The Future in their Hands: Developing Hearing Children’s Potential through Sign Language
The main aspect of this research will focus on finding new methods to achieve the goals of the Education For All. Being able to fulfill every learner’s social, academic and physical needs is a common concern for teachers who are determined to offer the best of the education for a growing diversity of learners.

Professional teachers are perpetually in quest of new methods to reach a wider scope of learners. As multisensory methods have been proved to be efficient in the past decades, the result of this research will analyze the use of sign language as an educational tool. In this thesis I will find out how does Sign Language exposure in inclusive classroom affect hearing children.

This thesis is a comprehensive literature review which will be part of a larger work later when empirical data will be collected with the aim of completing a Master Thesis. The literature review is composed of well-known educational theories such as The theory of Multiple Intelligence by Howard Gardner and the theory of multisensory learning by Neil Fleming. The rest of the literature review focuses on major researches related to the research question while identifying how existing literature is lacking in terms of studies made on hearing students exposed by Sign Language in inclusive setting.

The different results obtained in this bachelor thesis confirm that Sign Language in many ways improves the learning experience of hearing people by supporting language development, enhancing memory and vocabulary acquisition, developing both sides of the brain, stimulating several learning styles, fostering intercultural awareness, improving classroom atmosphere and developing emotional intelligence. Despite the fact that none of these studies were done in an inclusive setting but rather within hearing communities, we can expect the same kind of benefits emerging from an inclusive classroom where Sign Language would be displayed in a regular basis. Nevertheless the conclusion of this study gives a good starting point for teachers who would like to diverse their teaching style.

Keywords: Deaf Hearing Inclusion Multiple Intelligences Multisensory Sign Language Special education
THE FUTURE IS IN THEIR HANDS:
Developing hearing children’s potential through Sign Language

Figure 1. Hand (Artistlike, 2015)
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1. **INTRODUCTION**

From the beginning of the 21\textsuperscript{st} century the trend in special education is inclusion of special need pupils into mainstream classroom (Torreno, 2012). The teacher is expected to differentiate and adapt teaching in order to meet every kind of learner’s need including the ones with disabilities.

In the history of special needs education in different countries, the first trends often started by offering education to people suffering from sensory disabilities like deaf and blinds (Rotatory et al., 2011). Deaf children have been first rejected from any type of education, until the 16\textsuperscript{th} century when the monk Pedro Ponce de Leon in Spain starts educating noble deaf children. For the following centuries Education for the Deaf emerged in other countries like in France in the 18\textsuperscript{th} century and in United States in the 19\textsuperscript{th} century but only into segregated schools for deaf and hard of hearing students (Moores, 1996). Since the development of inclusive Education trend in the 1980’s, many programs like in United States and England for example have tried to include them in traditional classrooms providing Sign Language training to teacher, personal interpreters or advanced technologies to fulfill deaf pupils’ needs (Kreimeyer et al., 2000; Gregory, n.d).

The cochlear implant, an electronic device implanted directly in the brain of the deaf person and connected to an external microphone, has influenced a lot the Education for Deaf since its first apparition in the 1950’s and its large democratization since the 1990’s (Niparko, 2000). It has created opportunity for deaf people to live without Sign Language. Despite a large number of deaf children using the cochlear implant, sign language is still deeply imbedded in the deaf culture. Therefore it is legitimate to think that some families and some educational system might opt for inclusive classrooms providing a translation in sign language.

The purpose of this research is to study more deeply the consequences of exposing hearing children to a visual and kinesthetic language in a daily basis.
Some research has been done about the consequences of inclusion for deaf children (Stinson & Antia, 1999; Stinso & Kluwin, 2003; Wauters & Knoors, 2007). Often these studies are written by members or defenders of the deaf community who feel strongly that inclusion will lead to an isolation of the deaf child among the hearing culture. Another major point of concern for including deaf children in hearing classrooms is the reduced use of Sign Language. Whether there are grounds for worrying about the deaf child in a traditional classroom or not will not be the goal of this research. Only few references are mentioning the effects that inclusion of a deaf child might have on his hearing classmates in terms of learning. Indeed Larson & Chang (2007) tell us that most of the studies about sign language focus on hearing children with disabilities and they claim that the lack of studies with hearing children of general development is real. In the specific case of inclusive classroom with deaf students, there is a real need for studies focusing exclusively on hearing children to give teachers a holistic understanding of the classroom.

