed that, to some extent, placing children with special needs in inclusive setting is a healthy, economic mode, which optimizes allocation of educational resource and reduces fiscal expenditure. While the specialized schools are expensive to run and it may cost the government a large sum of money for your child to attend. Because there are fewer of them, this may mean that a cochlear implant user who wants to attend a deaf school will have to commute a great distance. Some specialized settings are residential, for example, boarding school which reduces travel time for the student.

2.2.4 Educational placement of children with cochlear implants

In the past, children with severe to profound hearing impairment were educated in deaf school, which is the main setting in China for children with different degrees of hearing loss. In middle or large cities in China, the boarding deaf school provides comprehensive services for children with hearing impairment. From the second half of twentieth century, with influence of inclusive trend in the world wide, resource

room (Cao et al., 2003) was mainly set up in some regular schools in Taiwan and Hongkong, then in mainland China. On the basis of school size, it was compulsory to be set up implement educational placement for children with special needs. Resource room functions as not only a place for special education resources, but also a complementary educational setting for students with special needs. The resource room plays a part in educational diagnosis and compensation, individual intervention, professional resources (Wu, 2014) and so on. In small towns or some rural areas in China, because of less density of population, students with special needs were placed in the nearby school district, which was called "learning in regular school" and was implemented as an educational policy (Regulations of Education of the Person with Disability, 1994; Dong, 2010). In this way, despite of limited economy, shortage of funds or insufficient staff, all students with special needs are ensured equal access to education. For example, a child with a disability may not attend school, because in the child's home community does not exist special school or other appropriate educational placement such as mainstreaming settings. In this case, the parents may decide that a public school with inclusive settings or special school in a neighboring town or county is most appropriate.

Wu (2013) conducted a study to investigate the educational placement of children with cochlear implants in the Sichuan province, which indicated that most of the random chosen samples were educated in preschool. This is mainly because in recent years the number of children with cochlear implants is rising, and the implantation is even as young as 6-month-old. However, in the past, very few families with severe hearing impaired children could afford a cochlear implant. With a variety of influencing factors, several children placed in regular school in the study, after a few years in primary school, they transited to the deaf school. There was a time when people thought of special education as a place. However, in fact it refers to services that are used to meet the learning needs of students with disabilities. In the Czech Republic, according to the Education Act No. 561/2004, "special" had been removed from school names within new characteristics of the educational system (Langer, 2013), which specifies schools for the people with hearing-impaired through

implementation Decree No. 73/2005 Coll. in Section 5 b) and c) include the following levels: 1) kindergarten for the hearing-impaired; 2) elementary school for the hearing-impaired; 3) high school for the hearing-impaired (professional apprentice schools for the hearing-impaired, practical schools for the hearing-impaired, grammar schools for the hearing-impaired, high technical schools for the hearing-impaired); except these educational system for the hearing-impaired, there are kindergarten for the deaf and blind and elementary school for the deaf and blind. Additionally, the provided education programs for children with severe and/or profound handicap include special organizations such as group homes and sanatoriums. For the school-age child with an implant, inclusive setting is the most frequent choice for them (Wu, 2014). While for a small number of them, they still preferred to be placed in the deaf school. Or there are also a few of them reported a transition from regular school to deaf school.

Frequently, children with cochlear implants are educated in a variety of educational settings including fully mainstreamed schools, partially mainstreamed schools, self-contained classes of deaf and hard-of-hearing children, residential school for the deaf, private schools with minority of hearing children and so forth. In a Scottish study (Thoutenhoofd, 2006) of a total of 152 5- to 18- year-old pupils with cochlear implants indicated that those children with different nations and ethnics were placed in different educational settings: most of them were placed in mainstreaming school; 48 of them in special class which attached in regular schools; others were placed in inclusive classroom, deaf school and organizations. One of them stayed at home for three years, and 7 of them had transition history during study. Similar study results got by Marc Marschark and Cathy Rhoten et al. (2007), children with cochlear implants in their study were placed mainly in mainstreaming school, with some few individuals in organizations for people with special needs. For the children with cochlear implants who achieve general well development, mainstream placements are the preferred (Archbold et al., 2002; Fortnum et al., 2002) educational placement. Because of Deaf culture in some specific societies, some deaf parents encouraged their children (Poskočilová, 2010) continue to choose the deaf

school by considering cochlear implant as a complementary of deaf world.

2.3 School adjustment

According to psychology wiki, school adjustment is the process of adapting to the role of being a student and to various aspects of the school environment. Even though researchers hold different perspectives of the content of school adjustment, most previous studies (Xu, 2010; Chang & Lin, 2011; Wu, 2014) indicated that school adjustment refers to the interaction between the students and all aspects related in the school environment. The length of adjustment period varied for different individuals. It is a process of interaction between the students and the whole environment, which related with not only the physical adjustment but also the mental adjustment. In recent years, when children with cochlear implants reached school age, more and more of them chose mainstreaming schools (Archbold et al., 2002; Fortnum et al., 2002; Blamey et al., 2001), including some children transited from deaf school after implantation. Additionally, the children placed in regular school presented higher verbal perception ability than children in other placements (Daya et al., 2000). Mainstreamed children with implants often continue to require classroom support services, which include sign language interpretation, oral interpreter, resource room help, media caption, personal assistive device, and note maker. Under the inclusive education background, learning in regular school does not just mean placing children with hearing impairment in regular school (Wu & Liu, 2013), from the perspective of inclusive processes, but to create an environment of acceptance of differences in regular school. For the children with cochlear implants, a variety of barriers inhibit their learning, which happen as a result of the negative attitudes towards the children (Wu, 2014), such as misunderstanding of the process of active learning, inadequate adaptation of the learning methods, inappropriate approach toward the educational environment.

2.3.1 Indicators and influencing factors of school adjustment

Children who are adjusting well have a sense of belonging to the school-they feel comfortable, secure and relaxed rather than anxious, fearful or upset. They listen to and follow instructions, interact well with others, share and take turns, cope with normal day-to-day conflicts and are able to manage their feelings and emotions appropriately. They are interested in learning and are motivated to take part in school activities (KidsMatter, 2016). Failure to adjust can lead to school refusal, school dropout, school transition and even mental health issues. The Fast Track Project has shown the school adjustment of school year aged children through three subscales: peer relationships, academic performance and school discipline. Ning, Xin, and Li (2007) conducted a survey of 6579 elementary school grade 3 and grade 5 students though questionnaires about the adjustment of academic, emotion, behaviour and peer relationship. They classified four types of school adjustment situation as positive, leisure, tense and high risk. The students with positive school adjustment reported positive scores on academic achievement, achievement motivation and metal health. While the students were classified as in high risk, they reported negative scores on all of three aspects. The students with leisure school adjustment reported positive scores on mental health, but negative on achievement motivation. The result was on the contrary of students with tense adjustment. Based on studies of school adjustment, Chang and Lin (2011) stated three main indicators of school adjustment: routines of school life, curriculum learning and interpersonal relationship. In their study, routines refer to students' behavior and performance in class, whether they obey basic rules in lessons. Curriculum learning mainly refers to students' study attitude, participation in class and academic achievement. Interpersonal relationship includes interaction between the students and their teachers and student peers in class. A study of examining effects of school adjustment on alcohol use (Henry, Stanley, Edwards, Harkabus, & Chapin, 2009), school bonding, behavior at school, and friend's school bonding were treated as the three variables of school adjustment. Simonsen et al. (2009) observed class teaching

activities and conducted interviews to study classroom activities, including collective learning in groups, participation in classroom instruction and associated peer interaction, in many cases which also restricted the learning of children with cochlear implants in inclusive educational programs. Through analyses of the teacher-pupil interaction (Jachova & Karovska, 2008), on the basis of the inclusive educational system in Macedonia, a series of video observation indicators including instructions, initiative following, accommodation, approval, and change of sequence were checked. To analyze the interaction between a fifth grade boy with a cochlear implant and his teacher, indicators include use of voice, eye contact and face expression, signs giving and body language, choosing a central position for all pupils, giving recommendations and approvals. The results have shown that: 1) the teachers use adequate methods, 2) the social interaction between the child with a cochlear implant and teachers is identical with the interaction between the teachers and the others pupils, 3) certain adaptations are made by the teachers to meet the needs of student, 4) proper attitude and equal treatment was conducted by teachers towards the child with a cochlear implant. Studies (Wang, 2002; Zhang & Chen, 2002; Wu, 2014) also indicated that teachers' attitude toward children may inhibit or improve their development. If teachers accepted the child with special needs in the class, they could guide and set a model for other student peers in the same class to help the child with special needs. Studies revealed that teachers' attitude was not only related to the degrees of handicapped severity but also to the cultural difference.

Adjustment to school is influenced by a combination of the child's personal characteristics, a range of skills and behaviours, their experiences, and the interconnections between home, preschool and school (KidsMatter, 2016). Researchers (Li & Liu, 2011; Chang & Lin, 2011; Wu, 2014) summarized that individual characteristics such as gender, age, intelligence, self-concept and personal attribution; the family factors like parenting style (Liang et al. (2007), socioeconomic status, family atmosphere (Chang & Lin, 2011) and school factors such as academic achievement, teaching instruction, teachers expectation, peer relationship had influence on school adjustment. Both self-concept and

school-adjustment of junior high school students with learning disabilities were reported above the average (Li & Liu, 2011) though analysis of a questionnaire. In this study, the self-concept was divided into family self, social self, academic self, emotional self and physical self. Among these indicators, the students' academic self was reported the worst. The self-concept presented significant gender differences on emotional self and physical self. The students of first and second grades scored higher than the third grades in academic self. But the self-concept did not show any difference because of different grades, genders or family socioeconomic status. Generally, they had better adjustment on school routines than their interpersonal relationship among peers and teachers. Additionally, this study has shown the significant correlation between self-concept and school adjustment.

To study the school adjustment of elementary school students with autism in regular classes (Chang & Lin, 2011), there were also a variety of influencing factors, including educational placement, parental socioeconomic status, class teachers' professional special education background and so on. These factors didn't show statistically significance, however, the students' degree of severity of autism was indicated as the most significant influencing factor. In this study, 262 teachers filled out a questionnaire about school adjustment, which indicated that students were reported different school adjustment among items of routines, interactions and curriculum learning. Students were reported better on routines than on curriculum learning, but generally not as good as expected. Study of deaf students' first year school adjustment in university (Ma, 2010) has shown that fresh deaf students' family factors such as the only child family, the family function and socioeconomic status had impact on their school adjustment. Liang et al. (2007) conducted a longitudinal study to investigate the relationship between maternal parenting style in early childhood and later school adjustment by parent-reported questionnaires and teacher's evaluation. Maternal parenting style was reported by sub items of concern, limit, punishment, encouragement of independency, control and acceptance. The study indicated the significant gender effects on the dimension of concern at 7 years old, and mothers' concern for girls was significantly higher than for boys. Maternal

control and encouragement of 2 years old could predict 11- year-old children's academic achievement, learning problem, shy-anxious, frustration tolerance, assertive social skills, and peer interaction significantly after controlling gender's main effect. While maternal concern and control of 7 years old could predict all of the same aspects of 11- year- old children.

In a study about school support system (Chang & Lin., 2011), 257 parents were investigated by profiles of questionnaire, based on the analysis, school support in this study was considered supportive. However, Qian (1999) presented that a large number of children with hearing impairment in regular school did not get enough special educational support which lead to lower academic achievement and lower self-esteem. A series of scales were employed to gain perception of self-esteem such as Familial Acceptance Scale, which measures self-esteem at home and within the family unit. The Peer Popularity Scale measures self-esteem in social situations and interpersonal relationships with peers. While the Personal Security Scale measures self-esteem based on an individual's feeling about his or her physical and psychological wellbeing. To measure self-esteem in academic and intellectual endeavors, the Academic Competence Scale is available. Each of these scales cannot be given independently of each other as items representing each scale are interspersed throughout. Perceived self-esteem was lower among those students who were placed in inclusive settings than others in non-inclusive settings. Reduced self-esteem may inhibit academic achievement and self-concept (Daniel & King, 1997; Wu, 2014). On the contrary, children benefit from a supportive inclusive environment which enhances self-esteem. Inclusive settings also encourage more parental participation in the school program than parents in non-inclusive settings. When schools engage in inclusive education, systematically parental involvement should be an essential component of inclusive process.

2.3.2 Educational placement transition of children with cochlear implants

Educational placement of children is usually mainly chosen by parents, who have

the right to agree with or disagree with their child's placement. After a period of study in the chosen educational placement, what can parents do when they are in trouble of or face challenges in the placement. Archbold et al. (2002) and Fortnum et al. (2002) quoted the effect of cochlear implantation on education setting in favor of mainstream placements, noting that the number of children with cochlear implants had transitions was roughly equates the number of them with severely hearing impairment of the same age. Similarly, after implantation, many school-aged deaf children with cochlear implants moved to regular school (Thoutenhoofd, 2006; Marschark et al., 2007). However, after a few years, some children transited back to deaf school. A four-year study (Thoutenhoofd, 2006) of children with cochlear implants reported that 76% of 152 children still placed in regular school, while 30 of them transited from mainstreaming schools to other types of placement like inclusive setting, special class or deaf school. Only 6 of them transited from deaf school to the regular school or regular class. A similar study result was got by Marc Marschark and Cathy Rhoten et al. (2007). In their study of 60 children with cochlear implants, 19 of them transited from mainstreaming school to organizations for special needs, while only 6 of them transited to mainstreaming school. Wu (2013) investigated 14 school-aged children with cochlear implants in a southwest city of China, 3 of them had transition from regular school to special school for the deaf. The main reason is because of study pressure in the regular school, the 3 children with cochlear implants' academic achievement was much lower than peers in the same class.

To evaluate the needs of parents on effective transition of their children with cochlear implants from preschool to inclusive school, Vinila et al. (2013) conducted a study about thirty five mothers with children using cochlear implants. Scale of parental needs in transition to school (Kargin, Baydik & Akçamete, 2004) was modified, then administered for this study. Percentage analysis has shown that 75% of parents expressed need for information on most of the areas of transition to school. Generally, if possible, they need help of school, immediate family members and other relatives, as well as the community (Messaria, 2002) and specialists (Hanline & Halvorsen, 1989). The families may reduce their level of anxiety and stress during

the transition period by preparing for transition (Spiegel-McGill, Reed & Mc Gowan, 1990; Fowler, Scwartz & Atwater, 1991).

Research on the effects of parental involvement has shown a consistent, positive relationship between parents' engagement in their children's education and student outcomes. Hoover-Dempsey and Sandler (1997) stated that parental involvement includes participation in home-based activities, for example, helping with homework, discussing school events and school-based activities such as volunteering at school and participating in school events. Parents irrespective of their socio-economic status are enthusiastic to get more education information for their children. For smooth transition, aged mothers reported an increase need of information (Fowler et al., (1991), Rous et al., (1994) and Kargin et al., (2004), like relevant services and legal arrangements. Additionally, no sense of failure or guilt need be attributed to student or parent. For instance, a sample in the study (Wu, 2014) who has experienced receiving education in regular school finally transited to deaf school and started to use sign language.

2.3.3 Effective education for children with cochlear implants in inclusive settings

After the US federal special education law, the IDEA was enacted, the LRE section listed detailed requirements to ensure its implement. Quality education can be assured only in least restrictive environment that is friendly towards all children, where supplementary aids and services. Supplementary aids and services refer to specially designed instruction, adaptations, modifications and accommodations. Such aids and services include specialized teaching methodology, collaborative teaching, adapted learning materials and adapted curricula, or parallel curricula, specialized equipment, sign language interpreters and auditory systems and so on. It is also worth noting that in inclusive school program parents had been involved more frequently than the parents in non-inclusive settings (Ohna, 2005).

The people with cochlear implants are able to perceive musical elements, so music

activities are often used to reinforce their levels of auditory development. Align with detection, discrimination, identification verbally rhythmic and melodic stimuli, further to understand rhythmic and melodic elements (Joiner & Prause, 1996), music activities provide sensory experiences that are both pleasurable and educational. Class wide peer tutoring (Wu, 2014) was introduced, which involved with varied tutoring skills like role-play tutoring was both teacher- and student- friendly. Cooperative meetings of educators and parents were advocated to be organized regularly. Tips for classroom instructions were given such as clear communication, good use of voice and face expression, writing down key points on the blackboard and so on and so forth. If possible, organize whole-class open dialogue activities to provide opportunities for more communication and socialization. To fully use different communication ways of speech, sign, and speech with sign (Simonsen et al., 2009) is important to improve the auditory input for children with hearing impairment.

2.4 Summary of literature review

As a conclusion, the literature review provides background information on key literature pertaining to three main sections. The beginning of the first section introduces the device of cochlear implants and rehabilitation after implantation, and then briefly addresses the efficacy of cochlear implants and the impact they have on deaf children. Research has shown the outcomes to be unpredictable; there are many factors that may impact deaf children's spoken language development, regardless of their cochlear implants. A review of families and their experiences with children who have cochlear implants was also shared in this section. Families are fully involved with the whole processes from choosing a cochlear implant to nurturing a child with cochlear implant. Parental concern (Luckner & Velaski, 2004) had great influence on the language development of the child and high quality of parent-child communication positively influence on the child's social emotional development. Then, the equality of access to cochlear implants was discussed. A number of public

policy equity and resource access issues need to be addressed to ensure equal access to implants for children of less affluent families, for many non-White children, and children with additional disabilities. Broader considerations of risk beyond medical and specific communicative parameters, to more fully inform parental expectations that linguistic, educational and communicate personal outcomes may be variable over time. Families' beliefs, ideologies, and attitudes matter about language development in bilingualism. For minority families with deaf parents, some of them persist on using sign language or some other perspectives about maintaining bilingualism in deaf community. Parents of children with cochlear implants are not only the main decision-makers on communication mode but also on early educational placement. The second section introduces the historical evolution of educational placement mode in the world wide, followed by discussions of existing previous studies of educational placement of children with cochlear implants in some countries. Unbiased professional procedures should be implemented to support parents' decisions on educational placement for their children. It was worth noting that some children transit among different educational placements. In the last section, school adjustment of children with cochlear implants was discussed.

Chapter 3 Methodology

3.1 The operationalization of relevant terms

According to the conceptual discussions noted in the part of literature review, to clearly specify all relevant terms particularly to the present study, precise statement of concepts associated with educational placement and school adjustment are operationalized in the following passage.

As stated above, educational placement is defined as the place where children with cochlear implants accept structured education. A continuum of alternative placements was listed as follows:

Regular class Being part of general education classroom is referred to as inclusion or mainstreaming. A placement is considered “regular” if at least half of the students in the placement do not have a disability. The student with disability placed in the inclusion or mainstreaming settings might receive some supplementary aids and services such as an interpreter, adapted materials and/or curricula, and a personal care assistant or aide. It is noting that the students receive special education or related services within regular class instead of outside the regular class.

Resource room It is a special class for students with disabilities who receive special education services to keep up with grade-level work. It is very common that a resource room is set up as a unit or base in general educational settings which have specialist resources for students with disabilities. Based on their personal unique needs, the students might receive regular classroom instruction for the majority of the school day, with special education services and programs provided by special education personnel in a resource room for the remainder of the school day.

Special school Where all students with special needs receive services outside of the general educational settings. Special education classes provided for the entire school day, with opportunities for participation in nonacademic and extracurricular activities to the maximum extent appropriate, which be taught by teachers who had specialized training in the field of special education and working experience with

students with disabilities. Many classes in special school are created around students within certain disability groups, for example, intellectual disabilities, Autism Spectrum Disorder (ASD), cerebral palsy, or with special learning, behavioral, or emotional needs.

Deaf school It is a specialized school for the deaf and students with severe and/or profound hearing impairment. In a deaf school, teachers use bilingual way of both spoken and signed language to educate students. Students in deaf school are provided opportunities for academic study, sign language, deaf culture, vocational orientation and so forth. throughout the day in a coordinated and integrated way that might not be possible in a typical school.

Institution In this study, some young children are placed in institution like rehabilitation center especially for preschool children. The institution, in which children receive day care services, provides a structured environment and whole day services such as intensive listening training, behavioral and social goals. This could also include placement in private nursing home care facilities.

School adjustment In this study, school adjustment is defined as the adaptation of children with cochlear implants to the academic study, interpersonal relationship and environmental conditions in the educational placement. The process of adapting to environmental conditions includes the adjustment of classroom setting, acoustical environment, school rules and regulations in the educational placement. An interpersonal relationship is an association or acquaintance during intercommunication, in this study it refers to the interpersonal relationship between the child with cochlear implants and the peers in the school, especially their classmates, and the relationship between the child and their main class teacher as well as other course instructors. Academic study refers to all studies related activities during school day.

Children with cochlear implants To study the educational placement and school adjustment, only the children under the age of 18 with unilateral or bilateral cochlear implants are eligible in this study.

3.2 Research questions

This dissertation explores the educational placement and school adjustment of children with cochlear implants. It is totally guided by the following research questions:

Question 1: What is the current educational placement of participant children?

Question 2: What is the difference in educational placement between the Czech and Chinese participant children?

Question 3: What influencing factors contribute to decision on educational placement?

Question 4: Are there any differences in influencing factors on a specific educational placement that has been chosen by parents and/or children with cochlear implants between the two groups?

Question 5: What challenges have they experienced in the process of decision on educational placement and how do they solve the problem?

Question 6: After entering educational placement, how is the school adjustment of these children?

Question7: What influencing factors contribute to children's school adjustment?

Question 8: Are there any differences in the influencing factors on school adjustment between Chinese and Czech groups?

Question 9: What challenges have they experienced in the process of school adjustment?

Question 10: What actions have been taken to improve the school adjustment?

3.3 Research hypotheses

H_0 1: There is no statistically significant difference in influencing factors on the decision on educational placement between the Czech and Chinese group.

H_1 1: There is statistically significant difference in influencing factors on the decision on educational placement between the Czech and Chinese group.

H_0 2: There is no statistically significant difference in the children's adaptation to environmental conditions in the placement between the Czech and Chinese group.

H_1 2: There is statistically significant difference in the children's adaptation to environmental conditions in the placement between the Czech and Chinese group.

H_0 3: There is no statistically significant difference in the children's adaptation to interpersonal relationship in the placement between the Czech and Chinese group.

H_1 3: There is no statistically significant difference in the children's adaptation to interpersonal relationship in the placement between the Czech and Chinese group.

H_0 4: There is no statistically significant difference in the children's adaptation to academic study in the placement between the Czech and Chinese group.

H_1 4: There is no statistically significant difference in the children's adaptation to academic study in the placement between the Czech and Chinese group.

H_0 5: There is no statistically significant difference in the overall school adjustment between the Czech and Chinese group.

H_1 5: There is statistically significant difference in the overall school adjustment between the Czech and Chinese group

H_0 6: There is no statistically significant difference in influencing factors on school adjustment between the Czech and Chinese group.

H_1 6: There is statistically significant difference in influencing factors on school adjustment between the Czech and Chinese group.

3.4 Research design

Quantitative researchers collect data on predetermined instruments that yield statistical data while qualitative researchers collect open-ended data with the primary intent of developing themes from the data. More specifically, quantitative research emphasizes on testing hypothesis and developing relationship between variables. In this study, quantitative method is suitable for testing the influencing factors on educational placement and school adjustment. While qualitative research is more interpretative, which means the researcher makes an interpretation of the data

including developing a description of an individual, analyzing data for themes or categories, and finally draws a conclusion based on the interpretation and proposes further questions to be asked (Liu, 2010). A combination of quantitative and qualitative methods of data collection and analysis will be involved to exactly serve the purpose of deeply seeking for answers of research questions for this study.

Specifically, educational placement and its influencing factors were studied through both in-depth interview and questionnaire. Then all of the influencing factors were coded through survey results, which including in-depth interview transcripts. Study on the school adjustment of children with cochlear implants was investigated firstly by questionnaire, followed by interview and field observation. Field observation data was used as supplementary details for data results from interview, which also validate the results shown by relevant items in the semi-opened questionnaire. Throughout the research process, the ethical issues were strictly monitored when conducting the interview and questionnaire survey.

The qualitative inquiry and research design of this study followed the generic process of data analysis (Creswell, 1998, 2011), which is strictly launched according to the required procedures of grounded theory. To avoid personal bias and to reach agreement in coding, the coding process involves frequently used open coding, axial coding and selective coding methods in grounded theory (Strauss & Corbin, 1990, 1998, 2008). The first step is preparing the data. This process includes transcribing interview records into texts, organizing and dividing the data into different types depending on the data sources. Before analysis, the second step is reading through all the data to obtain a general sense of the information and to reflect on its overall meaning. Then start detailed analysis through dividing text data into categories, followed by coding and labeling. The fourth step is generating themes by comparison terms of coding and labeling. The fifth step is considering how these themes carry research findings and how to be presented in a narrative way. The last step is interpreting the data, for example, comparing the findings with the information gleaned from literature or bringing the findings to particular culture or social context. The quantitative part is based on descriptive analysis, which mainly

includes frequency, the mean value and standard deviation, and comparative data analysis including the independent sample T-test and Pearson Correlation analysis though Statistics Package for Social Science (SPSS 19.0).

All in all, this study is grounded in theory, additionally, with a solid foundation of research literature and previous partial study results. Within the time frame and sufficient available data, the author applied her methodological strengths to research. Throughout the research process, the author adherence to mixed research methods approach to triangulation. Having multiple data sources (Maxwell, 2005; Mitchiner, 2012), exactly both from the questionnaire survey, the interview transcriptions, and field observation notes, provided ways to corroborate evidence. The following flow chart (see Figure 1) presents the research process which combines both qualitative and quantitative methods.

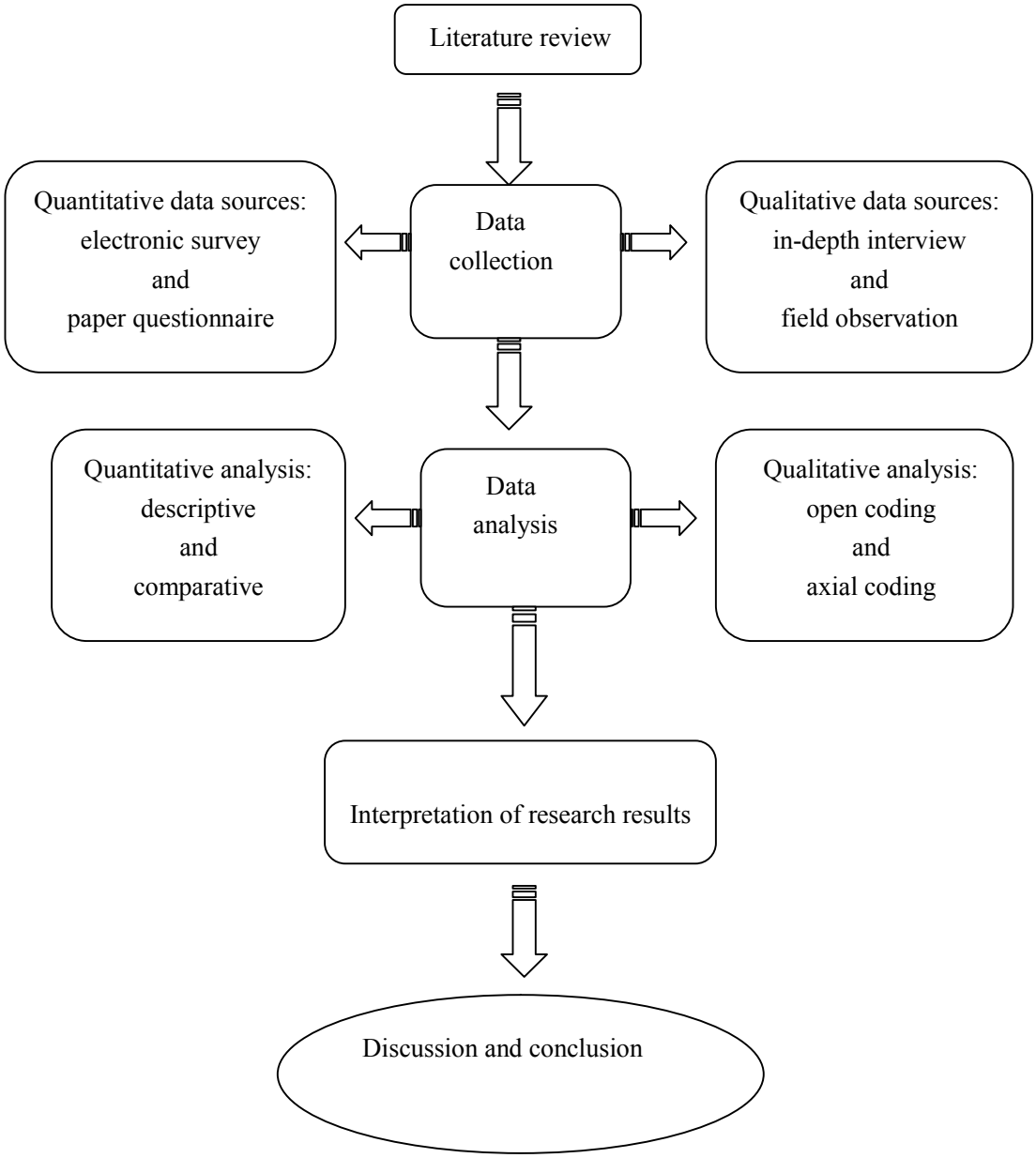


Figure 1. Research process flow chart

3.5 Quantitative data collection

3.5.1 Developing a questionnaire

To investigate the educational placement and school adjustment of children with cochlear implants, it is necessary to do a questionnaire survey. However, as literature

review stated above, there is not any available scale or questionnaire for the present study. To construct a questionnaire was not easy. It was accomplished by following the six steps outlined by Anderson and Arsenault (1998) of determining questions, drafting the questionnaire items, sequencing the items, design the questionnaire, pilot test, and developing a strategies for data collecting and analysis. To determine question items, literature review on cochlear implants, educational placement and school adjustment had been conducted. Additionally, previous partial research results (Wu, 2014) provide significant drafting resource for the constructing of the questionnaire. Then the developed questionnaire was sent to several special education specialists for a better face validity followed by a pilot study in Chengdu. Statistic analysis of the questionnaire had been applied to achieve an acceptable reliability and construct validity with 8 principal component analysis (cumulative 70.211%) after cancelling overlapping items. In the end, the questionnaire was translated into English (see Appendix B) and Czech (see Appendix C).

3.5.2 The structure of questionnaire

The questionnaire (see appendix B) in the present study consists of three parts, which will be discussed through three parts: the information about the informant; the background information of the children with cochlear implants; and the participant children's educational placement and school adjustment. The questionnaire was designed applied to the understandable children with cochlear implants, the main caregivers, the main class teacher, and other professionals who work with the children who use cochlear implants.

The first part states five questions to get information of the informants: 1) identity; 2) gender; 3) hearing; 4) educational attainment and 5) residence. The second part concerned the demographic questions about the child with cochlear implants, including: 1) gender; 2) age; 3) the time of onset of hearing loss; 4) cochlear implantation age; 5) educational placement; 6) whether have transition of educational placement; 7) degree of haring loss; 8) cochlear implants using

frequency; 9) the preferred communication mode at home; 10) the preferred communication mode in school and 11) whether have multiple disabilities. In the last part of the questionnaire, informants were asked using a series of numeric scales to rate influencing factors contributing to educational placement (items 1-13), and school adjustment (items 17-40) of children with cochlear implants. Items 14, 15 and 16 are listed to survey the children's adaptation of school adjustment in environmental conditions of the placement, interpersonal relationship and academic study in the placement. The first 38 items take the form of Likert five-point scale with only one complete thought whilst every of which carried a 5-point range of responses of strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree. This rating helped to determine whether there is a correlation, and how does the correlation between a variety of factors and the child's educational placement as well as their school adjustment. Such influencing factors mainly involved factors of child characteristics, teachers, parental factors and the placement. The last two questions (items 39, 40) are open-ended questions, which are created for any other possible factors that influence on educational placement (items 39) and school adjustment (items 40).

To avoid the language barrier, Google Docs survey was used as a tool to create an electronic survey solely for the Czech informants, while paper questionnaire was distributed for Chinese informants. The Google Docs survey result analysis shows that less than 10 minutes needed for 80% informants to fill out the questionnaire (see Figure 2) and 100% informants link online access to the questionnaire (see Figure 3).

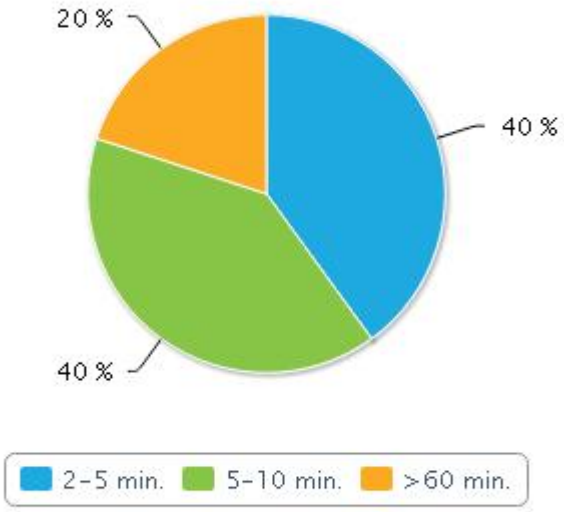


Figure 2. Time needed for filling out the electronic questionnaire survey

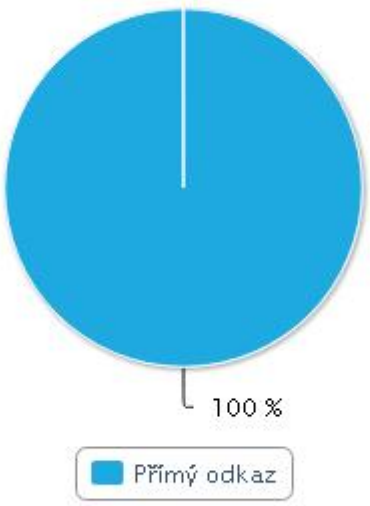


Figure 3. Access to the electronic questionnaire survey

3.5.3 Informants

With the development of technology, performance of cochlear implants is getting better and better, while the price is cheaper than before. Additionally, the candidacy criteria are open for more children to choose a cochlear implant. The implantation

age is even as young as 8-month-old (Wu, 2014). For getting governmental financial support and follow-up rehabilitation services, most children with cochlear implants had registered from 2007 in the Chengdu Rehabilitation and Education Center (CREC) which belongs to the Chengdu Federation of Persons with Disability. Some children who are still in the process of rehabilitation in the center after cochlear implants surgery, some have already been placed in specific educational placement. They come from different districts within Chengdu city, and neighbor counties in Sichuan Province. Comparing with the first level of developed cities like Shanghai or Beijing, as the capital city of Sichuan province which lies in the southwest of China, Chengdu is relatively the second level of developed, which well represent the current condition of socially and economically development of China. A total of 22 children with cochlear implants who registered in CREC were chosen based on random sampling as participants. The other 6 children who live in neighbor cities were introduced by the parents of children with cochlear implants (see Table 1).

Because of limited sum of population in the Czech Republic and language barrier the author faced with, the sample size was expected to be small. Children with cochlear implants in Czech Republic had been contacted under the cooperation of Olomouc special education center and University Hospital Motol which is the cochlear implant center in Czech Republic. According to Langer (2013), approximately a total of 450 child and 100 adult Australian cochlear implant recipients were across the Czech Republic by 2012. In this study, a total of 15 children with cochlear implants who have been placed in educational placement were selected to be the targeted participants (see Table 1).

Table 1. The participant children

Variable	Number (n=43)
Czech	15
China	28

The main caregiver of children (usually the parents) and the main class teachers of

children in educational placement as well as other relevant professionals were asked to fill in the questionnaire. Some children with cochlear implants who are old enough were also guided to fill in the questionnaire as eligible respondents. The full questionnaire was given to the main caregiver and the children with cochlear implants directly for demographic data collection. The main class teachers who work with students who use cochlear implants were asked to fill in the second part of the questionnaire if they did not know the relevant demographic information. Then the parents supplemented the counterpart demographic data. All of the questionnaire survey was conducted based on the principle of voluntariness. To ask whether the targeted participants agree to participate, the informed consent form was designed to get their intent to participate in this study (see Appendix A). The informants are told all of the materials and any information collected used solely for the research purposes associated with this study. In this case, a total of 62 Chinese participants were given paper printed questionnaire with 55 valid usable return questionnaires (see Table 2). The participant children's and questionnaire survey informants' relevant demographic and background information was reported in the opening part of quantitative research results.

Table 2. The informants of questionnaire survey

Variable	Number (n=87)	(Relationship with) the child
Czech (n=32)		
	21	main caregiver
	7	main class teacher
	4	children with CI(s)
China (n=55)		
	41	main caregiver
	7	main class teacher
	7	children with CI(s)

Note: CI(s)-cochlear implant(s)

To avoid the language barrier, Google Docs survey was used as a tool to create an electronic survey for the Czech participants, then the questionnaire survey was

distributed online to participants who met the inclusion criteria in the nationwide. Through the cochlear implants user group (www.suki.cz) and snowball sampling, where parents who have children cochlear implants were encouraged to recruit their acquaintances who met the criteria of the study to participate. The participants involve main caregivers, usually the parents of children who use cochlear implants, the main class teachers, and other professionals who work with students who use cochlear implants. The total number of valid return is 32 (see Table 2). Finally, over a period of three months, the questionnaire responses were collected and computed.

3.6 Qualitative data collection

3.6.1 Respondents

For qualitative data resources, the author conducted in-depth interview and field observation both in the Czech Republic and China. The selection for the interview respondents was purposeful with the child had educational placement transition and based on voluntary participation (see Appendix C). So, in the Czech Republic, three parents from two families, two main class teachers and two children with cochlear implants were interviewed, while in China, a total of four parents from four families, two main class teachers and three children were interviewed. Simultaneously, field-observation technique and video record were employed for two eligible children at their educational placement. The details are listed as follows:

Table 3. Respondents of in-depth interview

Variable	Number (n=17)	(Relationship with) the child
Czech		
	2	mother
	1	father
	2	main class teacher
	2	children with CI(s)
China		
	2	mother
	2	father

	2	main class teacher
	4	children with CI(s)

Note: CI(s)-cochlear implant(s)

Table 4. Participant children for observation

Variable	Number (n=5)	Educational placement
Czech		
	1	deaf school
	1	regular class
China		
	1	deaf school
	1	regular class
	1	institution

3.6.2 In-depth interview

The interview is widely used in qualitative research, because it is a very useful method of collecting data. Interview takes various forms, which is classified by different criteria. Usually it is divided into telephone interview and face to face interview, or structured interview, semi-structured interview and unstructured interview according to whether there is interview guide. In this study, because of long distance, the author firstly gave a phone call to the targeted interviewees, then conducted face-to-face semi-structured in-depth interview. To focus on the research topic, the interviewer firstly outlined main questions about the research topic, then conducted a dynamic interaction process with interviewees. The interview questions are separated depend on participants' relationship with the targeted children: a) the targeted children themselves; b) the parents of targeted children; c) the teachers or professionals who work with the targeted children. The interview guide was designed to elicit views and opinions from interviewees, mainly focus on: a) the decision on educational placement; 2) the factors contribute to educational placement; 3) factors influence on school adjustment; 4) if there is placement change,

and why.

Considering the language barrier and the requirement of interviewer being competent in the face of interviewee, the interview was only conducted for target interviewees. Parents who have children with cochlear implants, the main class teachers, and communicable oral speaking children with cochlear implants were eligible to participate in the interview. Finding respondents of interview relied on purposeful sampling and snowballing due to a small population of children with cochlear implants. Procedures to initiate independent in-depth interview for balanced information, the author tried to recruit deaf parents who have children with cochlear implants to participate in the study, but finally, only one parent with hearing impairment who has a child with a cochlear implant was recruited.

Following a formal interview procedure, two families from Decin, an industrial city in north of Czech Republic, were recruited to respond to the initial telephone interview. Then the author conducted follow-up face to face interviews with the two families, exactly the child's parents and another two class teachers from Olomouc who have students with cochlear implants. When the interview was conducted, professional terms such as educational placement, school adjustment, family expectation, deaf identity and so on. were explained for being easily understood by participants. The participants use language ranged from being fully oral to being bilingual in Chinese/Czech sign language and Chinese/Czech and/or English. The follow-up interviews in the Czech Republic were conducted in English and were later translated and transcribed into written English based on record. For some participants, it is a challenge to translate and transcribe exactly what they expressed. To avoid the possibility of mistranslation, the participants were asked to reflect and review the written transcripts. Two children responded with a complementary sign language, to avoid bias on word choice, their parents were asked to appropriately interpret what their children signed.

3.6.3 Field observation

After the questionnaire survey, when the author was conducting in-depth interview, simultaneously, field-observation technique and short video record were employed for 5 eligible children at their educational placement (see Table 4). The criteria for targeted object of observation were mainly based on their voluntary active cooperative attitude of the children, their parents and their main class teachers. In the Czech Republic, one child who studies in a deaf school and one child studies in a regular class were observed respectively for half a school day. In China, a similar observation process was conducted respectively in deaf school, regular class and institution. Finally, through observation of classroom interaction and environmental conditions, two short valid video records of both classroom teaching time and break time were analyzed. Field observation notes were analyzed by coding and labeling process, further used as supplementary details for data results from interview and validate the findings from close-ended question items through questionnaire survey.

Chapter 4 Research results

4.1 Quantitative research results

As stated earlier, this study was guided by several main questions to explore educational placement and school adjustment of children with cochlear implants. In this section, both quantitative research findings followed were presented briefly in the order of research questions.

4.1.1 The demographic information of the informants

Through analysis of a total of 85 questionnaires, the demographic information of the informant was classified as gender, hearing, educational attainment and rural or urban residence as the followed Table 5 shows. The gender difference for Czech informants is 20 women (62.50%) to 12 men (37.50%), the Chinese informants' gender ratio is 37 (67.27%) to 18 (32.72%).

Table 5. The demographic information of the informants

Variable	Czech (n=32)	China (n=55)
Gender		
female	20 (62.50%)	37 (67.27%)
male	12 (37.50%)	18 (32.72%)
Residence		
urban	20 (62.50%)	42 (76.36%)
rural	12 (37.50%)	13 (23.64%)
Hearing		
normal	24 (75.00%)	38 (69.09%)
mild impaired	4 (12.50%)	7 (12.73%)
moderate impaired	1 (3.12%)	5 (9.09%)
severe impaired	3 (9.37%)	5 (9.09%)

Educational attainment		
illiterate	0	0
primary education	4 (12.50%)	12 (21.82%)
secondary education	14 (43.75%)	26 (47.27%)
higher education	14 (43.75%)	17 (30.90%)

It is worth noting that 62.50% Czech informants resident in urban area, and 37.50% informants live in rural area. While 76.36% Chinese informants' residence in urban cities, only 13 (23.64%) live in rural area. A total of 8 Czech informants reported hearing impairment, three of them are severe hearing impaired. 5 (9.09%) Chinese informants are severe hearing impaired, and other 12 informants reported mild or moderate hearing impairment. The informants' educational placement was classified as illiterate, primary education (12.50%, 21.82%), secondary education (43.75%, 47.27%), and higher education (43.75%, 30.90%). As the table shows, there is no informants report as illiterate in this study.

4.1.2 The demographic and hearing loss related information of participant children

By analyzing all of the returned valid questionnaires, part of results of questionnaire survey about participant children (see Table 6) was listed under the variables. Among the participant children, boys took a bit bigger part of them. The gender rate of Chinese girls to boys is 39.29% to 60.71%, similarly, the Czech girl rate to boy is 40% to 60%. The average age of Czech participant children is 8.6 years old with a comparative number of 9.75 of the Chinese participant children. Age range was divided into: younger than 3 years old; 3 to 5 years old; 6 to 12 years old; 13-15 years old; and 16 to 18 years old. Most of them aged from 6 to 12 years old (53.33%, 42.86%), generally, this age range is during the primary school education. In this study, the percentage of congenital hearing loss is with 80% and 89.29% respectively, which means for most of them, the onset of hearing loss is at birth.

With a very few number of them lost hearing after 3 years old by accident such as car accident. 80% of Czech participant children's hearing loss degree is more than 110dB, another 20% with a hearing loss of 90 to 110 dB. Similarly, all Chinese participant children are also profound hearing impaired and five of them get hearing loss because of illness like tympanitis.

Table 6. The demographic and hearing loss related information of participant children

Variable	Czech (n=15)	China (n=28)
Age (years)		
average age	11.53	9
age range		
< 3	1 (6.67%)	5 (17.86%)
3-5	2 (13.33%)	3 (10.71%)
6-12	4 (26.67%)	10 (35.71%)
13-15	6 (40%)	7 (25%)
16-18	2 (13.33%)	3 (10.71%)
Gender		
girl	6 (40%)	11 (39.29%)
boy	9 (60%)	17 (60.71%)
Onset of hearing loss		
at birth	12 (80%)	25 (89.29%)
<1 year old	2 (13.33%)	2 (7.14%)
1-3 years old	1 (6.67%)	0
>3 years old	0	1 (3.57%)
Hearing loss degree		
41-55dB	0	0
56-70dB	0	0
71-90dB	0	0
90-110dB	3 (20%)	4 (14.29%)

>110dB	12 (80%)	24 (85.71%)

With the development of medical technology, the age of implantation is younger than before. It is easy to see in this study, 5 Chinese children received cochlear implants as young as 8-mongth-old. However, considering the security assessment, most of them got implantation from 1 to 3 years old. Even though research has shown that bilateral cochlear implants is beneficial for sound position and speech discrimination in noise environment (Sparreboom et al., 2010), probably because of security risk and large expense, only one third of cochlear implant users (Peters et al., 2010) choose bilateral way. In this study, only three participants got bilateral implants. With such a high expense to implant, researchers (Liu, 2009; Wu & Liu, 2013) argue that it must be an expensive decoration if they got implants but do not use them. The "always" and "often" users take large part of the participants in this study, however, there are also reports of "sometimes" and never".

Table 7. The cochlear implants related information of participant children

Variable	Czech (n=15)	China (n=28)
Age of implantation		
<1 year old	0	5 (17.86%)
1-3 years old	13 (86.67%)	18 (64.29%)
>3 years old	2 (13.33%)	5 (17.86%)
CI(s)		
bilateral	0	3 (10.71%)
unilateral	15 (100%)	25 (89.29%)
CI(s) using frequency		
always	10 (66.67%)	17 (60.71%)
often	3 (20%)	8 (28.57%)
sometimes	1 (6.67%)	2 (7.14%)
never	1 (6.67%)	1 (3.57%)

Note: CI(s)-cochlear implant(s)

The main purpose of cochlear implantation is getting auditory communication opportunities, however, not every cochlear implant users use cochlear implant after implantation. Participant children in this study report different preferred communication mode at home and in school (see Table 8). Very young age children mainly use a mixed approach of natural gesture to communicate. Interestingly to find that during having a class, the participants use both of spoken and sign language in deaf school, after class, they use only sign language with peers at school, while after school, these children use only spoken language at home. For the participants who study in regular school, they prefer to use spoken language both of during the whole school day and after school.

Table 8. The preferred communication mode of participant children

Preferred communication mode	Czech (n=15)	China (n=28)
At home		
natural gesture	2 (13.33%)	4 (14.29%)
spoken language	9 (60%)	16 (57.14%)
sign language	2 (13.33%)	3 (10.71%)
bilingual approach	2 (13.33%)	5 (17.86%)
In school		
natural gesture	0	0
spoken language	8 (53.33%)	14 (50%)
sign language	4 (26.67%)	8 (28.57%)
bilingual approach	3 (20%)	6 (21.43%)

4.1.3 Educational placement of participant children

As stated before in the literature review, in the Czech Republic, from 1996, the

cochlear implants center was established by the Czech Ministry of Health in the second Medical Faculty of Charles University to serve the people under-18-year-old (Langer, 2013). Till 2012, there are around 450 children cochlear implant users until 2012. In this study, 53.33 % of the participant children are receiving secondary school education. The situation is different in China, on one hand, because of homemade cochlear implants, as the mainly payers, more and more Chinese family could afford the implants. While in the past, only a few families could afford it unless they got financial support provided by the government (Liu, 2010; Zheng, 2010) or other donation from society. On the other hand, with the economic and social development, the Chinese central government is strengthening both policy and financial support for the persons with disabilities or persons with special needs. The Chinese 12th Five-year-plan stated that from 2011 to 2015, the government would annually provide financial support for 4,000 cochlear implants.