The main aspect of this research will focus on finding new methods to achieve the goals of the Education For All. Being able to fulfill every learner’s social, academic and physical needs is a common concern for teachers who are determined to offer the best of the education for a growing diversity of learners. Professional teachers are perpetually in quest of new methods to reach a wider scope of learners. As multisensory methods have been proved to be efficient in the past decades, the result of this research will analyze the use of sign language as an educational tool (Shams & Seitz, 2008). Sign language being a way of communicating with hands and body in a very visual way could be an alternative way of transmitting information.

Besides being a very relevant research topic for many teachers in the near future who might face inclusion of deaf pupils in their classroom, this field of research is also a very exciting one for me. Indeed, my first experience with deaf children was in 2012 in Togo, Africa. I learned there, the basics of Sign Language and taught a class of only deaf pupils. Since this first contact with the deaf culture I have been personally interested into Sign Language and I have taken Finnish Sign Language courses. Moreover as a
starting point for the idea of this research, I have been using Sign Language during a summer course as an active and fun way to teach French language to high school’s students. Later in 2015, I have had the chance to witness the practicalities of using sign language at school when I was doing my teaching internship in Rochester, US. Indeed the school was encouraging sign language to ease student-teacher communication. This experience persuaded myself that the purpose of my study was relevant and of common interest.

2. RESEARCH QUESTION AND METHODOLOGY

In this research, I will consider the following questions.

**Does Sign Language exposure in inclusive classroom affect hearing children?**

- How can Sign Language be used as a way to meet the needs of various learners?
- Is the influence of using sign language as a medium of instruction more positive for hearing students with certain learning style?

The methodology used for this bachelor thesis is a comprehensive literature review which will be part of a larger work later when empirical data will be collected with the aim of completing a Master Thesis. The purpose of a literature review is defined by Cronin, Ryan and Coughlan (2008) as "providing the reader with a comprehensive background for understanding current knowledge and highlighting the significance of new research". The literature review’s aim will be to closes areas of research already existing about the topic and discover areas where research is needed. In order to find relevant literature I used the University of Oulu library database as well as the Nelli database to find journal articles. I have also used Google Scholar search engine to find books and scientific articles. Google search engine was used only to find general information about deaf population, official documents from the United Nations and magazine articles. The literature review is concept-centric which means that the chapters are organized according to shared themes. The main concepts have been
defined after the first stage of the research where I searched and collected a relevant numbers of references. After reading once all the references through, I was able to make categories and classify the references within those categories. Every reference has been critically analyzed by evaluating the research methods and ethics of the studies. (Webster & Watson, 2002)

After defining the main concepts of the research like “Deaf/Hearing”, “inclusive classroom” and “sign language”, I will base the literature review on well-known educational theories such as The theory of Multiple Intelligence by Howard Gardner and the theory of multisensory learning by Neil Fleming. The rest of the literature review focuses on major researches related to the research question while identifying how existing literature is lacking in terms of studies made on hearing students exposed by Sign Language in inclusive setting. I use the Meta-synthesis method to analyze the literature that I found. It means that I integrated, evaluated and interpreted different findings in order to extract key element in each study. The aim is “to transform individual findings into new conceptualizations and interpretations” (Cronin, Ryan & Coughlan, 2008).

3. DEFINING THE MAIN CONCEPTS

To ensure the understanding of the following review, this chapter will first focus on defining the main concepts: hearing/deaf, inclusive classroom and Sign Language.

3.1. “Hear or not to Hear”: Difference between Deaf and Hearing

In this study I will use the terms hearing, deaf and hard of hearing. The deaf in general is a minority of people who cannot hear human speech properly and who therefore need to find a substitute to be able to communicate. A major party of hearing impaired uses sign language, some use lip reading, and others use technologies such as hearing aids and more recently cochlear implants (Stokoe, 2005). According to the World Health Organization (WHO) (2015) there are several levels of hearing loss ranging from mild, moderate, severe to profound. They also mention that the term “Hard of hearing”
applies to people who have mild to severe hearing loss. The term “Deaf” applies to people with profound hearing loss which means that they have no hearing at all. Regarding deaf children, the WHO (2015) tells us that: “Disabling hearing loss refers to [...] a hearing loss greater than 30dB in the better hearing ear in children.” By opposition, a hearing person is a person whose hearing is reaching the normal threshold of minimum 25 DB in both ears (WHO, 2015).