Specifically in this study, according to the analysis of questionnaire survey, educational placement presents a bit different in both countries. The Czech participant children (see Figure 4) are placed in regular class (66.67%), deaf school (13.33%), institution (6.67%), and two children stay at home (13.33%).

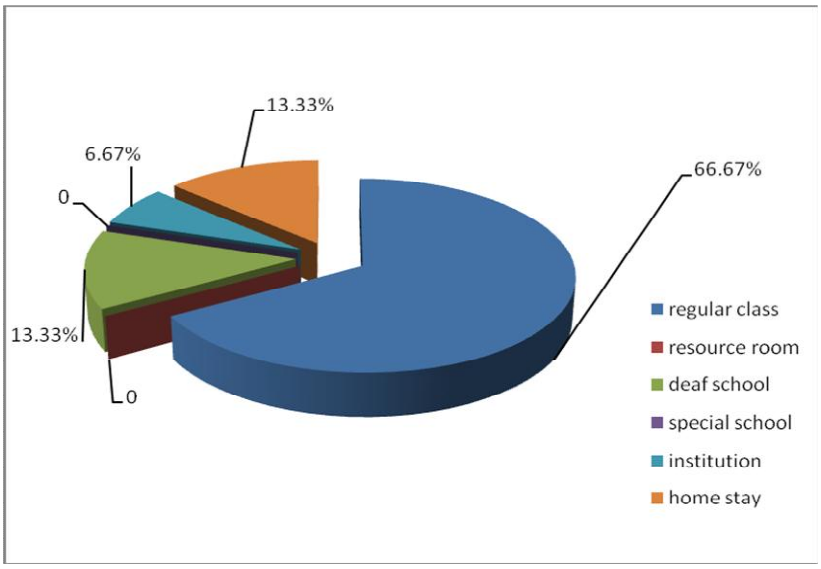


Figure 4. Educational placement of Czech participant children

While in China, educational placement of the participant children (see Figure 5) mainly involves regular class (46%), resource room (17.86%), special school (3.57%), deaf school (14.29%), and institution (10.71%). Participant children are receiving education programs in educational placements range from kindergarten classes to senior high school (see Figure 6). Some of these educational placements provide residential facilities, for instance, in China, usually the special school is set in every county to service all of the people who live in that county. The children who live far away from the school could join in boarding school program for school days.

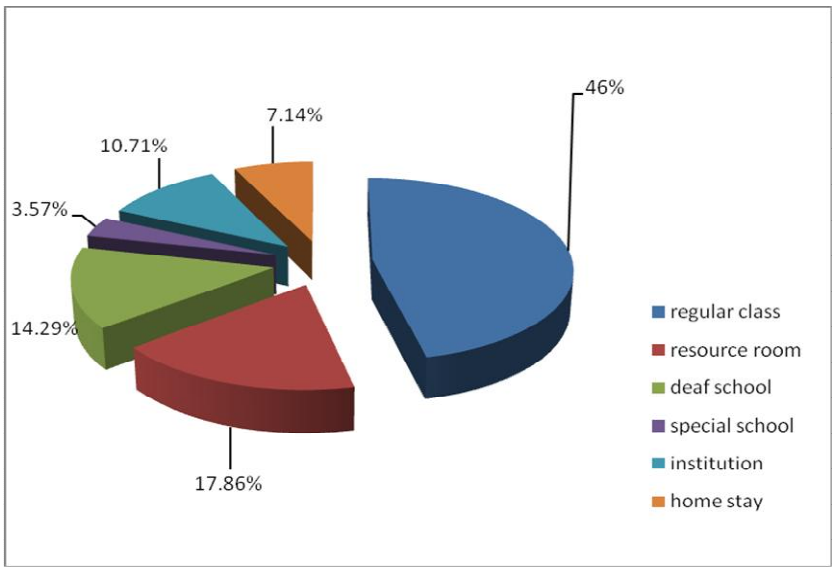


Figure 5. Educational placement of Chinese participant children

According to Figure 6, the participants are receiving different levels of education in the placement. It is worth noting that there are more preschool and primary school Chinese participant children (28.57%, 35.71%) than that of Czech participant children (20%, 26.67%). The result on this point is in line with the current situation in China, in another word, in recent years, there are more newly implanted children.

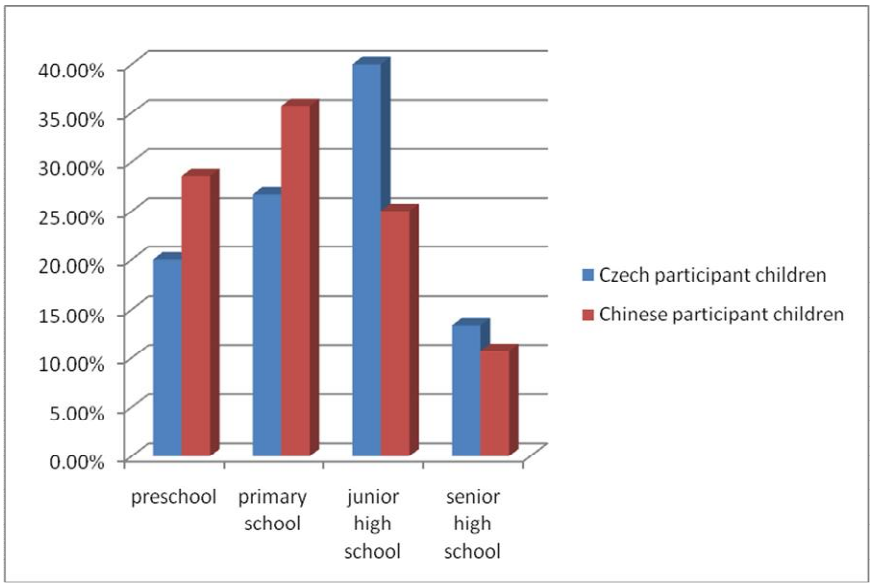


Figure 6. Participant children's stages of education

4.1.4 Influencing factors of educational placement

To study the influencing factors contribute to a specific educational placement that has been chosen usually by the parents, close-ended questions related with this theme were designed and listed in the questionnaire from item 1 to 13. For answering this question, possible factors were classified as three aspects to get related response from the informant. The three main aspects include factors come from the child's (items 1, 2, 3, 5, 9) current hearing, multiple disabilities, Deaf identity, prior school experience, and preferred communication mode; the parents' Deaf identity, hearing, educational attainment, family expectation, preferred communication mode (items 4, 6, 7, 8, 10) and, the placement (items 11, 12, 13), class teachers' preferred communication mode, teachers' attitude toward on

acceptance of the child and environmental conditions of the placement were listed respectively.

As the following descriptive statistics shows in this study the mean and standard deviation of contributors to the educational placement of children with cochlear implants. The influencing factors include the child, the family and the placement related items. To be more concrete, the child related factors such as current hearing, multiple disabilities, deaf identity, prior school experience, and preferred communication mode. The first three contributors reported with high value of mean as the table shows (see Table 9), while the family related contributors to decision on educational placement include parents' hearing and Deaf identity, educational attainment and family expectation. The family expectation is the most significant influencing factors according to the high value of 4.1839. The placement related factors also influence on the decision on educational placement, and the teachers' attitude toward acceptance the child with cochlear implants was reported as the highest value of mean (4.6207).

Table 9. The influencing factors of decision on educational placement (n=87)

Variable	Mean	Std. Deviation
Child		
current hearing	4.2184	.5989
multiple disabilities	4.7931	.4609
deaf identity	4.2414	.6281
pior school experience	3.2069	1.1924
PCM	4.2644	.6552
Family		
parents' hearing	1.8046	.7900
parents' deaf identity	3.3103	1.0377
parents' educational attainment	2.8621	1.0473
parents' PCM	2.0575	.8539

family expectation	4.1839	.6384
Placement		
teachers' PCM	3.7241	.9846
teachers' acceptance attitude	4.6207	.5335
environmental conditions	4.0690	.7893

Note: PCM-preferred communication mode

To answer the Question 3: Are there any differences of influencing factors on a specific educational placement that has been chosen by children with cochlear implants and/or by their parents between Chinese and Czech groups, the T-test for Equality of Means was conducted. As the Table 10 shows as follows, the T-test result shows that according to the reported influencing factors of decision on educational placement, there is statistically significant difference in child related contributors to current hearing (.003**), multiple disabilities (.009**), prior school experience (.021*) and preferred communication mode (.005**) impact on the decision on educational placement between the two groups. The family related contributors such as parents' educational attainment (.015*) and family expectation strongly influence (.000**) on the decision. Almost without surprise, teachers' attitude toward on acceptance the child with cochlear implants and their preferred communication mode significantly influence on the decision, but it is surprising to find out the significant difference in teachers' preferred communication mode (.000**) between the two groups. There is also statistically significant difference in the environmental conditions (.020*) with a reported mean of 3.8125 from the Czech group, however, the Chinese group reported a value of mean as high as 4.2182.

Table 10. The difference in influencing factors of decision on educational placement between the groups

Variable	Czech (n=32)		China (n=55)		t	Sig. (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		

Child						
current hearing	3.9688	.5948	4.3636	.5565	-3.057	.003**
multiple disabilities	4.5938	.6148	4.9091	.2901	-2.730	.009**
deaf identity	4.2188	.6082	4.2545	.6445	-.259	.799
prior school experience	2.8750	.7071	3.4000	1.3689	-2.355	.021*
PCM	4.0000	.6720	4.4182	.5991	-2.911	.005**
Family						
parents' hearing	1.8750	.7931	1.7636	.7926	.632	.529
parents' deaf identity	3.4063	.8370	3.2545	1.1420	.655	.514
parents' educational attainment	3.2188	1.1283	2.6545	.9470	2.495	.015*
parents' PCM	2.0000	.9503	2.0909	.7998	-.455	.651
family expectation	3.8125	.6444	4.4000	.5305	-4.598	.000**
Placement						
teachers' PCM	3.0000	1.0160	4.1455	.6781	-6.300	.000**
teachers' acceptance attitude	4.6875	.4709	4.5818	.5673	.890	.376
environmental conditions	3.8125	.7803	4.2182	.7623	-2.373	.020*

Notes: ** stands for being significant at 0.05 level; PCM-preferred communication mode

The statistics in the following table (see Table 11) shows that there is significant difference in both the child related factors (.000**, $p<0.01$) and placement related factors (.000**, $p<0.01$) between the two groups. Overall, there is statistically significant difference (.000**, $p<0.01$) of influencing factors on educational placement between the Chinese and Czech group of participants. Consequently, H_0 1 was rejected, while H_1 1 was accepted: there is statistically significant difference in influencing factors on educational placement between the Chinese and Czech group of participants.

Table 11. The difference in overall influencing factors of decision on educational placement between the groups

Variable	Czech (n=32) Mean	Czech (n=32) Std. Deviation	China (n=55) Mean	China (n=55) Std. Deviation	t	Sig. (2-tailed)
Child related factors	19.6563	1.1531	21.3455	1.9361	-5.100	.000**
Family related factors	14.3125	1.7677	14.1636	1.5958	.403	.688
Placement related factors	11.5000	1.2700	12.9455	1.1772	-5.365	.000**
Overall	45.4688	2.3415	48.4545	2.9238	-5.233	.000**

Notes: ** stands for being significant at 0.05 level.

To survey whether the child experienced transition of educational placement, the informant was asked to state the previous placement in the questionnaire. A total of 2 Czech children and 7 Chinese children had transition between different educational placements (see Table 12). To be specific, one Czech child transferred from regular classroom to deaf school, and another one transited from institution service center to stay at home. 4 Chinese children transited from regular class to deaf school, 2 children transited from regular class to resource room and one young child transited from the rehabilitation center to a regular class in public kindergarten.

Table 12. Transition of educational placement (n=43)

Variable	Number	Before	Now
Czech (n=15)			
	1	regular class	deaf school
	1	institution	home stay
China (n=28)			
	4	regular class	deaf school
	2	regular class	resource room
	1	institution	regular class

4.1.5 The school adjustment of children with cochlear implants

To answer the Question 4: How is the school adjustment of children with cochlear implants after their educational placement, close-ended questions of 14, 15 and 16 were listed in the questionnaire survey. Based on the three items, the findings from survey questionnaires show that generally the children adapts in educational placement on three main indicators of school adjustment: the environmental conditions, interpersonal relationship and the academic study. The participant had reported extremely high scores (mean=4.1149) in the environmental adaptation among the three indicators in both groups, while the mean value of interpersonal relationship (3.6437) and academic study being reported (mean=1.1099) as well.

Table 13. The overall school adjustment of participant children (n=87)

Variable	Mean	Std. Deviation
Environmental conditions		
Item 14: The child adapts to environmental conditions of the placement	4.1149	.8130
Interpersonal relationship		
Item 15: The child adapts to interpersonal relationship in the placement	3.6437	1.1099
Academic study		
Item 16: The child adapts to academic study in the placement	3.4483	1.1589
Overall	11.2184	2.6299

As the table above shows (see Table 13), among the three indicators of school adjustment, the reported standard deviation value of academic study is 1.1589, which is the highest, followed by interpersonal relationship (1.1099) and environmental condition (.8130). The overall reported score for school adjustment is 11.2184, with

a standard deviation of 2.6299. Generally speaking, to some extent, the two groups of informants reported the children with cochlear implants adapt to the present educational placement.

To survey in the placement whether there is significant difference in the school adjustment of children between the Czech and Chinese groups, relevant items report of 14, 15, and 16 was further analyzed though the use of SPSS. The statistical results of independent samples T-test for Equality of Means show that there is statistically significant difference in all of the three indicators, with environmental conditions ($p<0.01$), interpersonal relationship ($p<0.01$) and academic study ($p<0.05$), between the two groups (see Table 14).

Table 14. The group difference in overall school adjustment

Variable	Czech (n=32)		China (n=55)		t	Sig (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		
Environmental conditions						
item14	4. 5000	.6221	3.8909	.8316	3.596	.001**
Interpersonal relationship						
item15	4.2813	.7718	3.2727	1.1131	4.972	.000**
Academic study item16	3.7813	1.0390	3.2545	1.1897	2.083	.040*
Overall	12.6250	1.9633	10.4000	2.6359	4.479	.000**

Notes: *stands for being significant at 0.05 level.

Among the three indicators, according to Levene's Test for Equality of Variances, the interpersonal relationship between the two groups has assumed equal variances ($F=5.509$), with a significance of .021 ($p<0.05$). The environmental conditions between the two groups also has unequal variances ($F=.413$), with the significance of .522 ($p>0.05$). Similarly, the academic study between the two groups also has unequal variances ($F=.2.118$), with the significance of .149 ($p>0.05$). In this case, H_0

2 is rejected, while H_1 2 is accepted. There is statistically significant difference (.001**, p<0.05) in the children's adjustment of environmental conditions in the placement between the Czech and Chinese group. Similarly, H_0 4 is rejected, while H_1 4 is accepted, namely, there is statistically significant difference (.040*, p<0.05) in the children's adjustment of academic study in the placement between the Czech and Chinese group is accepted. H_1 3 is accepted, there is statistically significant difference (.000, p<0.05) in the children's adjustment of interpersonal relationship in the placement between the two groups. According to the T-test, the overall school adjustment (F=4.641, sig.= .034), with 95% Confidence Interval of the Difference, the t value is 4.479 (Sig.= .000**, p<0.05), indicating the statistic significance of the overall school adjustment of the two groups. Consequently, H_0 5 is rejected, while H_1 5 is accepted, that is to say there is statistically significant difference in overall school adjustment between the Chinese and Czech group of participants.

Based on the findings from the questionnaire survey, the mainly common placement for both groups includes regular class and deaf school, hence it is necessary to compare the group difference in school adjustment of children in these two main educational placements between Czech and China. The statistic findings show that there is significant group difference in two main indicators in environmental conditions and interpersonal relationship. There is significant group difference (.000**, p<0.05) in overall school adjustment of children in regular class. Generally speaking, the two groups reported well adjustment in deaf school with a mean value of 13.3333 and 11.4000 respectively, however the score of overall school adjustment in regular class is lower than this value.

Table 15. The group difference in overall school adjustment of children placed in regular class

Variable	Czech (n=15)		China (n=24)		t	Sig. (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		
Environmental conditions	4. 3333	.7237	3.5000	. 8340	3.188	.003**

Interpersonal relationship	3.9333	.7988	2.6667	1.0072	4.121	.000**
Academic study	3.3333	1.0465	2.6250	1.0959	1. 977	.053
Overall	11.6000	1. 7237	8.7500	2.0903	4.418	.000**

Note: ** stands for being significant at 0.05 level.

According to the table above (see Table 15), the comparison between the two groups of participant children placed in regular classes shows the significant difference in children's adjustment to environmental conditions (.003*, $p<0.05$) and to interpersonal relationship (.000**, $p<0.05$), while there is no significant difference in academic study (.053, $p>0.05$).

Table 16. The group difference in overall school adjustment of children placed in deaf school

Variable	**Czech (n=6)**		**China (n=10)**		**t**	**Sig. (2-tailed)**
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**		
Environmental conditions	4. 5000	.5477	4.0000	. 6666	1.545	.145
Interpersonal relationship	4.5000	.5477	3.7000	.9486	1.871	.082
Academic study	4.0000	.6324	3.7000	1.0593	.625	.542
Overall	13.3333	1.0328	11.4000	2.2211	1.986	.067

From the table above (see Table 16), a comparison between the two groups of participant children placed in deaf school shows there is no statistic significant difference in all of the three indicators of school adjustment (.145, $p>0.05$; .082, $p>0.05$; .542, $p>0.05$). Overall, there is no significant difference (.067, $p>0.05$) in overall school adjustment of children being placed in deaf school between the two groups.

Table 17. Chinese participant children's school adjustment in three main educational placements

Variable	Mean	Std. Deviation
Regular class(n=24)		
environmental conditions	3.5000	. 8340
interpersonal relationship	2.6667	1.0072
academic study	2.6250	1.0959
overall	8.7500	2.0903
Resource room (n=12)		
environmental conditions	4.0833	.6685
interpersonal relationship	3.4167	.9962
academic study	3.3333	1.0730
overall	10.8333	2.4058
Deaf school(n=10)		
environmental conditions	4.0000	. 6666
interpersonal relationship	3.7000	.9486
academic study	3.7000	1.0593
overall	11.4000	2.2211

As results stated before from the questionnaire survey (see Figure 4), in this study, the Czech participant children are mainly placed in regular class and deaf school, while the Chinese participant children are mainly placed in. regular class, resource room and deaf school (see Figure 5). To explore the children's school adjustment in main placements, statistic analysis is applied into examine the difference between main educational placements. The table above (see Table 17) shows according to a total of 46 informants' response of the Chinese participant children's school adjustment in three main educational placements, indicating the score of overall school adjustment in deaf school is a bit higher than in resource room and much higher than in regular class.

Through examining the difference in school adjustment of participant children of both groups between regular class and deaf school, the analysis of statistics shows overall there is significant difference (.002**, $p<0.05$) in Chinese participant children's school adjustment between regular class and deaf school (see Table18), while there is no significant difference (.199, $p>0.05$) in Czech participant children's

school adjustment between regular class and deaf school (see Table 19).

Table 18. The difference in school adjustment of Chinese participant children between regular class and deaf school

Variable	Regular class (n=24)		Deaf school (n=10)		t	Sig. (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		
Environmental conditions	3. 5000	.8340	4. 0000	. 6666	1.680	.103
Interpersonal relationship	2.6667	1.0072	3.7000	.9486	1.583	.979
Academic study	2.6250	1.0959	3.7000	1.0593	2. 630	.013*
Overall	8.7500	2.0903	11.4000	2.2211	3.309	.002**

Note: * stands for being significant at 0.05 level; ** stands for being significant at 0.05 level.

Table 19. The difference in school adjustment of Czech participant children between regular class and deaf school

Variable	Regular class (n=15)		Deaf school (n=6)		t	Sig. (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		
Environmental conditions	4. 3333	.7327	4.5000	. 5477	.506	.383
Interpersonal relationship	3.9333	.7988	4.5000	.5477	1.583	.979
Academic study	3.3333	1.0465	4.0000	.6324	1. 445	.074
Overall	11.6000	1.7237	13.3333	1.0328	2.283	.199

The comparison between the school adjustment of Chinese participant children who are placed in regular class and resource room (see Table 20) shows the significant difference in both environmental conditions (.043*, $p<0.05$) and interpersonal relationship (.42*, $p<0.05$), while there is no significant difference in academic study (.074, $p>0.05$). Overall, the difference in school adjustment of

Chinese participant children who are placed in regular class and resource room is significant (.011*, p<0.05).

Table 20. The difference in school adjustment of Chinese participant children between regular class and resource room

Variable	Regular class (n=24) Mean	Regular class (n=24) Std. Deviation	Resource room (n=12) Mean	Resource room (n=12) Std. Deviation	t	Sig. (2-tailed)
Environmental conditions	3. 5000	.8340	4. 0833	. 6685	-2.104	.043*
Interpersonal relationship	2.6667	1.0072	3.4167	.9962	-2.114	.042*
Academic study	2.6250	1.0959	3.3333	1.0730	-1. 840	.074
Overall	8.7500	2.0903	10.8333	2.4058	-2.682	.011*

Note: *stands for being significant at 0.05 level.

Table 21. The difference in school adjustment of Chinese participant children between deaf school and resource room

Variable	Deaf school (n=10) Mean	Deaf school (n=10) Std. Deviation	Resource room (n=12) Mean	Resource room (n=12) Std. Deviation	t	Sig. (2-tailed)
Environmental conditions	4. 0000	.6666	4. 0833	. 6685	-.291	.774
Interpersonal relationship	3.7000	.9486	3.4167	.9962	.679	.505
Academic study	3.7000	1.0593	3.3333	1.0730	. 803	.432
Overall	11.4000	2.2221	10.8333	2.4058	.569	.575

The findings from the statistics above motivated the action to further examine the difference in school adjustment of Chinese participant children between deaf school and resource room. The data collection from questionnaire survey shows 10 informants' responses about the school adjustment of children in deaf school and 12

informants' responses about the school adjustment of children in resource room. The analysis of statistics shows (see Table 21) informants generally reported high score in children's adaptation to environmental conditions (4.0000, 4.0833), the reported score of adaptation to interpersonal relationship and to academic study is similar in both placements. There is neither significant difference in score of any indicator ($p>0.05$) nor the overall score of school adjustment (.575, $p>0.05$) between the two placements.

Table 22. The difference in overall school adjustment of children in different stages of education between the groups

Variable	Czech(n=32) Mean	Czech(n=32) Std. Deviation	China(n=55) Mean	China(n=55) Std. Deviation	t	Sig. (2-tailed)
Preschool						
Czech (n=6)	12. 3333	2.1602	11.8125	2.2276	.492	.628
China (n=16)						
Primary school						
Czech (n=12)	11.7500	2.2613	8.3913	2.210	4.234	.000**
China (n=23)						
Junior high school						
Czech (n=10)	12.2000	2.1499	10.8889	3.1001	1.081	.295
China (n=9)						
Senior high school						
Czech (n=4)	10.2500	2.6299	9.2857	3.1471	.515	.619
China (n=7)						

Note: ** stands for being significant at 0.05 level.

Participant children are placed in a continuum of educational placement in different stages of education in kindergarten, primary school, junior high school and senior high school (see Figure 6). To explore the school adjustment of children in different stages of education, further to compare the group difference between the two groups, T-test for equality of means was applied to the statistic analysis. Even though the sample size is small, the findings are acceptable. The analysis reveals significant

difference (.000**, $p<0.01$) in school adjustment of children who are placed in primary school between the groups. While there is no significant difference ($p>0.05$) in school adjustment of children placed in preschool, junior high school or senior high school between the groups. Generally speaking, the preschool children reported the highest score in school adjustment regardless of public or private kindergarten, the institution for children with hearing impairment, or home stay (see Table 22). Analysis of interview, which would be discussed in the qualitative research result, indicating preschool children mainly stay with main care givers, usually the parents, and main class teachers. In the comfortable environment, they are guided to play games or spend quality floor time. Comparing with students who study in other three stages of education, records from the field observation also show that these children could play games almost with everyone in an open and free environment regardless of context difference between the groups. However, after entering into primary school, parents and teachers' pressure on academic push them to study hard. This is especially true for the children in senior high school, the informants reported the lowest score in overall school adjustment mainly due to poor performance in academic study.

4.1.6 Influencing factors of school adjustment

To answer the Question 7: What influencing factors contribute to children's school adjustment, factors related close-ended question items (17-38) come from the child, the parents and the family, the teachers and the placement were listed in the questionnaire. To be more concrete, questions (items 17-27, 37, 38) about factors of the child 's involved with the child's current hearing, language development, academic achievement, study pressure, peer relationship, learning style, social skills, personality, self-efficacy, multiple disabilities, early childhood education, preferred communication mode, and time duration in the placement; factors come from the parents' and the family are related with parents' educational attainment, parental stress, family function, and family involvement (items 28-31); the last aspect is about the placement (items 32-36), factors including class size, class teachers'

preferred communication mode, their working experience with child who are hearing impaired, received specialized training in the field of special education, and the environmental conditions of the placement are listed respectively. As follow, the correlation between influencing factors and school adjustment was presented (see Table 23). Though the process of Pearson Correlation analysis, the overall score of school adjustment of children with cochlear implants in environmental conditions, interpersonal relationship and the academic study was input as dependant variable while the other influencing factors were chosen as independent variables in the statistic package.

Table 23. The correlation between school adjustment and its influencing factors (n=87)

Variable	Mean	Std. Deviation	Pearson's r	Sig. (2-tailed)
Child				
current hearing	4.2184	.5989	.237*	.027
study pressure	3.9885	.7070	-.205	.057
peer relationship	4.1379	.6319	.310**	.003
learning style	4.1609	.5471	.008	.944
social skills	3.7125	.5478	.238*	.026
personality	3.6322	.6667	.192	.074
self-efficacy	4.3103	.6344	.154	.154
academic achievement	4.0920	.8711	.308**	.004
multiple disabilities	4.7931	.4609	-.097	.374
language development	3.4828	.7291	.144	.182
early childhood education	3.2759	.7264	.318**	.003
PCM	4.2644	.6552	.013	.902
time duration in the placement	3.7931	.8371	-.090	.406
Family				
educational attainment	2.8621	1.0473	.269*	.012
parental stress	2.4023	. 9333	-.324**	.002

family function	4.0805	.7808	.128	.239
family involvement	4.4828	.6073	.122	.258
Placement				
class size	4.4943	.5028	.155	.152
teachers' PCM	3.7241	.9846	.093	.391
teachers' specialized training	4.7816	.4155	.022	.988
teachers' working experience	4.6552	.5461	.239**	.026
environmental conditions	4.0690	.7893	.086	.428

Notes: *Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level; PCM-preferred communication mode

The statistic results show that several child related factors including the learning style, social skills, self-efficacy and early childhood education positively influence on the school adjustment with statistically significance (see Table 23). Additionally, the placement related factors like the teachers' working experience with the hearing impaired also reported with a significant value (.239**). While some other factors reported in this study such as multiple disabilities, current hearing, study pressure and parental stress negatively correlated to the overall school adjustment.

To answer the Question 6: Are there any differences in the influencing factors on school adjustment of children with cochlear implants between the Chinese and Czech groups, the T-test for Equality of Means was conducted again in this section. The following table (see Table 24) shows that among all of the child related factors, strongly statistic significance of factors including current hearing, study pressure, academic achievement, multiple disabilities, preferred communication mode ($p<0.01$) and early childhood education ($p<0.05$) between the two groups.

Table 24. The difference in child related influencing factors of school adjustment between the groups

Variable	Czech (n=32) Mean	Czech (n=32) Std. Deviation	China (n=55) Mean	China (n=55) Std. Deviation	t	Sig. (2-tailed)
Child						
current hearing	3.9688	.5948	4.3636	.5565	-3.057	.003**
study pressure	3.6875	.6444	4.1638	.6875	-3.186	.002**
peer relationship	3.9688	.5948	4.2364	.6372	11.935	.056
learning style	4.0938	.3901	4.2000	. 6206	-.980	.330
social skills	3.5625	.6189	3.8000	.4868	-1.861	.068
personality	3.6563	.7452	3.6182	.6233	.255	.799
self-efficacy	4.3125	.5922	4.3091	.6631	.024	.981
academic achievement	3.3438	.7873	4.5273	.5726	-8.076	.000**
multiple disabilities	4.5938	.6148	4.9091	.2901	-.2.730	.002**
language development	3.3438	.7878	3.8000	.7793	-1.363	.176
early childhood education	3.0313	.8607	3.4182	.5991	-2.246	.029*
PCM	4.0000	.6720	4.4182	.5991	-2.911	.005**
time duration in the placement	3.9375	.8775	3.7091	.8090	1.231	.222
Overall	49.5000	2.4494	53.2364	2.4111	-6.929	.000**

Notes: * stands for being significant at 0.05 level; ** stands for being significant at 0.05 level.

Overall, from the table above (see Table 24), it is obviously to see there is statistically significant difference (.000**, $p<0.05$) in the child related contributors to school adjustment between the Chinese and Czech groups. Specifically, there is significant difference in current hearing (.003**, $p<0.05$), study pressure(.002**, $p<0.05$), academic achievement (.000**, $p<0.05$), multiple disabilities (.002**, $p<0.05$), early childhood education (.029*, $p<0.05$)) and preferred communication mode (.005**, $p<0.05$). The following table (see Table 25) presents the difference in Pearson's correlation coefficient between the two groups regarding the correlation between school adjustment and its child related influencing factors.

Table 25. The group difference in correlation between school adjustment and its child related influencing factors

Variable	Czech (n=32)		China (n=55)	
	Pearson's r	Sig. (2-tailed)	Pearson's r	Sig. (2-tailed)
Child				
current hearing	.293	.103	.316*	.019
study pressure	-.108	.555	-.159	.245
peer relationship	.293	.103	.505**	.000
learning style	.332	.064	.154	.262
social skills	.020	.914	.283*	.036
personality	.703**	.000	.052	.707
self-efficacy	.146	.426	.288*	.033
academic achievement	.185	.310	.017	.901
multiple disabilities	-.291	.107	-.363**	.006
language development	.149	.417	.272*	.045
early childhood education	-.432*	.014	-.143	.297
PCM	.293	.103	.385**	.004
time duration in the placement	.229	.207	-.344*	.010

Notes: * stands for being significant at 0.05 level; ** stands for being significant at 0.01 level

The detailed results were reported respectively in the table above though analysis of Pearson Correlation between the child related influencing factors and school adjustment within the two groups. Different correlation coefficient showed in the influencing factor of the child's current hearing between the Czech and Chinese groups with 95% Confidence Interval of the Difference.

Table 26. The difference in family related influencing factors of school adjustment between the groups

Variable	Czech (n=32)		China (n=55)		t	Sig. (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		

Family						
parents' educational attainment	3.2188	1.1283	2.6545	.9470	2.495	.015*
parental stress	2.6563	.8654	2.2545	.9470	1.968	.052
family function	4.0000	.9503	4.1273	.6681	-.668	.508
family involvement	4.6250	.4918	4.4000	.6554	1.815	.073
Overall	14.5000	1.9007	13.4364	1.9414	2.483	.015*

Notes: * stands for being significant at 0.05 level.

From the table above (Table 26), it is easy to see the family related influencing factors, which include parents' educational attainment, parental stress, family function and family involvement. There is statistic significance in parents' educational attainment, with the value of Sig. (.015*, P<0.05) and the overall family related influencing factors, with the value of Sig. (.015*, p<0.05) respectively at 0.05 level. It is worth noting that mean of family involvement is relatively high (4.6250, 4.4000) as the study shows as follows. The following table (see Table 27) shows the comparison of the results of correlation coefficient between the family related influencing factors and the school adjustment with 95% Confidence Interval of the Difference.

Table 27. The group difference in correlation between school adjustment and its family related influencing factors

Variable	Czech (n=32)		China (n=55)	
	Pearson's r	Sig. (2-tailed)	Pearson's r	Sig. (2-tailed)
Family				
educational attainment	.093	.613	.331*	.014
parental stress	-.078	.670	-.404**	.002
family function	.138	.450	.093	.502
family involvement	.217	.233	.141	.303

Notes: * stands for being significant at 0.05 level; ** stands for being significant at 0.01 level

Table 28. The difference in placement related influencing factors of school adjustment between the groups

Variable	Czech (n=32)		China (n=55)		t	Sig (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		
Placement						
class size	4.6250	.4918	4.4182	.4978	1.877	.064
teachers' PCM	3.0000	1.0160	4.1455	.6781	-6.300	.000**
teachers' specialized training	4.8125	.3965	4.7636	.4287	.527	.600
teachers' working experience	4.7813	.4200	4.5818	.5991	1.818	.073
environmental conditions	3.8125	.7803	4.2182	.7623	-2.373	.020*
Overall	21.0313	1.2044	22.1273	1.4408	-3.626	.000**

Notes: ** stands for being significant at 0.05 level.

Comparing with the child related and family related influencing factors, factors involved placement mainly classified as class size, teachers' preferred communication mode, teachers' specialized training and working experience with children who have hearing impairment, and the environmental conditions. The Table 28 shows that there is statistic significance between the two groups in teachers' preferred communication mode (.000**) and environmental conditions (.020*) at 0.05 level. Three factors listed above reported with a very high value of mean: class size (4.6250), teachers' working experience (4.7813) and teachers' specialized training (4.8125) in the form of Likert five-point scale in the questionnaire survey. Overall, there is no statistic significance between the two groups. There is significant difference in overall placement related influencing factors between the two groups (.000**, $p<0.05$).

Table 29. The group difference in correlation between school adjustment and its placement related influencing factors

Variable	Czech (n=32)		China (n=55)	
	Pearson's r	Sig. (2-tailed)	Pearson's r	Sig. (2-tailed)

Placement				
class size	-.251	.167	-.223	.102
teachers' PCM	.016	.930	.329*	.014
teachers' specialized training	.073	.693	.062	.652
teachers' working experience	.093	.613	.213	.118
environmental conditions	.068	.710	.269*	.047

Notes: * stands for being significant at 0.05 level; ** stands for being significant at 0.01 level

From the comparative findings from the correlation analysis, it is obviously to see the difference in correlation between the placement related influencing factors and school adjustment between the Chinese and Czech informants. To analyze the overall influencing factors of school adjustment, the sum of all child, family, and placement related factors was computed as the following table shows (see Table 30).

Table 30. The difference in influencing factors of school adjustment between the groups

Variable	Czech (n=32)		China (n=55)		t	Sig (2-tailed)
	Mean	Std. Deviation	Mean	Std. Deviation		
Child related factors	49.5000	2.4494	53.2364	2.4111	-6.929	.000**
Family related factors	14.5000	1.9007	13.4364	1.9414	2.483	.015*
Placement related factors	21.0313	1.2044	22.1273	1.4408	-3.626	.000**
Overall	85.0313	2.7764	88.8000	3.7238	-4.973	.000**

Notes: ** stands for being significant at 0.05 level.

To sum up, the three related factors of school adjustment, specifically, the child related, the family related and the placement related factors respectively shows the significant difference (.000**, $p<0.01$; 015*, $p<0.05$; .000**, $p<0.01$). According to the overall information above, H_1 6 is accepted, namely, there is statistically significant difference in influencing factors on school adjustment between Chinese and Czech group of participants, while H_0 6 is rejected.

4.1.7 The two open-ended questions in the questionnaire survey

In the end of the survey questionnaire, two open-ended questions are listed as following table shows. 68.75% of Czech informants and 47.27% of Chinese informants responded to the first question, 59.37% of Czech informants and 69.09% of Chinese informants responded to the second question, while other informants did not response to the questions. Result findings from the questionnaire survey show that there are some common factors reported by both groups (see Table 31).

Table 31. Responses to the open-ended questions in questionnaire survey

	Czech (n=32)	China (n=55)
Question	**Response**	
Item 39: Please write down any other factors influence on the decision on child's educational placement.	**Cooperation** between the school and parents (11)	**Distance** from home to school (12)
	Distance from home to school (8)	**Law enforcement** for equality voluntary access to school (9)
	Relationship with other cochlear implants users inside and outside school (2)	**Relationship** with other cochlear implants users inside and outside school (5)
	Sickness absence (1)	
Item 40: Please write down any other factors influence on the child's school adjustment	**Acoustic noise environment** (10)	**Acoustic noise environment** (18)
	Specialized teaching methodology for the cochlear implant users in regular class (5)	**Cooperation** between the school and parents (9)
	Modified tests for the cochlear implant users in regular class (3)	**Seats arrangement** in the classroom (8)
	Hearing peers envy the cochlear implant users because of their exclusive sign language communication with class teachers (1)	**Adapted learning materials** for the cochlear implant users in regular class (3)
		Adapted curricula for the cochlear implant users in

regular class (3)

The Czech informants reported several other contributors to the decision on educational placement which involved with the cooperation between the school and parents (11), the distance from home to school (8), the relationship with other cochlear implants users both inside and outside school (2), and sickness absence (1). Four of them wrote in detail to explain the long distance from home to school. For instance, an informant explained 80 kilometers distance from the village where they live to the nearest deaf school in Olomouc city center. In this case, the family decided to place the child in a regular class near home. Comparing with the Czech group, except the common response on the distance from home to school and the relationship with other peers, 9 Chinese informants wrote even though with the legislative guarantee, it is necessary to supervise the law enforcement for equality voluntary access to school. Especially when the child with cochlear implants wanted to study in regular school, some regular class teachers emotionally rejected their decision on educational placement. As for the other influencing factors of the school adjustment, both group reported acoustic noise environment impact on the school adjustment with a relative high frequency (10, 18). In regular class, adapting teaching approach (5) and adapting assessment (3) for the cochlear implant users were reported by Czech informants. Another Czech informant wrote some other hearing peers envy the cochlear implant users because the class teachers use sign language to communicate with them, while the hearing peers in the class cannot be involved. Additionally, the high frequency other factors reported by the Chinese informants include the cooperation between the school and parents (9) and the seats arrangement in the classroom (8). The adapting course program for the cochlear implant users in regular class was reported by 3 informants.

4.2 Qualitative research results

To deeply explore the related questions of educational placement and school adjustment in the qualitative part of the study, research methods of both in-depth interview and field observation are conducted respectively. To successfully conduct

the in-depth interview, interview guide has been designed in advance as presented above in the section of qualitative research methods. All of the interview records were transcribed into word texts, simultaneously, the notes from field observation were transcribed as well. It is very meaningful to find out the differences in responses and reasons behind when addressing those interview questions. Depends on the previous listed research questions, transcripts are classified and presented by different themes in this section as the characteristics of respondents, problems in the process of decision on educational placement and school adjustment, transition of educational placement, findings from observation and actions have been taken to improve school adjustment. Though open and axial coding, the following analysis from both interview and field observation shows the qualitative research results.

4.2.1 The characteristics of respondents

As stated in the section of research methods, for achieving more qualitative information to complete the questionnaire survey, the semi-structured in-depth interview was conducted for respondents. Based on their voluntariness and understandable spoken language, there are a total of 6 eligible child respondents being involved in interview. Because of language barrier in the Czech Republic, only two primary school children in regular class (CZC1, 2) and their parents (CZP1, 2) were interviewed by spoken English at their home. In China, two children who study in deaf school (CHNC1, 4) and another two children who study in regular class (CHNC2, 3) were interviewed by Mandarin Chinese in their schools. On the same day, their main class teachers were interviewed for other related questions listed in the interview guide. The following table shows the main detailed characteristics of child respondents.

Table 32. The characteristics of child respondents for interview (n=6)

Number	Gender	Age	Educational placement	Placement location	Implantation age	Preferred communication mode
CZC 1	boy	11	regular class	urban	2-year-old	spoken language

CZC 2	girl	10	regular class	urban	1-year-old	spoken language
CHNC 1	girl	9	deaf school	urban	6-year-old	sign language
CHNC 2	boy	13	regular class	urban	2-year-old	spoken language
CHNC 3	girl	10	regular class	urban	2-year-old	spoken language
CHNC 4	boy	17	deaf school	urban	8-year-old	sign language

Additionally, a total of 7 parents of the child with cochlear implants were interviewed. As the following table shows, there are 6 hearing parents and one Chinese mother reported with severe hearing impairment (CHNP2). Among the three Czech parents, two of them received higher education, one got secondary education, and all of them live in the urban cities.

Table 33. Demographic characteristics of parent respondents for interview (n=7)

Number	Relationship with the child	The child's placement	Residence	Hearing status	Educational attainment
CZP1	mother	regular class	urban	hearing	higher education
CZP2	father	regular class	urban	hearing	higher education
CZP3	mother	deaf school	urban	hearing	secondary education
CHNP1	mother	deaf school	urban	hearing	secondary education
CHNP2	mother	regular class	rural	hearing	secondary education
CHNP3	father	regular class	urban	hearing impaired	higher education
CHNP4	father	deaf school	urban	hearing	higher education

The demographic characteristic of being interviewed main class teachers were presented as follows in the Table 34. All of the main class teachers are from the urban area in both countries. Two women teachers were interviewed in Olomouc, one of them teaches in deaf school (CZT1) and the other in regular class (CZT2). Both of them achieved Master's degree of Special Education and use bilingual way as the main communication mode to teach in classroom. The interview was also

conducted in Chengdu for two Chinese teachers, CHNT1 teaches in a regular class in the regular school, she teaches in spoken language because she does not know sign language. Another male teacher teaches in a deaf school (CHNT2) mainly with a bilingual approach.

Table 34. Demographic characteristics of main class teachers for interview (n=4)

Number	Gender	School type	School location	Hearing status	Main communication mode	Degree
CZT 1	female	deaf school	urban	hearing	bilingual	MSE
CZT 2	female	regular class	urban	hearing	bilingual	MSE
CHNT 1	female	regular class	urban	hearing	spoken language	MOE
CHNT 2	male	deaf school	urban	hearing	bilingual	BSE

Notes: MSE-Master of Special Education; MOE-Master of Education; BSE-Bachelor of Special Education

Table 35. The characteristic of participant children for observation (n=5)

Number	Gender	Age	Educational placement	Placement location	Implantation age	preferred communication mode
CZC 1	boy	11	regular class	urban	2-year-old	spoken language
CZC 3	girl	7	deaf school	urban	5-year-old	sign language
CHNC 1	girl	9	deaf school	urban	6-year-old	sign language
CHNC 3	girl	10	regular class	urban	2-year-old	spoken language
CHNC 5	boy	6	institution	urban	2-year-old	natural gesture

As the table (see Table 35) shows above, a total of 5 children aged from 6 to 11 were observed in three different educational placements: regular class, deaf school and institution. The youngest child being placed in institution where the center provided comprehensive services involved rehabilitation after implantation, speech therapy, and education for children with cochlear implants. The two children in regular class both used spoken language, while the children in deaf school took a

sign approach. It is important to pay attention to their implantation age, which varied from 2 years old to 6 years old. The observation in every placement was continued for half a school day, notes were written in the placement, and two short valid video records of both classroom teaching time and break time were analyzed through coding and labeling.

4.2.2 Challenges in the process of decision on educational placement

To answer the Question 5: What challenges have they experienced in the process of decision on educational placement and how do they solve the problem? During the interview, when the parents were asked the challenges they have experienced in the process of decision on the educational placement, the first response by two Chinese parents was "the dilemma in mainstreaming or specialized setting". "Regular school would be beneficial for him, because someday in the future he will step out into society, after all orally communication is the social mainstream. My son's hearing is not good enough, it is really hard to choose suppose that I can choose the placement. The problem is if he cannot understand well in the regular class, he must be frustrated, unhappy and even be hurted more inward."

Table 36. Challenges reported by parents in decision on educational placement

Czech	China
Large class size in regular class "I considered the regular class, but doubted with the class size. In the beginning, the class teacher said the class size is 22, finally it is 32. It's too noisy, I changed my plan for another school." (CZP1)	**Dilemma in mainstreaming or special settings** "of course it's better to go to regular class, but my daughter's situation is too hard!" (CHNP1) "my son's hearing is not good enough, it is really hard to choose suppose that I can choose the placement." (CHNP3)
Long distance from home to deaf school "80 kilometers, it's too far for us to send the child to the deaf school." (CZP3)	**Long distance from home to deaf school** "he is too young to go to the boarding school." (CHNP3)

	Regular class teachers refuse to accept the child "you know she is hearing impaired, regular school is unfit for her. Special school is good for her!' (CHNP 1)
	Regular class teachers do not know sign language "we plan for regular class, but the main class teacher is so kindly to tell that no teachers in her regular class know sign language." (CHNP 1)

Other challenges in the process of decision on educational placement reported by parents are listed in the table above. CHNP 1 reported "I planned to register the regular school near of home. It is the lawful right and free entrance because our family has registered permanent residence here. Then after consultation with the main class teacher, she is so kindly to tell that no problem the child study in her class, but no teachers can sign if he does not understand anything." She continued to say "it's very difficult for me. We contacted with a regular school in the village where we live and met with the main class teacher with the help of the headmaster. You cannot imagine her attitude, my daughter and I just stood there near of her office table and waited about two hours, but she turned a blind eye to us. I smiled a lot and tried to talk to her, you know what she said 'you know she is hearing impaired, regular school is unfit for her. Special school is good for her!' " The problem of long distance from home to deaf school was reported by parents of both groups. "We do not live in the city center, it is so far away from our home to the deaf school. After consultation with the headmaster in the primary school, we are informed my son could study in the regular class. If we register the deaf school, my son is so young to go to boarding school alone."

Generally speaking, to solve problems in the process, parents tried to change their

decision on another placement, or consult with the headmaster or the main class teacher for a better choice. CZP 1 points out the special education inspector plays an important role in helping children with special needs successfully entering into the regular class. The inspector routinely checks the students in placement and document all school study related materials.

4.2.3 Challenges in the process of school adjustment

After entering into educational placement, children with cochlear implants reported the difference in overall school adjustment. Furthermore, they have experienced varied challenges and problems in the process of school adjustment. To answer the Question 9: What challenges have they experienced in the process of school adjustment? Depending on regular class and deaf school, though coding of all interview transcripts about the problems in the process of school adjustment reported by the parents and participant children, all challenges and problems are classified as the following table (see Table 37).

Table 37. Challenges reported in the process of school adjustment in regular class

Czech	China
A low teacher-student ratio "it should be no more than 22, if there is student with disability in the class. In private school, usually there are more teachers in one class." (CZP1)	**A low teacher-student ratio** "you know the class size (45 students), how much time does a teacher can give for each student in the class." (CHNP1) "one main class teacher, others are subject teachers. " (CHNC 2)
Acoustic noise environment "it should be no more than 22, if there is student with disability in the class, my son can't easily hear in outdoor activities." (CZP1)	**Acoustic noise environment** "when we're doing group activities, it's so noisy that I can't hear clearly." (CHNC 2)

Communication barrier with hearing peers "they speak in the school, but sometimes others don't understand them. (CZP 1)	**Communication barrier with hearing peers** "she doesn't want to explain again and again, and finally found that the classmates don't understand her……can't understand the meaning of sentences." (CHNP1) "others don't understand him." (CHNP3)
Isolation "during the break, he always sit alone in the classroom and enjoy snacks brought from home." (CZP1) "I stay alone, I have my interest." (CZC 1)	**Isolation** "classmates don't play games with her, and vice versa." (CHNP1) "others don't understand him, neither play games with him. He plays by himself. " (CHNP 4)
Class teachers do not know sign language "the class teacher doesn't know sign language, but there is a tutor for help if necessary." (CZP 1)	**Class teachers do not know sign language** "teachers don't sign, it really depends on how much she can understand from the spoken language in lesson." (CHNP 1) "nobody signs in the class." (CHNP 4)
	Peers bullying "the group leader don't collect her homework, because nobody knows her handwriting. She even has no chance to join in some other activities ." (CHNP 1) "when she speaks in the public, some classmates look at her and call her robot!" (CHNP 3)
	Study pressure "for mathematics, she doesn't understand how to calculate…she felt so hard to study. She cries a lot." (CHNP 1) "from the grade 5, she can't achieve the average

	level, it's a tough problem!" (CHNP3) "I'm one the top ten students in primary school, but after middle school, everybody is fighting for a good high school…" (CHNC 4)
	Teachers refuse to accept the child "the Chinese language teacher said she can't speak, but I know my daughter can speak. She let my daughter sit in the last row near of the wall in the classroom. " (CHNP 1)

Some common problems reported by both Czech and Chinese respondents during the interview, in regular class, the large class size, communication barrier with hearing peers, isolation feeling, the class teachers do not know sign language were reported. In the Czech Republic, the class size usually is about 30-35, during the interview, CZP1 said "the class size should be no larger than 22 if there is student with disability in the class. When the class size is larger than 28, I really doubt my son can hear well in the lesson." The class size is even larger in China because of large population in cities. It is very common to see 45 students in a class in regular school. "You know the class size, 45 students in one class, how much time does a teacher can give for each student in the class" said by CHNP1. In the rural area, the class size is a bit flexible depends on how many children in the local area. Additionally, a big class size caused challenging acoustic environment for the children with hearing impairment, especially in the outdoor activities and collective studies, they cannot hear clearly. The class teachers do not no sign language was also reported by CZP 1, CHNP 1 and CHNP 1. "Teachers don't sign, it really depends on how much she can understand from the spoken language in lesson," reported by CHNP 1, and CHNP 4 said, "nobody signs in the class." The situation for CZP 1 was different, her son has really good hearing after cochlear implantation, she said, "the class teacher doesn't know sign language, but it's not a big problem because there is

a tutor for help if necessary. My son understands well, so he doesn't need it!" The emotion related problems reported by respondents were listed as isolation, as a quote from CZP1 "during the break, he always sit alone in the classroom and enjoy snacks brought from home. He feels quite boring to do what other hearing peers do in the class, such as playing and chasing. He likes to talk to the teacher or some others who are mature and knowledgeable." CHNP 1 and CHNP 4 reported their children don't play games with others and vice versa.

Three other problems were only reported by Chinese respondents: peers bullying, study pressure, and teacher's bad attitude. CHNP 1 said in the interview, "the group leader doesn't collect her homework, she even has no chance to join in some other activities." The bullying behaviors include verbal violence, "when she speaks in the public, some classmates look at her and call her robot! She feels angry and sad" reported by CHNP 3. Additionally, teacher's bad attitude towards on the child also negatively impact on the child's school adjustment. As reported by CHNP 1, she remained fresh memory of that terrible experience, "the Chinese language teacher said my daughter can't speak, but I know she can speak. She let my daughter sit in the last row near of the wall in the classroom. How can she hear clearly in such a big class size." It is worth noting that both CHNP 1 and CHNP3 reported the children had study pressure in the regular school, on one hand because they can't understand well about the academic study work, on another hand, they felt frustrated by the competition with other hearing peers.

Table 38. Challenges reported in the process of school adjustment in deaf school

Czech	China
(No problem reported)	**Communication barrier with peers** "The child doesn't know how to sign in the beginning. Soon it's getting better to communicate with peers in the deaf school." (CHNP1)

	"in the beginning I don't know much about Chinese sigh language, I used natural gesture, they understand some." (CHNC 4)

While in the deaf school, the class size is much smaller than the regular class, in this case, the class size caused problems such as challenging acoustic environment and low teacher-student ratio disappeared. The class size in the deaf school being observed in China is 18, the counterpart being observed in Czech is 9. Through interviews of five respondents (CHNC 1, CHNC 4, CZP 3, CHNP 1, CHNP 4), there was only one problem reported by both CHNP1and CHNC 4, in the beginning, they didn't know much about Chinese sigh language, but very soon they got used to communicate with other hearing-impaired or deaf peers. It was also reported that he teachers in deaf school provided strong support by a bilingual approach, in this case, they learned sign language very quickly. From all of the analysis above, it is clearly to see the Chinese respondents experienced more problems than the Czech respondents. There are more problems reported by those being placed in regular school than those in deaf school, it is also worth nothing that the most salient problem being reported by both group of respondents is communication barrier.

4.2.4 Transition of educational placement

In the part of quantitative research results, the questionnaire survey shows that a total of 2 Czech children and 7 Chinese children had transition between different educational placements (see Table 12). To analyze the reasons behind and the differences of transition between the Czech and Chinese participant children, the interview guide question was designed (see Appendix E). Among the interview respondents, CHNC 1 and CHNC4 transited from regular class to deaf school, without any other reports of transition between different educational placements. CZT 1 and CHNP 1 were asked the same question to explore reasons for transition of educational placement.

Table 39. Reasons reported for transition of educational placement

Czech	China
Communication barrier "other children don't understand him." (CZT 1)	**Communication barrier** "her classmates don't understand what she said. She only understand low speed Mandarin Chinese, if classmates speak in Sichuan dialect, She understands nothing….. for lessons, she understand some. " (CHNP 1)
Poor academic performance "he can listen but he can't understand…….never completed any study assignment." (CZT 1)	**Poor academic performance** "I can't follow the study, in the deaf school I'm not overwhelmed by study pressure." (CHNC 4)
Family lose expectation "in the beginning, his mom strongly involves with everything, now he is almost abandoned." (CZT 1)	**Deaf identity** "I'm a deaf, I'm happy to stay in the deaf school." (CHNC 1) "it's more natural for her to communicate with other hearing impaired friends, she likes being with them." (CHNP 1)

According to the response from the two children who had transition from regular class to deaf school, one parent of one of the child, and one teacher whose student also transferred from regular class to deaf school. Reported reasons for transition include communication barrier with hearing peers and teacher in school, which is also the most salient problem being reported. Poor academic performance, as CHNC 4 said during the interview was the key reason for her transition, "I can't follow the study, in the deaf school I'm not overwhelmed by study pressure". Similar response

was also mentioned, a quote from CZT 1 “he had never completed any study assignment” was used as the evidence. CHNP 1 said it was really hard for CHNC 1 to fulfill academic requirements in regular school, however in special school she had choice to focus on her interests like painting and embroidery. Family’s expectation underpinned the decision that they would like to do everything they could at all costs to maximize the development of child. On the contrary, they could do nothing. The teacher CZT 1 reported that the child’s mom was the only person involves with everything about him, when his mom didn’t care about him, he is almost abandoned. Deaf identity is essential to psychological development of deaf people. Bat-Chava (2000) argues that those people with stronger culturally deaf identities have higher self-esteem than those with weaker deaf identifies. “She couldn’t communicate with peers or teachers by spoken language. The worst thing is she has low self-esteem and motivation, she said she’s a deaf” reported by CHNP 1. During the interview, CHNC 1 answered the question to Deaf identity by “I’m a deaf, I’m happy to stay in the deaf school.” Her mom CHNP 1 gave a confirmation by saying “it’s more natural for her to communicate with other hearing impaired friends, she likes being with them.” On the contrary, the other child respondents in the interview reported that they are hearing people, because they can hear and speak. CZP 1 shared an interesting response of her son CZ 1 to his friends, “my son went to the shopping mall with his friends. He wants to buy some game cards. So his friends show him a notice written on the checkout ‘discount for the disabled’, but my son said ‘he is not a deaf’.”

The transition of educational placement brings so many changes for the child, which not only involves with the placement but also the teachers, peers, even the main communication mode. After transition, the children’s preferred communication mode changed in school, they started to mainly use sign language to communicate with teachers and peers. The peer relationship was also changed with the transition of educational placement. During the interview, CHNP 1 shared her daughter’s personal experience in the process of hard decision on educational placement and transition from a regular class to a deaf school. In the regular school, CHNC 1 was isolated by hearing peers, however she became a focus of friends in special school.

And no wonder that she was one of the several students who can speak in the class. In the field observation which would be discussed in the following part, it was found that the peer interaction was correlated with the gender effect. Through the check list, generally speaking in the primary school, girls interacted with girls more often than with boys, and vice versa.

4.2.5 Observation of placement

In the Czech Republic, two children with cochlear implants who studies in a deaf school and a regular class were observed respectively for half a school day. A similar observation process was conducted for three Chinese counterparts in a deaf school, regular class and resource room. Finally, two short valid video records of classroom teaching time and break time were transcribed and analyzed mainly focus on their classroom interaction. Field observation notes were analyzed by coding and labeling process, further used as supplementary details for data results from interview and compare with the research findings from close-ended question items through questionnaire survey.

Generally speaking, all observed schools and one institution in this study are far from busy traffic arteries, with beautiful and quiet schoolyard.. The classrooms are arranged one by one in the school, in the institution where the sound insulation panel and one-way glass grantee a better acoustic environment. The first worth noting point is the big difference in class size between the two observed students in regular classes. CZC 1 and CHNC 3 both are fourth grade primary school students. CZC 1 sits in the second row in a class with 22 hearing students, while in CHNC 3's class, there are 45 students. Even though CHNC 3 sits in the front row, noisy environment really challenges her such as during the collective study activities. In some of group activities, she cannot distinguish location of where the sound comes from. As stated before, a typical deaf person's thought process depends on means of visual and logical concepts, anyway, to some extent, CHNC 3 must be a good observer.

Based on the Child Behavior Checklist (Achenbach, 1991) and parental narratives,

some common factors including spoken communication ability, personality and the ability to participate in athletic activities had been found impact to children's peer relationship (Bat-Chava & Deignan, 2001). This observation revealed that the peer relationship was apparently correlated with gender difference, namely, girls tend to have frequent interaction with girls, while boys prefer to make friends with boys wherever in regular class or in deaf school. CZC 1 enjoyed working individually and having a discussion or getting help from the teacher. Most of the break time, CZC 1 preferred to sit quietly to enjoy snacks brought snacks from home or reading a book by himself. He explained that he thought he was much more mature than others in the same class and he thought probably adults knew much more than what he knew.

Several observation indicators are listed for field observation notes writing and further analysis of video records, for instance, teachers' use of voice, eye contact, facial expression, signs giving, body language, choosing standing a central position to stand, giving instructions and approvals, checking for understanding. Through analysis of classroom interaction between the child with cochlear implants and the class teachers, findings show that in regular class the teachers' specialized teaching skills need to be improved. The class teachers observed in this study, they had never signed and they do not know sign language, the hearing impaired children's communication opportunities might be limited by exclusive spoken communication mode. While in the deaf schools and in the institution, teachers there always take a bilingual communication mode.

4.2.6 Actions have been taken to improve school adjustment

From the qualitative analysis of data from in-depth interview as stated before, respondents from Czech reported that the special education inspector plays an important role in guaranteeing the children's (with special needs) equality access to education and a least limited environment to educate them. Based on individualized education program, which is available in both regular class and deaf school, the inspector gives practical suggestions to the school director to meet requirements

such as a certain class size, arranging a tutor or interpreter for the child with hearing impairment. While in China, individualized education program is available in deaf school and special school, but the child with cochlear implants placed in regular class do not get supports from individualized education program. Information support from professionals, mainly by class teachers were given for parents as CHNP 1 reported in the interview, "the class teachers called me and told me it's free to study. We don't need to pay for tuition fee and even got monthly financial support from the government. " CHNT 2 said "any related information would be informed for parents, for instance, some activities organized by the association". The two deaf schools being observed in this study both regularly provide parents with free sign language courses to improve their effective communication with the children.

Table 40. Actions have been taken to improve school adjustment

Czech	China
Maintaining a small class size "we consult with the class teacher, it would be no more than 22 students in one class." (CZP1) "there are only 23 students in this class, but other class size is bigger, with 30 or 32 students." (CZT 2)	**Maintaining a small class size** "we tried our best to choose a small class, we consulted with the headmaster and the class teacher." (CHNP 1) "we tried, but you know we have many students, the school cannot give up anyone." (CHNT 1)
Sign language courses in deaf school "sign language courses are provided for all parents. The regular meeting is held for parents for discussion and consultation about students." (CZT 2)	**Sign language courses in deaf school** "the school hands out Chinese sign language book and professional teachers teach them how to sign on Fridays. Some common problems about communication with hearing impaired and culture related topics are discussed in the lesson." (CHNT 2)
Information support from professionals	**Information support from professionals**

"teachers and the special education supervisor helped a lot. The special education inspector can recommend to the school director……we can write letter to her if there is any problem……if it's necessary we can apply for an interpreter." (CZP 1)	"the class teachers called me and told me it's free to study. We don't need to pay for tuition fee and even got monthly financial support from the government." (CHNP 1) "parents are informed on, for instance, some activities organized by the association" (CHNT 2)
Prosocial orientation in school "regularly we organized some activities to improve their prosocial orientation." (CZT 1) "on that school open day, we did record in the school. Students are dancing together, including a boy with physical disability sits on the wheelchair. I saw my daughter feels so happy and confident. " (CZP 1)	**Prosocial orientation in school** "the school held many school activities for children as well as varied parent-child activities like sports meeting, picnic……" (CHNT 1) "in the class, one or two student tutor are assigned to help the student with special needs……during school activities, students are guided to be ready to help others. There are also some fellowship activities with some private companies, the students are very happy to watch their animation shows." (CHNT 2)
Parental involvement "I learned sign language, sometimes we discussed with my children by sign language. Every day after school, I correct their homework……help them with practicing pronunciation." (CZP 1)	**Parental involvement** "in the school, I learned some sign language……I had taken initiative to learn sign language by reading books. For about three months I accompanied her in the beginning of entering regular school……join in workshops, help her to review school study." (CHNP 1)
Individualized education program in	**Individualized education program in deaf**

regular class and deaf school	**school and special school**
"they had IEP, the special education inspector routinely check all study related situation in school." (CZP 1) "the special education inspector gave advices." (CZT 1)	""we use IEP for students." (CHNT 2) "they have IEP in special school." (CHNT 1)

Effective family function (Wang et al., 2011) mainly depends on families' coping strategies facing of challenges, the mutual support between family members, the communication between children and family members, the social communication of children beyond the family, the ability to solve problems and make a decision, and the families' expectation for the child. Actually, families in this study involved a lot with children's school adjustment, according to responses, the parents accompanied the child in placement in the beginning varied from one week to three months. As the main caregiver, CHNP 1 and CZC 1 had great expectation in her daughter's spoken language, they spent a lot of time in helping children with review of school study or addressing homework. They talked with class teachers about the situation of their children, and helped the child being familiar with the classmates and so on. Parents also actively participated in school activities such as sports meeting and some other parent-child activities organized by association.

Chapter 5 Discussion

This chapter discussed the findings from both quantitative and qualitative studies by the following classified themes: 1) the educational placement and its influencing

factors; 2) the limitation of regular class settings for children with cochlear implants; 3) the difference in overall school adjustment between the groups and the group difference in correlation between school adjustment and its influencing factors, and 4) the significance of bilingualism for children with cochlear implants. In the ending of this chapter, implication and recommendations are listed in order to support the children with cochlear implants, their families, and personnel who work with them followed by the discussion of limitations of this study and recommendations for future research.

5.1 The difference in educational placement and its influencing factors between the groups

Research findings from this study suggest the difference both in educational placement of children with cochlear implants between the two participant groups and its influencing factors. The related continuum of educational placement includes regular class, deaf school, resource room and institution, the Czech participants mainly placed in the regular class, while the Chinese participants placed in the four above placements. Participants are receiving different level of education from preschool to senior high school. With a relative much bigger number of preschool and primary children in China, which is consistent with the current situation in recent years, there are more newly implanted children benefit by cheaper homemade cochlear implants and the central government's financial support.

The further analysis of influencing factors shows that for both groups, the child related factors mainly influence on the decision on educational placement, followed by placement related factors and the family related factors. The child whether has multiple disabilities, the current hearing, Deaf identity and preferred communication mode are the influencing factors contribute to the decision on educational placement. While comparing with the two groups of informants, there is significant difference in the current hearing, prior school experience, preferred communication mode, parents' educational attainment, teachers' preferred communication code, teachers'

acceptance attitude and environmental conditions being reported as influencing factors of the decision on educational placement.

5.2 Transition of educational placement and problems reported in the process of decision on educational placement and school adjustment reveal the limitation of regular class settings

For those children being placed in regular class, the statistics analysis shows that there is significant difference in their school adjustment between the two groups, while there is no significant difference in the school adjustment of children placed in the deaf school between the groups. Based on the qualitative methods, this study shows the reported problems in the process of decision on educational placement and school adjustment. In the process of decision on educational placement, some common problems reported by both groups include the long distance from home to ideal school, the big class size in regular class. There are more problems reported by the Chinese interviewees such as the dilemma in mainstreaming or specialized setting, the regular class teachers do not know sign language. It is worth noting that there is surprising phenomenon of child being refused by regular class teachers. The interviewed main class teacher has never received any pre-service and in-service teacher education in order to enable them to work with students with special needs in their classrooms. However, if teachers accepted the child with special needs in the class, they could guide and set a model for other student peers in the same class to help the child with special needs. After entering the educational placement, generally children being placed in regular class experienced more problems than those being placed in deaf school. A variety of problems have been reported: communication difficulties with peers and teachers, a challenging acoustic environment due to large class size, peers bulling, isolation, study pressure, teachers' bad attitude and class teachers do not know sign language.

While in the deaf school the class size caused problems such as challenging acoustic environment and low teacher-student ratio disappeared, the only problem

reported is communication barrier with peers in the beginning because of incomplete sign language learning. After year(s) of study in regular class, some children transferred to deaf school, transition of children with cochlear implants was also examined by previous studies (Thoutenhoofd, 2006; Marschark et al., 2007; Rhoten et al., 2007; Wu & Liu, 2013). According to the interview, even though there are some other reported reasons for transition, for instance, the family lost expectation for the child, poor academic performance and the child related factors such as communication barrier and Deaf identity, we cannot neglect those above problems result from limited regular class setting. As Marschark et al. (2006) argued that if we truly want these children to succeed, we must confront environmental and methodological barriers to education.

5.3 The group difference in overall school adjustment and in correlation between school adjustment and its influencing factors

Though statistic analysis, generally speaking, to some extent, the two groups of informants reported the children with cochlear implants adapt to the present educational placement. While the findings show that there is significant difference in overall school adjustment of children with cochlear implants and its influencing factors between the Czech and Chinese participants due to the significant difference in adjustment in environmental conditions and academic study. There is no significant difference in interpersonal relationship between the two groups. Comparing the group difference between the Czech and Chinese participants, statistic findings show there is significant difference in children's current hearing, study pressure, learning style, self-efficacy, language development, early childhood education, preferred communication mode, time duration in the placement. Significant difference has also been showed in family related influencing factors such as parents' educational placement and family function. Similarly, the placement related influencing factors including teachers' preferred communication mode, teachers' specialized training in the field of special education and their working

experience with children who have hearing impairment, as well as the environmental conditions reported the significant difference between the two groups. The analysis of correlation between school adjustment and its influencing factors shows children's learning style, social skills, self-efficacy, early childhood education and time duration in the placement, and teachers' preferred communication mode significantly influence on school adjustment. A comparative finding shows the group difference in correlation between school adjustment and the child related, family related and placement related influencing factors.

5.4 Communication barrier in placements implies the significance of bilingualism for children with cochlear implants

Classroom study activities such as collective learning in groups and participation in classroom instruction in many cases limit the hearing impaired children's learning because of communication barrier (Simonsen et al., 2009). What matters in education is not how well a child can hear or speak but whether a child has equal access to the social interactive process of teaching and learning.

On one hand, because the regular classroom teachers do not know sign language, children could not have equal chances to communicate with teachers. Even though in some situation for part of school day, they could get help from an interpreter or note taker, simultaneously, they miss something during the class instruction. Similarly, in the beginning of study in deaf school, children do not know well in sign language, they might experience a temporary period of incomplete communication with peers. It is no doubt their communication opportunities are limited due to communication barrier in regular class. This finding is consistent with previous studies (Yoshinaga-Itano, 2006) and will be discussed in the following. On the other hand, it seems like the language barrier is getting bigger when the children with cochlear implants in regular class do not sign either. Preisler et al. (2002) argued the children who had the best oral skills were also well-versed in a signed language, they use sign language to clarify misunderstandings by asking for repetition or explanation.

Knowing sign language benefits children's spoken language development (Yoshinaga-Itano, 2006), however, for the child who does not have a foundation of sign language can only depends on spoken approach. Percy-Smith, Cayé-Thomasen, Breinegaard, & Jensen (2010) pointed out parental mode of communication is essential for speech and language outcomes in cochlear implanted children. If the hearing families recognize advantages of bilingualism and maintaining bilingualism (Mitchiner & Sass-Lehrer, 2011; Mitchiner, 2012; Mitchiner, 2015; Sass-Lehrer, 2016) in the early diagnosis and even after implantation, the main class teacher take a bilingual approach, the child would have more possibilities to participate in classroom interaction.

5.5 Implications and recommendations

From research findings of this study, it is apparent to see the children with cochlear implants being placed in regular classes, their unique challenges or needs had not been recognized. They had not received insufficient support to maximize their academic potential. The class teachers' attitude toward children with cochlear implants and/or hearing impairment is limited by their own ideologies about inclusive education and cultural views related to Deaf and sign language and further to understand how their own ideologies may influence their practices in supporting children's educational placement and school adjustment. Additionally, especially for some older children who had an established sign language base prior to cochlear implantation, even though after receiving the cochlear implant, they still rely on visual language. In the mainstreaming setting, a big class size has impact on acoustical environment which challenges the children with cochlear implants and/or hearing impairment to listen clearly. As pointed out in the literature review, research has shown cochlear implants cannot guarantee children's spoken language development, there are many factors may have impact. The mainstreaming educational placement to be unpredictable, however, hearing families may only use spoken language and push their children learning spoken language only regardless of how bilingualism can

maximize their children's language development and growth, as a consequence, they lose the chance to lay an early foundation for sign language or bilingual development in spoken and sign language.

Findings from this study and implications stated above warrant several recommendations for decision on appropriate educational placement and achieving better school adjustment to support children with cochlear implants and their families. A summary of recommendations are listed below:

1). In the early time of diagnosis of hearing impairment and even after receiving cochlear implants, families first need to understand how their own communication mode influence their practices in supporting children's language development and increasing communication opportunities. Recognizing advantages of bilingualism and maintaining bilingualism is valuable to optimize children's cognitive, social, and linguistic development. To safeguard a child's language development and growth, families must reduce the pressure on children to push learning spoken language only and, instead, learn more about bilingual development in spoken and sign language as well as strategies on how to promote bilingualism at home.

2) For the children with cochlear implants in regular class, the IEP is necessary to be needed, especially for the Chinese participant children, to recognize their unique strengths and challenges. Professionals who work with these children need specify their unique needs in the IEP to maximize their academic potential, for instance, the decision on educational placement should be rational based on the individualized program instead of families' own wishful thinking. Specially designed supplementary aids and services should be included such as adapted learning materials and auditory systems for hard of hearing students. Sign language interpreters may be needed in the class for all or part of the school day or the child might need a note taker in order to focus on classroom instruction.

3) In China, the regular classroom teachers need to be respectful towards the decision on educational placement of children who have cochlear implants and improve their attitudes toward inclusion of students with special needs in their classrooms.

4) Families need to enhance parental involvement in school activities. It is important and helpful to have open discussion and cooperate closely with class teachers as well as other professionals who work with children who use cochlear implants.

5) Maintaining a small class size for the class with students who have hearing impairment. It is also helpful for them to seat in the front and middle section of the class.

6) Professionals, especially class teachers need to understand how their own communication mode influences their practices in supporting cochlear implant users. A bilingual approach, especially when there are students who rely on visual language in addition to their hearing and speech broaden their possibilities to classroom interaction.

7) Families need to develop a reciprocal relationship with other families with children who have cochlear implants though which families can find out more information about parenting children, decision on educational placement, problems and solutions in the process of educational placement and school adjustment for appropriate educational placements and achieving better school adjustment.

8) Regular classroom teachers who work with children who use cochlear implants should develop a reciprocal relationship with other counterparts by having a dialogue about their experiences on implement of educational placement and knowledge about inclusion, collaboration and team teaching.

9) In order to create a more supportive environment, hearing peers as well as their parents in inclusive settings are needed to be informed on their children might be benefit from their experience with other persons who have disabilities. For instance, peer tutoring in the class-wide is valuable.

10) It is critical to deploy specialized pre-service and in-service teacher education to establish their attitudes toward inclusion and enhance their specialized teaching methodology and skills such as utilizing repeat, rephrase, paraphrase, directions and checking for understanding during instruction in order to enable class teachers to work with students with cochlear implants and/or other special needs in their

classrooms.

5.6 Limitations of the study

Meaningful research findings and implications have been shown from this study, while it is worth noting that some limitations to be mentioned. Firstly, it is a comparative study between the groups respectively comes from Czech and China, while the language- and culture- non-correspondence could possibly have impact on participants' responses. For instance, during the interview, the Chinese respondents are likely to state problems in school adjustment result from educational placement while the Czech respondents are likely to attribute to the child. Secondly, the researcher handed out hard copy of questionnaire survey in China and informants were required to fill out independently and take back on the spot, with instructions and explanation of some terms such as Deaf identity, parental involvement being given, however because of language barrier, electronic survey was conducted in Czech for about three months. Finally, though the present study consists of quantitative and qualitative parts because of a combination of the two research methods being conducted in both countries, for achieving theoretical saturation and avoiding sample error, future research need to ask for not only larger but also paired samples to compare with.

Chapter 6 Conclusion

This study examines the educational placement and school adjustment of a total of 43 children who have cochlear implants mainly through a combination of quantitative and qualitative methods. Research findings from this study will be discussed in this section by subchapters which are parallel with guided research questions and

hypotheses.

6.1 The educational placement of participant children

Question 1: What is the current educational placement of participant children?

Question 2: What is the difference in educational placement between the Czech and Chinese participant children?

The findings from the questionnaire survey indicate the difference of children's educational placement between Czech and China groups, among a continuum of educational placement which includes regular class, resource room, deaf school, institution and home stay. The Czech participant children are placed in regular class (66.67%), deaf school (13.33%), institution (6.67%), and two children stay at home (13.33%). While the Chinese participant children are mainly placed in regular class (46%), resource room (17.86%), special school (3.57%), deaf school (14.29%), and institution (10.71%). The participants are receiving different levels of education in the placement range from kindergarten classes to senior high school. It is worth noting that there are more preschool and primary school Chinese participant children (28.57%, 35.71%) than that of Czech participant children (20%, 26.67%). The result on this point is in line with the current situation in China, there are more newly implanted children.

6.2 The influencing factors of educational placement

Question 3: What influencing factors contribute to decision on educational placement?

Question 4: Are there any differences in influencing factors on a specific educational placement that has been chosen by parents and/or children with cochlear implants between the two groups?

The findings indicate that mainly because of the child related influencing factors such as the child's age, current hearing, multi disabilities, deaf identity, prior school experience and preferred communication mode, they are placed in different

placements in different stages of education. Except the child related factors, the family related factors and placement related factors also contribute to the decision on educational placement. While according to T-test results, there is statistically significant difference in scores of some influencing factors being reported between the two groups: 1) the child related contributors include current hearing (.003**), multiple disabilities (.009**), prior school experience (.021*) and preferred communication mode (.005**), 2) the family related contributors include parents' educational attainment (.015*) and family expectation (.000**), and 3) the placement related factors include teachers' preferred communication mode (.000**) and environmental conditions (.020*). The Chinese group reported higher scores on class teachers' communication mode, their attitude toward acceptance the children with cochlear implants and environmental conditions, however the Czech group reported lower scores on them. Overall, there is statistically significant difference (.000**, $p<0.01$) of influencing factors on educational placement between the two groups due to the significant difference in both the child related factors (.000**, $p<0.01$) and placement related factors (.000**, $p<0.01$). Consequently, H_0 1 was rejected, while H_1 1 was accepted: there is statistically significant difference in influencing factors on educational placement between the Chinese and Czech group of participants.

6.3 Challenges and solutions in the process of decision on educational placement

Question 5: What challenges have they experienced in the process of decision on educational placement and how do they solve the problem?

Challenges reported by both groups in decision on educational placement include large class size in regular class, long distance from home to deaf school. Additionally, Chinese parents generally experienced the dilemma in mainstreaming or specialized setting. One parent reported regular class teachers do not know sign language and they refuse to accept the child in their classroom. To cope with these challenges and solve problems in the process of decision on educational placement, parents tried to change their decision on another placement, or consult with the headmaster or the

main class teacher for a better choice. It is worth noting that based on Czech parents' report, the special education inspector plays an important role in helping children with special needs successfully entering into the regular class.

6.4 The school adjustment of participant children

Question 6: After entering educational placement, how is the school adjustment of these children?

Generally speaking, participant children adapt to environmental conditions, interpersonal relationship and academic study in the placement, while there is statistically significant difference in children's adaptation to environmental conditions (.001**, $p<0.05$), interpersonal relationship (.000, $p<0.05$) and to academic study (.040*, $p<0.05$). In this case, H_0 2 is rejected, while H_1 2 is accepted. Similarly, H_0 3 and H_0 4 are rejected, while H_1 3 and H_1 4 are accepted. Consequently, H_0 5 is rejected, while H_1 5 is accepted, that is to say there is statistically significant difference in overall school adjustment between the two groups. There is significant difference (.000**, $p<0.05$) in overall school adjustment of children placed in regular class, while there is no significant difference (.067, $p>0.05$) in overall school adjustment of children placed in deaf school between the two groups. Through examining the difference in school adjustment of participant children of both groups between regular class and deaf school, the analysis of statistics shows there is significant difference ($p<0.05$) in Chinese participant children's school adjustment between regular class and deaf school, while there is no significant difference ($p>0.05$) in Czech participant children's school adjustment between regular class and deaf school. Overall, the difference in school adjustment of Chinese participant children who are placed in regular class and resource room is significant (.011*, $p<0.05$), while there is no significant difference in overall score of school adjustment (.575, $p>0.05$) between deaf school and resource room. Among the four different stages of education, for the Czech group, preschool children reported the highest score in overall school adjustment followed by junior high school students, primary school children and senior high school students. While

primary school students in the Chinese group reported the lowest score in overall school adjustment, and statistics findings show that there is statistically significant difference between the two groups.

6.5 The influencing factors of school adjustment

Question 7: What influencing factors contribute to children's school adjustment?

Question 8: Are there any differences in the influencing factors on school adjustment between Chinese and Czech groups?

Results from this study show that several child related factors including the learning style, social skills, self-efficacy and early childhood education have significantly positive influence on their school adjustment. Some other factors reported in this study such as multiple disabilities and parental stress negatively correlated to the children's overall school adjustment. Additionally, the placement related factors such as the teachers' preferred communication mode also being reported with a significant influence. Statistic findings indicate there is significant difference (.000**, $p<0.05$) in the influencing factors of school adjustment between the two groups: 1) the child related influencing factors (.000**, $p<0.05$) include current hearing (.003**, $p<0.05$), study pressure (.002**, $p<0.05$), academic achievement (.000**, $p<0.05$), multiple disabilities (.002**, $p<0.05$), early childhood education (.029*, $p<0.05$)) and preferred communication mode (.005**, $p<0.05$); 2) the family related influencing factors (.015*, $p<0.05$) regards parents' educational attainment (.015*, $P<0.05$) with 95% Confidence Interval of the Difference, and 3) placement related influencing factors (.000**, $p<0.05$) include teachers' preferred communication mode (.000**, $p<0.05$) and environmental conditions (.020*) at 0.05 level. Consequently, H_0 6 is rejected, while H_1 6 is accepted.

6.6 Challenges and actions in the process of school adjustment

Question 9: What challenges have they experienced in the process of school adjustment?

Question 10: What actions have been taken to improve the school adjustment?

Respondents in the follow-up in-depth interview reported challenges in the process of their decision on educational placement and in the process of children's school adjustment. According to the analysis of 17 interview transcription, communication barrier with peers and poor academic performance are the common reasons for transition of educational placement being reported by both groups in this study. A total of 2 Czech children and 7 Chinese children had transition experience between different educational placements, and most of them transferred from regular class to deaf school. The findings indicate the children with cochlear implants in regular class neither receive sufficient supports nor their unique challenges or needs have been recognized. This is especially true in China. Based on the field observation in the placement, analysis of classroom interaction also suggests that main class teachers in regular class neither know sign language nor fully use basic specialized teaching skills when giving instructions for the children with hearing impairment, while in the deaf school, teachers prefer to take a bilingual approach and made the best of their skills and prior experiences in working with hearing impaired students to optimize the unique strength of children with cochlear implants. To improve and facilitate children's school adjustment, actions have been taken such as maintaining a small class size, school prosocial orientation, parental involvement, individualized education program and sign language learning.

As a conclusion, the study shows the educational placement and school adjustment of participant children and the difference in educational placement and its influencing factors as well as the difference in school adjustment and its influencing factors between the two groups. The research suggests the family expectation and the children's language development have impact on the decision on educational placement. Families need to recognize the advantages of bilingualism in the early time of diagnosis and maintain bilingualism further to optimize children's cognitive, social, and linguistic development. The findings suggest that parental involvement in school activities and after school studies are instrumental in enhancing children's adaptation to academic study. Professionals especially the main class teachers in regular class settings need to be more sensitive towards children who have cochlear implants and

recognize their unique strengths and challenges. The findings are valuable in rational decision on educational placement for children with cochlear implants and improving their school adjustment to maximize their academic potential. When addressing with actions have been taken by parents and teachers to improve school adjustment, this research provides glimpses of solutions in improving children's school adjustment in placement that can be helpful for other families with children who have cochlear implants and professionals such as class teachers who work with children who use cochlear implants to better facilitate children's school adjustment.

References

Allegretti, C. M. (2002). The effects of a cochlear implant on the family of a hearing-impaired child. *Pediatric Nursing,* 28 (6), 614-620.

Anneke, V., Leo, R., Langereis, M., & Snik, A. (2012). Changing Realities in the Classroom for Hearing Impaired Children with Cochlear Implant. *Deafness &*

Education International, 14(1), 36-47.

Anmyr, L., Larsson, K., Olsson M., & Freijd, A. (2012). Strengths and difficulties in children with cochlear implants-Comparing self-reports with reports from parents and teachers. International Journal of Pediatric Otorhinolaryngology, 76 (8), 1107–1112.

Archbold, S. M., Harris M., O'Donoghue, G., Nikolopoulos, T., White, A., & Richmond, H. L. (2008). Reading abilities after cochlear implantation: The effect of age at implantation on outcomes at 5 and 7 years after implantation. *International Journal of Pediatric Otorhinolaryngology,* 72 (10), 1471-1478.

Archbold, S. M., Sach, T. H., O'Neil, C., Lutman, M. E., & Gregory, S. (2006). Deciding to have a cochlear implant and subsequent after-care: Parental perspectives. *Deafness and Education International,* 8, 190-206.

Archbold, S. M., Sach, T. H., O'Neil, C., Lutman, M. E., & Gregory, S. (2008). Outcomes from cochlear implantation for child and family: Parental perspectives. *Deafness & Education International*, 10(3), 120-142. doi:10.1002/dei.243

Archbold, S. M., Wheeler, A. (2010). Cochlear implants: Family and young people's perspectives. In M. Marschark, Spencer P. (Eds.), *Oxford handbook of deaf studies, language, and education* (2nd ed., pp.226-240). New York, NY: Oxford University Press

Bat-Chava Y. Diversity of deaf identities (2000). *American Annals of the Deaf,* 145(5), 420-428.

Bat-Chava, Y., & Elizabeth, D. (2001). Peer relationships of children with cochlear implants. *Journal of Deaf Studies and Deaf Education*, 6 (3), 186-199.

Beadle, E. A., Whores, A., & Wood, E. J. (2000). Parental perceptions of the impact upon the family of cochlear implantation in children. *The Annals of Otology, Rhinology & Laryngology,* 109 (12), 111-114.

Beadle, E. A., McKinley, D. J., Nikolopoulos, T. P., Brough, J., O'Donoghue, G. M., & Archbold, S. M. (2005). Long term functional outcomes and academic-occupational status in implanted children after 10 to 14 years of cochlear implant use. *Otology & Neurotology, 26*(6), 1152–1160.

Belzner, K. A., & Seal, B. C. (2009). Children with cochlear implants: a review of demographics and communication outcomes. *American Annals of the Deaf,* 154 (3), 311-315.

Berent, G. P. (2004). Sign language-spoken language bilingualism: Code mixing and mode mixing by ASL-English bilinguals. In Ritchie, W. C., Bhatia, T. K. (Eds.), *The handbook of bilingualism* (pp.312-335). San Diego, CA: Academic Press

Bond, M., Mealing, S., Anderson, R., Elston, J., Weiner, G., Taylor, Rod S.,…Stein, K. (2009). The effectiveness and cost-effectiveness of cochlear implants for severe to profound deafness in children and adults: a systematic review and economic model. *Health Technology Assessment,* 13, (44),1- 330.

Buhler, H. C., Thomasis, B. D., Chute, P., & Cora, A. D. (2007). An analysis of phonological process use in young children with cochlear implants. *The Volta Review,* 107 (1), 55-74.

Chang, H. H., & Lin H. F. (2011). The study of the school adjustment and the school support system for the autistic elementary school students of regular classes in central Taiwan area. *Bulletin of Special Education and Rehabilitation,* 25, 25-46.

China Soong Ching Ling Foundation. (2015, March 3). Program for making maternal and child health-let angel hear the love. Retrieved from http://news.xinhuanet.com/politics/2011-09/05/c_121971906.htm

Christiansen J. B., Leigh I. W. (2004). Children with cochlear implants changing parent and deaf community perspectives. *Archives of Otolaryngology-Head & Neck Surgery,* 130 (5), 673-677.

Chute, P. Nevins, M. E. (2006). *School professionals working with children with cochlear implants*. San Diego, CA: Plural Publishing

Connor, C. M. (2006). Examing the communication skills of a young cochlear implant pioneer. *Journal of Deaf Studies and Deaf Education,*11 (4), 449-460.

Connor, C. M., & Zwolan, T. A. (2004). Examining Multiple Sources of Influence on the Reading Comprehension Skills of children who use cochlear implants. *Journal of Speech, Language, and Hearing Research,* 47, 509.

Connor, C. M., Zwolan, T. (2004). Examining multiple sources of influence on the

reading comprehension skills of children who use cochlear implants. *Journal of Speech Language Hearing Research,* 47, 509-526.

Connor, C. M., Hieber, S., Arts, H. A., & Zwolan, T. A. (2000). Speech, vocabulary, and the education of children using cochlear implants: oral or total communication. *Journal of Speech, Language, and Hearing Research,* 43, 1185-1204. doi:10.1044/jslhr.4305.1185

Cooper, W. B., Tobey, E., & Loizou, P. C. (2008). Music perception by cochlear implant and normal hearing listeners as measured by the Montreal Battery for Evaluation of Amusia. *Ear & Hearing,* 29(4), 1-9.

Creswell, J. W. (1998). *Qualitative inquiry and research design*. London: Sage Publications.

Creswell, J. W. (2011). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. New Jersey: Prentice Hall

Daniel, L.G., & King, A. D. (1997). Impact of inclusion education on academic achievement, student behavior and self-esteem, and parental attitudes. *The Journal of Educational Research,* 91(2), 67-79.

Davidson, K., Lillo, M. D., & Chen, P. D. (2013). Spoken English language development in native signing children with cochlear implants. *Journal of Deaf Studies and Deaf Education,* 19(2), 238-250. doi:10.1092/deafed/ent045

Deaf Ex-Mainstreamers' Group. (2016, May 5). *Deaf identity.* Retrieved from http://www.dex.org.uk/?page_id=123

Deng, M. (2004). The discussion of educational placement and inclusive education. *Chinese Journal of Special Education,* 6, 31.

Dettman, S. J., Pinder, D., Briggs, R. J., Dowell, R. C., & Leigh, J. R. (2007). Communication development in children who receive the cochlear implant younger than 12 months: risks versus benefits. *Ear and Hearing,* 28(2), 11-18.

Dettman, S., French, S., Constantinescu, G., Dowell, R., Rousset, A. (2012).Children using cochlear implants who have Deaf parents: Outcomes of Di-CODAs. In proceedings of the 12th International Conference on Cochlear Implants and Other Implantable Auditory Technologies. Baltimore, Maryland

Dong, C. N. (2010). Supportive strategies for deepening the inclusive education. *Modern Special Education,* 7, 78.

Easterbrooks, S. (1999). Improving practices for students with hearing impairments. *Exceptional Children,* 65, 537-554.

Edwards, L. C. (2007). Children with cochlear implants and complex needs: a review of outcome research and psychological practice. *Journal of Deaf Studies and Deaf Education,* 12 (3), 258-268.

Edwards, R. (2005). Sound and fury; or, much ado about nothing? Cochlear implants in historical perspective. *The Journal of American History,* 92 (3), 892-990.

Emmorey, K., Borinstein, H., Thompson, R., & Gollan, T. H. (2008). Bimodal bilingualism. *Bilingualism: Language and Cognition,* 11,43–61.

Ertmer, D. J., & Mellon, J. A., (2001). Beginning to talk at 20 months: early vocal development in a young cochlear implant recipient. *Journal of Speech, Language, and Hearing Research,*44 (1),196-206.

Emmorey, K., & McCullough, S. (2009). The bimodal bilingual brain: Effects of sign language experience. *Brian & Language*, 109(2-3), 124-132. doi:10.1016/jbandl.2008.03.005

Fagan, M. K., & Pisoni, D. B. (2010). Hearing experience and receptive vocabulary development in deaf children with cochlear implants. *Journal of Deaf Studies and Deaf Education*, 15(2), 149-161. doi:10.1092/deafed/eng001

Fagan, M. K., Pisoni, D. B., Horn, D. L., & Dillon, C. M. (2007). Neuropsychological correlates of vocabulary, reading, and working memory in deaf children with cochlear implants. *Journal of Deaf Studies & Deaf Education*, 12(4), 461-471. doi:10.1093/deafed/enm023

Farrell, P., & Ainscow, M. (2002). (Eds.). Making Special Education Inclusive. London: David Fulton Publishers.

Fast Track Project. *School adjustment: child report*. Retrieved from https://fasttrackproject.org/data-instruments.php

Fiori, A., Reichmuth, K., Matulat, P., Schmidt, C. M., & Dinnesen, A. G. (2006). Model Oriented Assessment of Literacy Performance in Children with Cochlear

Implants. *Laryngo-Rhino-Otol,* 85, 489–495.

Fischer, L. C., & McWhirter, J. J. (2001). The Deaf Identity Development Scale: A revision and validation. Journal of Counseling Psychology, 48(3), 355-358. doi: 10.1037/0022-0167.48.3.355

Fowler, S. A., Schwartz, I., & Atwater, J. (1991). Perspectives on the transition from kindergarten for children with disabilities and their families. *Exceptional Children,* 58(2), 136-145.

Fuchs, D., Fuchs, L., Mathes, P. G., & Simmons, D. C. (1997). Peer assisted learning strategies: Making classrooms more responsive to diversity. American Educational Research Journal, 34, 174-206.

Galvin, J. J., Fu, Q. J., & Nogaki, G. (2007). Melodic contour identification by cochlear implant listeners. *Ear and Hear,* 28 (3), 302-319.

Geers, A., Brenner, C., Nicholas J. Tye-Murray, N., & Tobey, E. (2003). Educational factors contributing to cochlear implant benefit in children. *International Congress Series,* 1254, 307-312. doi: 10.1016/S0531-5131(03)01114-2

Geers, A. E., & Nicholas, J. G. (2013). Enduring advantages of early cochlear implantation for spoken language development. *Journal of Speech, Language and Hearing Research,* 56, 643-655. doi:10.1044/1092-4388(2012/11-0347)

Geers, A. E., Moog, J. S., Biedenstein, J., Brenner, C., & Hayes, H. (2009). Spoken Language scores of children using cochlear implants compared to hearing age-mates at school entry. *Journal of Deaf Studies and Deaf Education,* 14, 371-385.

Geers, A. E., Spehar, B., & Sedey, A. (2002). Use of speech by children from total communication programs who wear cochlear implants. *American Journal of Speech-Language Pathology,* 11, 50–58.

Ge, X. B. (2006). Theory analysis of educational placement of children with special needs. *Journal of Educational Development*, 3,50.

Glickman, N. S. (1993). Deaf identity development: construction and validation of a theoretical model. (Doctoral dissertation). Retrieved from http://scholarworks.umass.edu/cgi/viewcontent.cgi?article=2202&context=disser

tations_1

Grosjean, F. (2010). Bilingualism, biculturalism and deafness. *International Journal of Bilingual Education and Bilingualism*, 13, 133-145. doi: 10.1080/13670050903474051

Gulliford, R., & Upton, G. (1992). *Special Educational Needs,* London: Routledge.

Hardonk, S., Daniels, S., Desnerck, G., Loots, G., Van Hove, G., Kerschaver, E.,…& Louckx, F. (2011). Deaf parents and pediatric cochlear implantation: An exploration of the decision-making process. *American Annals of the Deaf*, 156(3), 290–304. doi:10.1353/aad.2011.0027

Harris, R. L., Paludneviciene, R. (2011). Impact of cochlear implant on the Deaf community. In Paludneviciene R., Leigh, I. W. (Eds.),*Cochlear implants: Evolving perspectives* (pp.3-15). Washington, DC: Gallaudet University Press

Hassanzadeh, S. (2012). Outcomes of cochlear implantation in deaf children of deaf parents: Comparative study. *Journal of Laryngology & Otology*, 126, 989-994. doi:10.1017/S0022215112001909

Haug, T. (2012). Methodological and theoretical issues in the adaptation of sign language tests: An example from the adaptation of a test to German Sign Language. *Language Testing,* 29, 181–201.

Henry, K. L., Stanley, L. R., Edwards, R. W., Harkabus, L. C., & Chapin, L. A. (2009). Individual and contextual effects of school adjustment on adolescent alcohol use. *Prevention Science: the Official Journal of the Society for Prevention Research,* 10(3), 236-47. doi: 10.1007/s11121-009-0124-2

Heron, T. E., Villareal, D. M., Yao, M., Christianson, R. J., & Heron, K. M. (2006). Peer tutoring systems: Applications in classrooms and specialized environments. *Reading if Writing Quarterly*, 22, 27-45.

Herring-Harrison, T.J.,Gardner, R., & Lovelace, T.S.(2007). Adapting Peer Tutoring for Learners Who Are Deaf or Hard of Hearing. Intervention in School and Clinic. 43(2), 82.

Hintermair, M. (2000a). Hearing impairment, social networks, and coping: the need for families with hearing-impaired children to relate to other parents and to

hearing-impaired adults. *American annals of the Deaf*, 145 (1), 41-57.

Hintermair, M. (2000b). Children who are hearing impaired with additional disabilities and related aspects of parental stress. *Exceptional children*, 66 (3), 327-332.

Hintermair, M. (2006). Parental resources, parental stress, and social motional development of deaf and hard of hearing children. *Journal of Deaf Studies and Deaf Education,* 11 (4), 493-513.

Horn, D. L., Houston, D. M., Miyamoto, R. T. (2007). Speech discrimination skills in deaf infants before and after cochlear implantation. *Audiological Medicine,* 5(4), 232-241. doi.org/10.1080/16513860701659438

Houston, D. M., Miyamoto, R. T. (2010). Effects of early auditory experience on word learning and speech perception in deaf children with cochlear implants: Implications for sensitive periods of language development. *Otol Neurotol,* 31(8), 1248-1253. doi: 10.1097/MAO.0b013e3181f1cc6a

Houston, D. M., Ying, E., Pisoni, D. B., Kirk, K. I. (2003). Development of pre word-learning skills in infants with cochlear implants. *The Volta Review,* 103, 303-326.

Huang, Z. M., Du, X.X., & Ji, P. Y. (2004). Combination of medical and educational rehabilitation mode. *Chinese Scientific Journal of Hearing and Speech Rehabilitation,* 3,45.

Hua, G. D. (2004).View of the gifted students. *Modern Special Education,* 4, 8.

Huber, M., Wolfgang, H., & Klaus, A. (2008). Education and training of young people who grew up with cochlear implants. International Journal of Pediatric Otorhinolaryngology.72 (9), 1393-1403.

Huttunen, K., & Välimaa, T. (2010). Parents' views on changes in their child's communication and linguistic and socioemotional development after cochlear implantation. *Journal of Deaf Studies and Deaf Education*, 15(4), 383-404. doi:10.1093/deafed/enq029

Hyde, M., & Power, D. (2006). Some ethical dimensions of cochlear implantation for deaf children and their families. *Journal of Deaf Studies and Deaf*

Education, 11 (1), 102-111.

Hyde, M., & Punch, R. (2011).The modes of communication used by children with cochlear implants and role of sign in their lives. *American Annals of the Deaf*, 155, 535-549. doi:10.1353/aad.2011.0006

Hyde, M., Punch, R., & Komesaroff, L. (2010). Coming to a decision about cochlear implantation: Parents making choices for their deaf children. *Journal of Deaf Studies and Deaf Education*, 15, 162-178. doi:10.1093/deafed/enq004

Jachova Z., & Karovska A.(2008). Analyses of the teacher-pupil interaction within inclusive classroom-case study of a child with a cochlear implant. *Special education-professional and scientific issues,* 9(3-4), 7-22.

Jiménez, M. S., Pino, M. J., & Herruzo, J. (2009). A comparative study of speech development between deaf children with cochlear implants who have been educated with spoken or spoken + sign language. *International Journal of Pediatric Otorhinolaryngology,*73, 109–114.

Joiner, S., & Prause, M. (1996). Strategies for Working with Children with Cochlear Implants Author(s). Music Educators Journal. 1, 48-55.

Jones, L. R., Agrawal S.et al.(2010). Effect of Age at Onset of Deafness on Binaural Sensitivity in Electric Hearing in Humans. *Journal of Acoustical Society America*, 127, 1, 400-414.

Kargin, T., Baydik, B., Akcamete, G. (2004). A study on needs of parents with children with hearing impairment in transition to kindergarten in turkey. International Journal of Special Education, 19(2), 35- 45.

Kermit, P. (2010). Choosing for the child with cochlear implants: A note of precaution. *Medicine, Health Care, and Philosophy*, 13(2), 157-167. doi:10.1007/s11019-010-9232-9

KidsMatter. *School adjustment critical to long-term wellbeing.* Retrieved from https://www.kidsmatter.edu.au/health-and-community/enewsletter/school-adjustment-critical-long-term-wellbeing

Kirk, K. I.; Miyamoto, R. T.; Lento, C. L.; Ying, E.; O'Neill, T.; Fears, B. (2002).

Effects of age at implantation in young children. *Annals of Otology, Rhinology & Laryngology,* 111(5), 69-73.

Kristoffersen, A. E., & Simonsen, E. (2014). Exploring letters in a bimodal, bilingual nursery school with deaf and hearing children. *European Early Childhood Education Research Journal,* 22(5), 604-620.

Knoors, H., & Marschark, M. (2012). Language planning for the 21st Century: Revisiting bilingual language policy for deaf children. Jo*urnal of Deaf Studies and Deaf Education,* 17, 291–305.

Kyeung, H., Holmes, S. A., & Colburn, M. (2005). Twin Language Development: A Case Study of a Twin with a Cochlear Implant and a twin with typical hearing. *The Volta Review,* 105 (2), 175-188.

Lang, Y. P., & Liang, W. (2010). Assessment of cochlear implants effect. Chinese *Journal of Rehabilitation Theory and Practice,* 16(2), 161-163.

Langer, J. (2013). *Special education for the people with hearing impairment.* Olomouc: Palacky University v Olomouc.

Lederberg, A. R., Spencer, P. E. (2009). Word-learning abilities in deaf and hard-of-hearing preschoolers: effect of lexicon size and language modality. *Journal of Deaf Studies and Deaf Education*. 14, 44–62.

Lenden, J. M., Flipsen, P. (2007). Prosody and voice characteristics of children with cochlear implants. *Journal of Communication Disorders,* 40, 66–81.

Leigh, I. W., Marcus A., Dobosh, P. K., & Allen, T. (1998). Deaf/hearing cultural identity paradigms: modification of the deaf identity development scale. *Journal of deaf studies and deaf education,* 3(4), 329-338.

Li, C. Y., & Liu, M. S. (2011). A study on self-concept and school-adjustment of the junior high school students with learning disabilities. *Bulletin of Eastern-Taiwan Special Education,* 13, 99-126.

Li, Y., Bain, L., Steinberg, A. (2003). Parental decision making and the choice of communication modality for the child who is deaf. *Archives of Pediatrics & Adolescent Medicine*, 157, 162-168. doi:10.1001/archpedi.157.2.162

Liang Z. B., Zhang G. Z., Chen H. C. (2007). The relationship between maternal

parenting style of childhood and 11-year-old children's school adjustment. *Studies of Psychology and Behavior,* 5(1), 36-40.

Liu, S. L. (2009). European countries tendency of deaf education development. *Chinese Journal of Special Education,* 1, 45.

Liu, S. L. (2010). Family coping and family-centered early intervention for children with hearing impairment. *Chinese Journal of Special Education,* 1, 19.

Liu, J., & Sun, X. (2012). A review of rehabilitation effect assessment. *Disability Research*, 2, 11.

Liu, Q. Y., Huang, Z.M., & Chen, L. (2011). Comparing study of speech recognization among children with cochlear implants, hearing aids and hearing children. *Chinese Journal of Special Education,* 2, 14.

Liu, S. L. (2010). *Research on family resilience in families of children with hearing impairment.* (Doctoral dissertation). Retrieved from http://theses.cz/id/t1dju9/DissertationLiu_Shenglin.pdf

Luckner, J. L., & Velaski, A. (2004）Healthy families of children who are deaf. *American Annals of the Deaf,* 149(4), 324.

Lu, X. P., Wong, L. N, Wong, A. M., & Xi, X. (2013). Development of a mandarin expressive and receptive vocabulary test for children using cochlear implants. *Research in Developmental Disabilities,* 34, 3526–3535.

Makhdoum, M. J., Snik, A. F., & Broek P. (1997). Cochlear implantation: A review of the literature and the Nijmegen results. *Laryngol Otol,* 111, 1008-1017.

Marschark, M., Lang, H. G., & Albertini, T. E. (2002). *Educating deaf students: From research to practice.* New York: Oxford University Press

Marschark, M., Hauser, P. C. (2008). *Deaf Cognition: Foundations and Outcomes.* New York: Oxford University Press

Marschark, M., Rhoten, C., Fabich, M. (2007). Effects of cochlear implants on children's reading and academic achievement. *Journal of Deaf Studies and Deaf Education,* 12 (3), 269-282.

Martindale, M. (2007). Children with significant hearing loss: learning to listen, talk, and read-evidence-based best practices. *Communication Disorders Quarterly,* 28,

73.

Mayberry, R. I. (2007). When timing is everything: Age of first-language acquisition effects on second-language learning. *Applied Psycholinguistics,* 28, 537-549.

McCracken, W., & Turner, O. (2012). Deaf children with complex needs: parental experience of access to cochlear implants and ongoing support. *Deafness and education international,* 14(1), 22-35.

McDermott, H. J. (2004). Music perception with cochlear implants: a review. *Trends Amplification,* 2, 49-82.

McIlroy, G., & Storbeck, C. (2011). Development of deaf identity: an ethnographic study. *Journal of Deaf Studies and Deaf Education,* 16 (4), 494-511.

Meyer, T., Svirsky, M. A., Kirk, K., & Miyamoto, R. T. (1998). Improvements in speech perception by children with profound prelingual hearing loss. *Journal of Speech, Language, and Hearing Research,* 41, 846-858. doi:10.1044/jslhr.4104.846

Ministry of Education of the People's Republic of China. (2016, December 1). Retrieved from http://www.moe.gov.cn/jyb_xwfb/s5147/201612/t20161201_290554.html

Mirza, S., Douglas, S. A., Lindsey, P., Hildreth, T., & Hawthorne, M. (2003). Appreciation of music in adult patients with cochlear implants: a patient questionnaire. *Cochlear Implants International,* 4 (2), 85-95.

Mitchiner, J. C. (2012). *Deaf families with children who have cochlear implants: perspectives and beliefs on bilingualism in American sign language and English.* (Doctoral dissertation). Retrieved from http://mars.gmu.edu/handle/1920/8080

Mitchiner, J. C. (2015). Deaf Parents of Cochlear-Implanted Children: Beliefs on Bimodal Bilingualism. *Journal of Deaf Studies and Deaf Education,* 20 (1), 51-66. doi: https://doi.org/10.1093/deafed/enu028

Moog, J. S., & Geers, A. E. (2010). Early educational placement and later language outcomes for children with cochlear implants. *Otology & Neurotology*, 31, 1315-1319.

Moores, D. F. (2009). Cochlear failure. *American Annals of the Deaf*, 153 (5), 464.

Mortari, A. L., Bevilacqua, M. C., Costa, O. A. (2007). Cochlear implant: hearing and

language in pre-lingual deaf children. *Pró-Fono Revista de Atualização Científica,* 119 (3). doi: 10.1590/S0104-56872007000300008

Neuss, D. (2006). The Ecological Transition to Auditory-Verbal Therapy: Experiences of Parents whose children use cochlear implants. *The Volta Review,* 106(2), 195.

Nikolopoulos, T. P., Gibbin, P., & Dyar, D. (2004). Predicting speech perception outcomes following cochlear implantation using Nottingham children's implant profile (NChIP). *International Journal of Pediatric Otorhinolaryngology,* 68 (2), 137-141.

Nimmons, G. L., Kang, R. S., Drennan, W. R., Longnion, J., Ruffin, C., Worman, T.,…Rubinstein, J. T. (2008). Clinical assessment of music perception in cochlear implant listeners. *Otol Neurotol,* 29 (2), 149-155.

Ning, H., Xin, T., & Li, X. X. (2007). The classification and discriminate of school adjustment. *Psychological Development and Education,* 2, 57-62.

Niparko, J. K., Tobey, E. A., Thal, D. J., Eisenberg, L. S., Wang, N., Quittner A. L., & Fink, N.E. (2010). Spoken language development in children following cochlear implantation. *Journal of the American Medical Association,* 303, 1498-1506.

Noam, Y., Naama T., Talma, S.. Tova, M., & Luntz, M. (2011). Demographic factors influencing educational placement of the hearing impaired child with a cochlear implant. *Otology & Neurology,* 32 (6), 943-947.

Ohna, S.E. (2005). Researching classroom processes of inclusion and exclusion. *European Journal of Special Needs Education,* 20(2),167–178.

Okubo, S., Takahashi, M., & Kal, I. (2008). How Japanese parents of deaf children arrive at decisions regarding pediatric cochlear implantation surgery: A qualitative study. *Social Science & Medicine,* 66, 2436.

Olivier, M.A.J., & Williams, E.E. (2005). Teaching the Mentally Handicapped Child: Challenges Teachers Are Facing. The International Journal of Special Education, 20 (2), 19-24.

Osberger, M. J., Maso, M., & Sam, L. K. (1993). Speech intelligibility of children

with cochlear implants, tactile aids, or hearing aids. *Journal of Speech, Language and Hear Research,* 36, 168-203.

Patterson, J. L. (2004). Comparing bilingual and monolingual toddlers' expressive vocabulary size: Revisiting Rescorla and Achenbach. *Journal of Speech, Language, and Hearing Research,* 47, 1213–1215.

Patterson, J. M. (2002). Understanding family resilience. *Journal of Clinical psychology*. 58 (3), 233-246.

Pearson, B. Z., Fernandez, S. C., & Oller, D. K. (1993). Lexical development in bilingual infants and toddlers: Comparison to monolingual norms. Language Learning, 43, 93–120.

Pennsylvania State Education Association (PSEA). (2016, September, 11). Retrieved from https://www.psea.org/uploadedFiles/TeachingandLearning/LRE%20and%20Gaskin.pdf

Percy-Smith, L., Cayé-Thomasen, P., Breinegaard, N., & Jensen, J. H., (2010). Parental mode of communication is essential for speech and language outcomes in cochlear implanted children. *Acta Otolaryngology,* 130, 708–715.

Peters, B. R., Wyss, J., & Manrique, M. (2010). Worldwide trends in bilateral cochlear implantation. *The laryngoscope,* 120 (S2*)*, 17-44.

Peters E. (2000). Our decision on a cochlear implant. *American Annals of the Deaf,* 145(3), 263.

Peterson, N. R., Pisoni, D. B., & Miyamoto, R. T. (2010). Cochlear implants and spoken language processing abilities: Review and assessment of the literature. *Restorative Neurology and Neuroscience*, 28. 237-250. doi:10.3233/RNN-2010-0535

Petitto, L. A., Holowka, S. (2002). Evaluating attributions of delay and confusion in young bilinguals: Special insights from infants acquiring a signed and spoken language. *Sign Language Studies*, 3, 4-33. doi:10.1353/sls.2002.0025

Pijl, S.J., Meijer, C.J.W., & Hegarty, S. (Eds.) (1997). Inclusive education: A global agenda. London: Routledge.

Ping, L. C., &Yuan, M. (2010). Music perception assessment of people with cochlear implants. *Acoustics Technique,* 29 (5), 14.

Pisoni, D. B., Cleary, M., Geers, A. E., & Tobey, E. A. (2000). Individual differences in effectiveness of cochlear implants in children who are prelingually deaf: New process measures of performance. *The Volta Review,* 101, 111-164.

Pisoni, D. B., Conway, C. M., Kronenberger, W. G., Horn, D., Karpicke, J., & Henning, S. C. (2008). Efficacy and effectiveness of cochlear implants in deaf children. In Marschark, M., Hauser, P. C. (Ed.), *Deaf Cognition: Foundations and Outcomes* (pp, 58), New York: Oxford University Press

Poskočilová, M. (2010). Finanční zabezpečení „centra kochleárních implantací u dětí“ v Praze se zřetelem na jeho léčebné cíle. (Bachelor dissertation). Retrieved from http://theses.cz/id/6q0fgp/?furl=/id/6q0fgp/;lang=en

Power, D. J., & Hyde, M. B. (2002) The characteristics and extent of participation of deaf and hard of hearing students in regular classes in Australian schools, *Journal of Deaf Studies and Deaf Education,* 7, 302–311.

Preisler, G., & Tvingstedtand, M. (2002). A Psychosocial Follow-up Study of Deaf Preschool Children Using Cochlear Implants. *Child: Care, Health & Development*, 28(5), 403–418.

Psychology Wikia. *School adjustment.* Retrieved from http://psychology.wikia.com/wiki/School_adjustment

Raeve, L. D., Baerts, J., & Colleyer, E. (2012). Changing schools for the deaf: updating the educational setting for our deaf children in the 21st century, a big challenge. *Deafness & Education International*, 14(1), 48-59.

Reagan, T. (2011). Ideological barriers to American Sign Language: Unpacking linguistic resistance. *Sign Language Studies*, 11, 606-636. doi:10.1353/sls.2011.0006

Richter, B., Eissele, S., Laszig, R., & Lohle, E. (2002). Receptive and expressive language skills of 106 children with a minimum of 2 years' experience in hearing with a cochlear implant. *International Journal of Pediatric Otorhinolaryngology,* 64, 111-125.

Rinaldi, P., Baruffaldi, F., Burdo, S., & Caselli, M. C. (2013). Linguistic and pragmatic skills in toddlers with cochlear implant. *International Journal of Language & Communication Disorders,* 48, 715–725.

Rinaldi, P., & Caselli, M. C. (2009). Lexical and grammatical abilities in deaf Italian preschoolers: the role of duration of formal language experience. Journal of Deaf Studies and Deaf Education, 14, 63-75.

Rinaldi, P., & Caselli, M. C. (2014). Language development in a bimodal bilingual child with cochlear implant: A longitudinal study. Bilingualism: Language and Cognition, 17 (4), 798–809.

Rous, B., Hemmeter, L. M., & Schuster, J. (1994). Sequenced transition to education in public schools: A systems approach to transition planning. Tecse, 14(3), 374-393.

Sass-Lehrer, M. (2016). *Early intervention for deaf and hard-of-hearing infants, toddlers, and their families.* New York: Oxford University Press

Schorr, E. A., Roth, F. P., & Fox, N. A. (2009). Quality of life children with cochlear implants: perceived benefits and problems and the perception of single words and emotional sounds. *Journal of Speech, Language, and Hearing Research,* 52, 141-152.

Semenov, Y. R., & Yeh, S. T. (2013). Age-dependent cost-utility of pediatric cochlear implantation. *Ear Hear.* 34(4), 402–412.

Seung, H. K., Holmes, A., & Colburn, M. (2005). Twin language development: A case of a twin with a cochlear and a twin with typical hearing. *The Volta Review*. 105 (2), 175-188.

Sharma, A., Dorman, M.F., & Spahr, A.J. (2002). A sensitive period for the development of the central auditory system in children with cochlear implants: Implications for age of implantation. *Ear and Hearing,* 23,532-539.

Silverman, D. (2006). Interpreting Qualitative Data. London: Sage Publications.

Simonsen, E., Kristoffersen, A. E., Hyde, M. B., & Hjulstad, O. (2009). Great expectations: perspectives on cochlear implantation of deaf children in Norway. American Annals of the Deaf, 154(3), 263-273. doi: 10.1353/aad.0.0103

Smith, D. H., & Ramsey, C. L. (2004) Classroom discourse practices of a deaf teacher using American Sign Language. *Sign Language Studies,* 5, 39-62.

Smith, L. P., Thomasen, P. C., & Gudman, M., Jensen, J. H., & Thomsen, J. (2008). Self-esteem and social well-being of children with cochlear implant compared to normal-hearing children. International Journal of Pediatric Otorhinolaryngology, 72 (7), 1113-1120.

Snik, A. F., Vermeulen, A. M., Brokx, J. P. L., Beijk, C., & Broek, P. V. (1997). Speech perception performance of children with a cochlear implant compared to that of children with conventional hearing aids. *Acta Oto-Laryngologica,* 117 (5), 750-754.

Sorkin D. L., Zwolan T. A. (2004). Trends in educational services for children with cochlear implants. *International Congress Series,* 1273, 417–421.

Sparreboom, M., Schoonhoven, V. J. (2010). The Effectiveness of Bilateral Cochlear Implants for a Profound Deafness in Children: A Systematic Review. *Otology & Neurology*, 31, 1062-1071.

Spencer, L. J., & Bass-Ringdahl S. (2004). An evolution of communication modalities: very young cochlear implant users who transitioned from sign to speech during the first years of use. *International Congress Series,* 1273, 352–355.

Spencer, L. T., Tomblin, J. B., & Gantz, B.J. (1997). Reading skills in children with multichannel cochlear-implant experience. The Volta Review, 99(4), 193-202.

Spencer, P. E.(2004). Individual differences in language performance after cochlear implantation at one to three years of age: Child, family, and linguistic factors. *Journal of Deaf Studies and Deaf Education,* 9, 395–412.

Spolek Uživatelů Kochleárního Implantátu. (2015, May 3). *Výroční zpráva o činnosti a hospodaření za rok 2014*. Retrieved from http://www.suki.cz/wp-content/uploads/2016/02/vyrocni-zprava-suki-2014.pdf

Strong, C. J. (1992). *Home-based programming for children with hearing impairments: Demographics, child identification, and program effectiveness, 1979-1991*. Office of Special Education and Rehabilitative Services, Washington,

DC.

Sue, D. W., & Sue, D. (1990). Counseling the culturally different. New York: Wiley.

Sun, G. (1999). Comparing study of segregation and integration mode. *Chinese Journal of Special Education,* 1, 41.

Szagun, G., & Stumper, B. (2012). Age or experience? The influence of age at implantation and social and linguistic environment on language development in children with cochlear implants. Journal of Speech, Language, and Hearing Research, 55, 1640–1654.

Svirsky, M. A., Teoh, S., & Neuburger, H. (2004). Development of language and speech perception in congenitally, profoundly deaf children as a function of age at cochlear implantation. *Audiology & Neurotology,* 7, 224.

Tajfel, H. (2010). Social identity and intergroup relations. London: Cambridge University Press.

Thal, D., DesJardin, J. L., & Eisenberg, L. S. (2007). Validity of the MacArthur-Bates communicative development inventories for measuring language abilities in children with cochlear implants. *American Journal of Speech-Language Pathology,* 16, 54–64.

Thomas P. Nikolopoulos, K., Gibbin, P., & Dyar, D. (2004). Predicting speech perception outcomes following cochlear implantation using Nottingham children's implant profile (NChIP). *International Journal of Pediatric Otorhinolaryngology,* 68 (2),137-141.

Thoutenhoofd, E. (2006). Cochlear implanted pupils in Scottish schools: 4-year school attainment data(2000-2004). *Journal of Deaf Studies and Deaf Education,* 11(2), 171-188.

Tobey, E. A., Rekart, D., Buckley, K. & Geers, A. E. (2004). Mode of communication and classroom placement impact on speech intelligibility. *Archives of Otolaryngology – Head & Neck Surgery,* 130, 639–643.

Tomasuolo, E., Valeri, G., Renzo, D., Pasqualetti, P., & Volterra, V. (2013). Deaf children attending different school environments: Sign language abilities and theory of mind. *Journal of Deaf Studies and Deaf Education,* 18, 12–29.

Trader, C. B. (2000). The Stanford achievement test, 9th edition: National norming and performance standards for deaf and hard-of-hearing students. *Journal of Deaf Studies and Deaf Education,* 5(4), 337-348.

Trading Economics. (2016, August 1). China Economic Indicators. Retrieved from http://www.tradingeconomics.com/china/indicators

Trading Economics. (2016, August 1). Czech Republic GDP. Retrieved from http://www.tradingeconomics.com/czech-republic/gdp

UNESCO. (1994). *The Salamanca statement and framework for action on special needs education*. Paris: UNESCO.

UNESCO. (2005). Open file on inclusive education: Support materials for managers and administrators. Paris: UNESCO.

Valencia, D. M., Rimell, F. L., Friedman, B. J., Oblander, M. R., Helmbrecht, J. (2008). Cochlear implantation in infants less than 12 months of age. *International Journal of Pediatric Otorhinolaryngology,* 72(6), 767-773.

Verhaert, N., Willems J., Kerschaver, E. V., & Desloovere, C. (2008). Impact of early hearing screening on language development and education level: evaluation of 6 years of university hearing screening in Flanders-Belgium. *International Journal of Pediatric Otorhinolaryngology,* 72, 599-608.

Vinila, J., Ravichandran, A., & Prakash S. (2013). Parental needs of transition of children using cochlear implants from preschool to inclusive school. *International journal of special education,* 28(1), 45-54.

Wang, M. (2007).The education for students with autism. *Modern Special Education,* 2, 12.

Wang, N., Liu, C. J., Liu, S. Y., Huang, K. Y., & Kuo, Y. C. (2011). Predictor of Auditory Performance in Mandarin Chinese Children with Cochlear Implants. *Otology & Neurotology,* 32, 937-942.

Warner-Czyz, A. D., Loy, B., & Roland, P. S. (2009). Parent versus child assessment of quality of life in children using cochlear implants. *Int ernational Journal of Pediatric Otorhinolaryngology,* 73(10), 1423–1429.

Watson, L. M., Archbold, S. M., & Nikolopoulos, T. P. (2006). Changing

communication mode after implantation by age at implant. *Cochlear Implants International,* 7, 77–91.

Watson, L. M., Hardie, T., Archbold, S. M., & Wheeler, A. (2008). Parents' views on changing communication after cochlear implantation. *Journal of Deaf Studies and Deaf Education,* 13, 104–116.

Weisel, A., Most, T., & Michael, R. (2007). Mothers' stress and expectations as a funtion of time since child's cochlear implantation. *Journal of Deaf Studies and Deaf Education.* 12 (1), 55-64.

Wie, O. B., Falkenberg, E. S., Tvete, O., & Tomblin, B. (2007). Children with a cochlear implant: Characteristics and determinants of speech recognition, speech-recognition growth rate, and speech production. *International Journal of Audiology,* 46, 232–243.

Woodward, K. (Ed.). (1997). Identity and difference. London: Sage Publications.

Wu, J. J. (2014). Children with cochlear implants: educational placement and school adjustment. *E-ped*agogiu*m,* IV, 79-85.

Wu, J. J., & Liu, S. L. (2013). The educational placement of children with cochlear implants and its influencing factors. *Chinese Scientific Journal of Hearing and Speech Rehabilitation,* 5, 395-398. doi: 10.3969/j.issn.1672-4933.2013.05.018

Wu, L. (2007). A case study of a child with cochlear implant and hearing aid. *Chinese Scientific Journal of Hearing and Speech Rehabilitation,* 5, 26.

Wyne , M. D., & O'Connor, P. D. (1979). *Exceptional children: a developmental view.* Michigan: Health

Xu C. X. (2010). School adaptation: comparative study between children of floating population and left-behind children. *China Rural Survey,* 76(1), 76-95.

Yoshinaga-Itano, C. (2006). Early identification, communication modality, and the development of speech and spoken language skills: Patterns and considerations. In Spencer,P. E., Marschark, M. (Eds.), *Advances in the spoken language development of deaf and hard-of-hearing children* (pp. 298-327). New York, NY: Oxford University Press

Yopp, H.K., & Yopp, R.H. (2000). Supporting phonemic awareness development in

the classroom. *The Reading Teacher,* 54(2), 130-144.

Yu, S. H., Zeng, F. L., & Dong, Y. L. (2001).The influence of three different educational placements on personality development of students with mild mental retardation. *Shanghai Research on Education,* 1, 22.

Zaidman-Zait, A., & Most, T. (2005). Cochlear implants in children with hearing loss: maternal expectations and impact on the family. *The Volta Review,* 105 (2), 129-150.

Zaidman-Zait, A. (2007). Parenting a Child With a Cochlear Implant: A Critical Incident Study. *Journal of Deaf Studies and Deaf Educa*tion, 12(2), 222-229.

Zheng, L. Y. (2010). *Research on family resilience and its influencing factors in families of children with hearing impairment.* (Master dissertation). Retrieved from http://cdmd.cnki.com.cn/Article/CDMD-10636-2010267428.htm

Zhou, H. Q. (2013, July 2). Promoting Compulsory Education in Rural China: What Are the NPOs Doing? China Daily. Retrieved from http://blog.chinadaily.com.cn/blog-1142759-10925.html

Zwolan, T. A., Ashbaugh, C. M, Alarfaj, A., Kileny, P. R., Arts, H. A., El-Kashlan, H. K., & Telian, S. A. (2004). Pediatric cochlear implant patient performance as a function of age at implantation. *Otology and Neurotology,* 25(2), 112-120.

Appendix

Appendix A

Informed consent form for survey questionnaire

Project title: Educational placement and school adjustment of children with cochlear implants

Principal investigator: Mgr. Jiaojiao Wu

Phone: (420) 736125936 **Email**: jiaojiao.wu01@upol.cz

Address: Žižkovo nám. 5, 771 40 Olomouc, Czech Republic

I am a doctoral candidate at Palacky University Olomouc. I am conducting research on educational placement and school adjustment of children with cochlear implants for my dissertation.

This study:

1. You will be asked to fill out the questionnaire to share demographic information about the child and the data about their educational placement and school adjustment.
2. It is anticipated the survey should last no longer than 15 minutes. All data from the survey will be confidential and used solely for the research purposes associated with this study.

Language:

The survey will be written in Czech / simplified Chinese. If you have any other communication requirements, please let me know.

Risks:

There is no more than minimal risk to individuals who participate in this research study.

Benefits:

There are no benefits to you, but there may be benefits contributing to general knowledge about educational placement and school adjustment of children with cochlear implants.

Confidentiality:

All materials and any information collected will be used solely for the research purposes associated with this study. The videotape of the interview will be discarded after the study is completed.

Voluntary participation:

Your participation is totally voluntary. You may withdraw from the study at any time and for any reason. If you decide not to participate or withdraw from the study, there

is no penalty or

loss of benefits.

Results:

By request, an electronic copy of the published dissertation will be sent to you.

Disclaimer:

Participants who do not fit the study participant requirements will not be compensated.

The requirements of the study participant are parents who have child(ren) under the age of 18 with cochlear implants or main class teachers who have students under the age of 18 with cochlear implants. Any fraudulent responses on the survey will be eliminated from the data

collection and will not be compensated.

Intent to participate:

If you agree to participate, then read the following, and click "yes" below to give consent to participate in this study.

I have read this Informed Consent Form and agree to participate in this study conducted by Jiaojiao Wu. I understand that I can withdraw from this study at any time without penalty or prejudice.

Yes_____ No_____

Appendix B

Questionnaire of educational placement and school adjustment of children with cochlear implants

Introduction

As you may know, educating a child with cochlear implants is challengeable, the purpose of this interview is to help us to understand the implementation of educational placement of children with cochlear implants.

We would like to discuss the process of educational placement, present school adjustment and influencing factors, to explore educational placement on the premise of meeting the unique educational needs of the child.

To get to know them better, we will need basic characteristic information of the child. We will ensure that this questionnaire is absolutely anonymous and will be used only in this research. Thanks for your cooperation!

Student doctoral study programme

Institute of Special Education Studies

Faculty of Education

Palacky University Olomouc

I. Demographic information about the informants

Please circle the response which best applies to you:

1. You are:

a. the child b. main caregiver c. main class teacher d. other professional who works with the child

If you are the child with cochlear implants, please skip to II

2. Your gender is:

a. male b. female

3. You live in:

a. urban b. rural

4. Your hearing is:

a. normal b. impaired

5. Your educational attainment is:

a. illiterate b. primary education c. secondary education d. higher education

II. Demographic information about the child

Please circle or fill the data

1. The gender of the child is:

a. male b. female

2. The age of the child is ___year(s) old.

3. The onset of hearing loss of the child was ___ year (s)___month (s) old.

4. The age of getting cochlear implants was___year (s)___month (s) old.

5. The child is studying in:

a. regular class b. resource classroom c. special school d. deaf school e. other_____

6. Before the current placement, the child studied in:

a. regular class b. resource classroom c. special school d. deaf school e. other_____

7. The degree of haring loss is：

a. 41-55dB b. 56-70dB c. 71-90dB d. 91-110dB e. >110dB

8. Cochlear implants using level is:

a. never b. sometimes c. often d. always

9. The preferred communication mode at home is:

a. natural gesture b. spoken language c. sign language d. bilingual approach

10. The preferred communication mode in school is:

a. natural gesture b. spoken language c. sign language d. bilingual approach

11. The child has other disabilities:

a.no b.yes. What disabilities？ _____

III. Data about educational placement and school adjustment

Please circle the response which best applies to you

1	2	3	4	5
strongly disagree	disagree	neither agree nor disagree	agree	strongly agree

1. The child's current hearing influences on his/her educational placement

1 2 3 4 5

2. The child's multiple disabilities influence on his/her educational placement

1 2 3 4 5

3. The child's deaf identity influences on his/her educational placement

   1 2 3 4 5

4. Parents' deaf identity influences on the child's educational placement

   1 2 3 4 5

5. The child's prior school experience influences on his/her educational placement

   1 2 3 4 5

6. Parents' hearing influences on the child's educational placement

   1 2 3 4 5

7. Parents' educational attainment influences on the child's educational placement

   1 2 3 4 5

8. Family expectation influences on the child's educational placement

   1 2 3 4 5

9. The child's preferred communication mode influences on his/her educational placement

   1 2 3 4 5

10. Parents' preferred communication mode influences on the child's educational placement

    1 2 3 4 5

11. Class teachers' preferred communication mode influences on the child's educational placement

    1 2 3 4 5

12. Teachers' attitude toward on acceptance of the child influences on the his/her educational placement

    1 2 3 4 5

13. Environmental conditions of the placement influence on the child's educational placement

    1 2 3 4 5

14. The child adapts to environment conditions of the placement

    1 2 3 4 5

15. The child adapts to interpersonal relationship in the placement

1 2 3 4 5

16. The child adapts to academic study in the placement

1 2 3 4 5

17. The child's current hearing influences on his/her school adjustment

1 2 3 4 5

18. The child's multiple disabilities influence on his/her school adjustment

1 2 3 4 5

19. The child's preferred communication mode influences on his/her school adjustment

1 2 3 4 5

20. The child's language development influences on his/her school adjustment

1 2 3 4 5

21. The child's study pressure influences on his/her school adjustment

1 2 3 4 5

22. The child's academic achievement influences on his/her school adjustment

1 2 3 4 5

23. The child's peer relationship influences on his/her school adjustment

1 2 3 4 5

24. The child's learning style influences on his/her school adjustment

1 2 3 4 5

25. The child's social skills influence on his/her school adjustment

1 2 3 4 5

26. The child's personality influences on his/her school adjustment

1 2 3 4 5

27. The child's self-efficacy influences on his/her school adjustment

1 2 3 4 5

28. Parents' educational attainment influences on the child's school adjustment

1 2 3 4 5

29. Parental stress influences on the child's school adjustment

1 2 3 4 5

30. Family function influences on the child's school adjustment

    1 2 3 4 5

31. Family involvement influences on the child's school adjustment

    1 2 3 4 5

32. Class teachers' preferred communication mode influences on the child's school adjustment

    1 2 3 4 5

33. The class size influences on the child's school adjustment

    1 2 3 4 5

34. Class teachers' specialized training in special education influences on the child's school adjustment

    1 2 3 4 5

35. Class teachers' working experience with students who have hearing impairment influences on the child's school adjustment

    1 2 3 4 5

36. Environmental conditions of the placement influences on the child's school adjustment

    1 2 3 4 5

37. The child's early childhood education influences on his/her school adjustment

    1 2 3 4 5

38. The child's time duration in the placement influences on his/her school adjustment

    1 2 3 4 5

39. Please write down any other factors influence on a decision on the child's educational placement

    _____

40. Please write down any other factors influence on the child's school adjustment

    _____

Appendix C

Dotazník, vzdělávací prostředí a přizpůsobení ve škole u dětí s kochleárním implantátem

Jak jistě víte, díte s kochleárním implantátem může být pro rodiče výzvou, cílem tohoto dotazníku je porozumět umisťování dětí do různého vzdělávacího prostředí a jejich přizpůsobování se v tomto prostředí. Rádi bychom diskutovali o procesu umisťování dětí s kochleárním implantátem, o tom, jaký vliv má na dítě současná škola, rádi bychom tak našli předpoklad pro společné definování potřeb dětí s kochleárním implantátem.

Tento dotazník je zcela anonymní a bude použit pouze pro tento výzkum.

Studentka doktorského studijního programu speciální pedagogika
Ústav speciálněpedagogických studií
Pedagogická fakulta
Univerzita Palackého v Olomouci

I. Demografické údaje o informátorů

Zakroužkujte, prosím, nejvhodnější odpověď.

1. Jste:
   a. dítě b. hlavní pečovatel c. hlavní třídní učitel d. jiný profesionál, který pracuje s dětmi

Jste-li dítě s kochleární implantáty, přejděte prosím rovnou k bloku II

2. Pohlaví:
   a. mužské b. ženské
3. Žiješ:
   a. ve městě b. na venkově
4. Váš sluch je:
   a. normální b. narušený
5. Míra dosaženého vzdělání:
   a. negramotná b. základní c. středoškolské d. vysokoškolské

II. Demografické informace

Prosím zakroužkujte (popř. doplňte) dle Vašeho názoru.

1. Pohlaví dítěte je

   a. mužské b. ženské

2. Věk dítěte je _____

3. Dítěti byla diagnostikována ztráta sluchu v _____ letech, _____ měsících.

4. Dítě má zaveden kochleární implantát od _____ let _____ měsíců.

5. Dítě studuje v:

   a. běžné třídě b. ve speciální třídě v běžné škole c. speciální škole

   d. hluché škole e. jinde_____

6. Před umístěním do současného zařízení dítě studovalo v:

   a. běžné třídě b. ve speciální třídě v běžné škole c. speciální škole

   d. hluché škole e. jinde_____

7. Míra ztráty sluchu je:

   a. 41-55dB b. 56-70dB c. 71-90dB d. 91-110dB e. >110dB

8. Jak často dítě využívá kochleární implantát:

   a. nikdy b. někdy c. často d. pořád

9. Preferovaná forma komunikace doma je:

   a. přirozená gestikulace b. orální řeč c. znaková řeč d. bilingvní

10. Preferovaná forma komunikace ve škole je:

    a. přirozená gestikulace b. orální řeč c. znaková řeč d. bilingvní

11. Má dítě další postižení?

    a. ne b. ano Jaké? _____

III. Dotazník o vzdělávacím prostředí a přizpůsobení ve škole

1	2	3	4	5
silně nesouhlasím	nesouhlasím	ani nesouhlasím,	Souhlasím	Silně souhlasím

		ani souhlasím		

1. Míra sluchové percepce dítěte má vliv na umístění dítěte do speciální či běžné školy.

   1 2 3 4 5

2. Vícenásobné postižení dítěte ovlivňuje umístění dítěte ve vzdělávacím prostředí.

   1 2 3 4 5

3. Hluchá identita dítěte ovlivňuje umístění dítěte ve vzdělávacím prostředí.

   1 2 3 4 5

4. Hluchá identita rodičů ovlivňuje umístění dítěte ve vzdělávacím prostředí.

   1 2 3 4 5

5. Zkušenost se školou, kterou dítě dříve navštěvovalo, má vliv na umístění dítěte ve vzdělávacím prostředí.

   1 2 3 4 5

6. Míra sluchové percepce rodičů má vliv na umístění dítěte ve vzdělávacím prostředí.

   1 2 3 4 5

7. Míra dosaženého vzdělání rodičů má vliv na umístění dítěte ve vzdělávacím prostředí.

   1 2 3 4 5

8. Očekávání rodiny má vliv na umístění dítěte ve vzdělávacím prostředí.

   1 2 3 4 5

9. Preferovaná forma komunikace dítěte má vliv na jeho umístění ve vzdělávacím prostředí.

   1 2 3 4 5

10. Preferovaná forma komunikace rodičů má vliv na umístění dítěte ve vzdělávacím prostředí.

    1 2 3 4 5

11. Preferovaná forma komunikace učitele má vliv na umístění dítěte ve

vzdělávacím prostředí.

1 2 3 4 5

12. Postoj učitele k dítěti (míra přijetí) má vliv na jeho fungování ve vzdělávacím prostředí.

1 2 3 4 5

13. Podmínky životního prostředí mají vliv na umístění dítěte ve vzdělávacím prostředí.

1 2 3 4 5

14. Dítě se přizpůsobí podmínkám životního prostředí ve vzdělávacím prostředí.

1 2 3 4 5

15. Dítě se přizpůsobí mezilidským vztahům ve vzdělávacím prostředí.

1 2 3 4 5

16. Dítě se přizpůsobí akademickému studiu ve vzdělávacím prostředí.

1 2 3 4 5

17. Míra sluchové percepce dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

18. Vícenásobné postižení u dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

19. Preferovaná forma komunikace dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

20. Úroveň jazykových schopností dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

21. Stres spojený se studiem má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

22. Školní úspěchy mají vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

23. Vrstevnické vztahy mají vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

24. Postoj k učení (motivace, vůle, aj.) má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

25. Sociální dovednosti dítěte mají vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

26. Osobnost dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

27. Důvěra ve vlastní schopnosti u dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

28. Míra dosaženého vzdělání rodičů má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

29. Stres rodičů dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

30. Funkční rodina má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

31. Míra zapojení rodiny má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

32. Preferovaná forma komunikace učitele má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

33. Počet dětí ve třídě má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

34. Vzdělání učitele v oblasti speciální pedagogiky má vliv na přizpůsobení dítěte ve škole

1 2 3 4 5

35. Pracovní zkušenosti učitele s žáky, kteří mají sluchové postižení mají vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

36. Prostředí školy (poloha, velikost města, okolí, budova školy, aj.) má vliv na přizpůsobení dítěte ve škole.

1 2 3 4 5

37. Ranná výchova dítěte má vliv na jeho přizpůsobení ve škole.

1 2 3 4 5

38. Časové období (jeho délka), kdy je dítě umístěno do zařízení, má vliv na jeho

přizpůsobení ve škole.

1 2 3 4 5

39. Prosím napište další faktory, které podle Vás ovlivňují umístění dítěte ve vzdělávacím prostředí.

_____

40. Prosím napište další faktory, které podle Vás ovlivňují přizpůsobení dítěte ve vzdělávacím prostředí.

_____

Appendix D

Informed consent form for follow-up interview

Project title: Educational placement and school adjustment of children with cochlear implants

Principal investigator: Mgr. Jiaojiao Wu

Phone: (420) 736125936 **Email**: jiaojiao.wu01@upol.cz

Address: Žižkovo nám. 5, 771 40 Olomouc, Czech Republic

I am a doctoral candidate at Palacky University Olomouc. I am conducting research on educational placement and school adjustment of children with cochlear implants for my dissertation.

This study:

1. You will be asked to participate in a follow-up interview on educational placement and school adjustment of children with cochlear implants. You are asked to share your thoughts and perspectives on the child's educational placement and school adjustment.

2. It is anticipated that the interview should last no longer than 15 minutes. The interviews will be videotaped. All materials and any information collected will be used solely for the research purposes associated with this study.

Language:

The interview will primarily be conducted in English (in Czech) / Mandarin Chinese (in China). If you have any other preference for language, for instance, a sign language interpreter, please let me know any particular communication requirements that you require.

Risks:

There is no more than minimal risk to individuals who participate in this research study.

Benefits:

There are no benefits to you, but there may be benefits contributing to general knowledge
about deaf parents and their perspectives on bilingual education for deaf children with cochlear implants.

Confidentiality:

All materials and any information collected will be used solely for the research purposes associated with this study. The videotape of the interview will be discarded after the study is completed.

Voluntary participation:

Your participation is totally voluntary. You may withdraw from the study at any time and for any reason. If you decide not to participate or withdraw from the study, there is no penalty or
loss of benefits.

Results:

To avoid mistranscription, a copy of the interview transcript will be sent to you. By request, an electronic copy of the published dissertation will be sent to you.

Intent to participate:

If you agree to participate, please sign your name below and enter the date.

I have read this Informed Consent Form and agree to participate in this study conducted by Jiaojiao Wu. I understand that I can withdraw from this study at any time without penalty or loss of benefits.

Signature_____ Date_____

Appendix E

Interview questions

For parents:

1. What educational choices have you made for your child? Why did you make these choices?
2. What are the problems/challenges you have experienced in decision on educational placement?
3. How did you solve the problems? What kind of support and services have you received from?
4. How is your child's school adjustment?
5. What are the problems/challenges your child has experienced in school?
6. Have your child ever transferred between different placements? What are the reasons for transition?
7. How do you support and facilitate your child's school adjustment?

For children with cochlear implants:

1. Do you agree with you are a deaf?
2. How is the environmental condition in your school? What are the challenges?
3. How is your relationship with the class teachers in school?
4. How is your relationship with peers in school?
5. How about your studies in school?
6. What are the challenges you have experienced in school?

For teachers:

1. Do you have any working experience with children who have hearing impairment?
2. Have you ever received any specialized teachers training to work with children who have hearing impairment?
3. What are the problems/challenges you have experienced in working with the child with cochlear implants?
4. What educational placement do you think is good for educating a child with cochlear

implants?

5. What have you done to improve the child's school adjustment?
6. How have school changed in providing support for the child's school adjustment?

Appendix F

Abstrakt

Tato studie zkoumá vzdělávací prostředí a školní úpravy dětí, které mají kochleární implantáty, především prostřednictvím dotazníkového šetření a hloubkových rozhovorů doprovázených terénním pozorováním v konkrétním místě. Je to komparativní studie, která porovnává české a čínské děti s kochleárními implantáty. Celkový výzkumný vzorek byl složen ze 43 respondentů, z čehož bylo 15 dětí z České Republiky a 28 dětí z Číny. Prostřednictvím dotazníkového šetření byly zjištěny rozdíly mezi vzdělávacím prostředím dětí z obou skupin, v kontinuálním vzdělávání, které zahrnuje pravidelné hodiny, zdrojový pokoj, škola pro sluchově postižené, instituce a domácí vzdělávání. Zúčastněné děti ve výzkumu mají různé stupně vzdělání. Na dítě působí řada faktorů, které ovlivňují konečné rozhodnutí o umístění dítěte ve vzdělávacím prostředí. Mezi tyto faktory patří jak věk dítěte, aktuální úroveň sluchu, další postižení, hluchá identita, předchozí školní zkušenosti a preferovaný komunikační způsob dítěte, tak rodinné vztahy a další místní faktory. Ze zjištění vyplývá, že adaptace dítěte na prostředí, které je opatřeno školními úpravami je v této studii založena na třech ukazatelích: přírodní podmínky, mezilidské vztahy a akademické studium. Statisticky významný rozdíl v celkovém nastavení školního prostředí mezi skupinami vzhledem k rozdílům v procesu adaptace závisí na přírodních podmínkách a na akademickém studiu. Závěrečná zjištění rovněž ukazují statisticky významný rozdíl mezi oběma skupinami dětí umístěnými v běžné škole, zatímco rozdíl mezi skupinami dětí umístěných ve školách pro sluchově postižené nebyl shledán jako signifikantně významný. Ze čtyř stupňů českého vzdělávacího systému mají předškolní zařízení nejvyšší skóre u celkových úprav školních zařízení, následující střední školy, pak základní a nazávěr

vysoké školy. V čínské skupině bylo shledáno nejnižší skóre u základní školy. Statistická zjištění ukazují některé související faktory zahrnující: styl učení, sociální dovednosti, samo-účinnost a ranné dětství, jenž mají pozitivní vliv při školních úpravách, zatímco jiné faktory jako kombinované postižení a rodičovský stres v této studii naopak negativně korelují s úpravami školního prostředí. Faktory spojené s prostředím jako učitelův preferovaný komunikační styl, také může mít významný vliv na úpravy školy.

Respondenti v řízeném interview vyjádřili překážky a problémy v procesu rozhodování o umístění dítěte ve vzdělávacím prostředí a ve školních úpravách. Podle analýzy 17 rozhovorů jsou nejčastějšími příčinami změny vzdělávacího prostředí komunikační bariéra s vrstevníky a špatné studijní výsledky a to u obou skupin. Celkem 9 dětí zažilo změnu vzdělávacího prostředí, 5 z nich přestoupilo z běžné třídy do školy pro neslyšící. Ze zjištění z interwiev a pozorování vyplývá, že zejména v Číně děti s kochleární implantáty umístěny v běžných třídách neměly dostatečnou podporu a ani jejich jedinečné požadavky a potřeby nebyly naplňovány. Analýza interakce třídy naznačuje, že v obou skupinách třídní učitel v běžné třídě neuměl znakový jazyk a ani plně nevyužíval speciálních pedagogických dovedností při vydávání pokynů dětem se sluchovým postižením, zatímco ve škole pro sluchově postižené učitelé upřednostňovali dvojjazyčný přístup a snažili se využívat vlastních schopností a předchozích zkušeností při práci se sluchově postiženými dětmi k optimalizaci unikátní síly dětí s kochleárními implantáty. V následné diskuzi problémů, výzkum poskytuje záblesky možných řešení, které navrhli rodiče a učitelé pro zlepšování vzdělávacího prostředí a školních úprav, což může být užitečné pro jiné rodiny s dětmi, které mají kochleární implantáty a profesionály, kteří pracují s těmito dětmi. Shromážděné údaje se mohou implikovat při racionálním rozhodování o vhodném vzdělávací prostředí a pro zlepšení školních úprav za účelem podpory dětí s kochleární implantáty a jejich rodin.

Klíčová slova: Kochleární implantáty, Vzdělávací prostředí, Školní úpravy, ČR, China