Historically deaf people were considered as “dumb”. Awareness has increased recently about deafness but still nowadays the deaf culture, representing 360 million of people worldwide, often suffers of its statue of minority. The public has hard time to accept deaf people and treat them as equals due to their ignorance of the gravity of the handicap but also the fact that deafness is usually an invisible disability (Stokoe, 2005).

3.2. Inclusive classroom

Inclusive education is defined by the United Nations as being the capacity for an education system to reach out to all learners. This relatively new term in the field of education does not only concern education for special needs children.

“An inclusive school must offer possibilities and opportunities for a range of working methods and individual treatment to ensure that no child is excluded from companionship and participation in the school” (UNESCO, 2009, p.8).

Tony Knight (1999) writes that a classroom can be labeled democratic and socially inclusive at the condition that it welcomes all students as equally valued members of the school community. UNESCO views inclusion as “a dynamic approach of responding positively to pupil diversity and of seeing individual differences not as problems but as opportunities for enriching” (UNESCO, 2005, p. 12).

There are several criteria to look at within a school to assess whether the community is indeed inclusive or not. According to the Policy Guidelines on Inclusion in Education, the first step towards an inclusive school is to care about the attitudes of the entire school community. Having a professional staff that is willing to accept and welcome diversity into their classroom is a key element to label a school “inclusive”. The second
inclusion checklist from the United Nations concerns the curriculum. This checklist aims at making sure that the curriculum includes topics about diversity, human rights, sustainable development, health education and gender issues among others. It is also mentioned that the curriculum must be flexible to allow “variation in working methods” (UNESCO, 2009, p. 19). A teacher who would see the use of Sign Language as a way to offer different stimulation to his/her students would therefore act in line with the UN guidelines for inclusion. The way teachers teach is the last key from the UN guidelines to insure that the classroom is really inclusive. The decision is in the hand of the teachers to make sure that every single learner will understand and benefit from the learning experience at school.

In the case of deaf pupils’ education, inclusive classroom has been a very controversial issue from the beginning of the inclusive trend. The idea of having every children going to their local neighborhood school would impend children to go to boarding schools and leave their families. Inclusive classroom also helps deaf children to take part in the society in their future life and get contact with hearing population. However many educational professionals are worried about the isolating effect of putting a deaf child in the middle of a hearing community. Researches show that the deaf child might lack social relationships and communication opportunities in traditional schools (Cawthon, 2007). Another concern is to see the cultural heritage of deaf society to diminish.

3.3. Sign language

Sign Language is a complex language on its own using different ways than a traditional language to transmit an idea. Despite the fact that Sign Language has all the features to be considered an official language in itself, its recognition has been only very recent and only in few part of the world (Timmermans, 2005). After a brief historical review of the language of the deaf, we will understand better the particularity of this gestural language.
3. Definition:

For the purpose of this research, I will use mainly the term Sign Language. However in some studies mentioned in my thesis they might have used different form of gestural communication or only isolated words from a specific Sign Language. I understand and respect the complexity of the different Sign Languages and do not intend to depreciate them. I find it important to define what the term “Sign Language” refers to in today’s world as many people might have misconception about Sign Languages. Moreover providing a clear definition of the term “Sign Language” will make it easier for the reader to understand and interpret the different research results depending if they used an actual official Sign Language or a another form of gestural communication to support learning.

Today about 70 million deaf people in the world have Sign Language as their mother tongue. When speaking about the gestural language used by deaf people to communicate, we generally mean the Sign Language of a certain country. Sign language, despite what many people think, is not a universal language. There exist as many sign languages as there are spoken languages around the world (World Federation of the Deaf, n.d).

Sign Languages are defined by the World Federation of the Deaf ([WFD], n.d) as being “a sequence of movements and configurations of the hands and arms, upper torso and facial expressions.” Timmermans (2005) adds that they are all natural rule based languages with grammatical structures as complex as spoken languages.

There are other forms of gestural languages used in different context which are not related to deafness. In the literature such terms like “Simple gesture” are used by Goodwin (2000) to define the use of individual signed words for toddlers. “The Makaton” system also uses symbols, signs and speech to enable people suffering from Down syndrome for example to communicate effectively (Mottley, 2012). In other sources, it is possible to encounter the term “Siglish” or “Signing Exact English” which is a system using American Sign Language vocabulary but English syntax patterns (Paling, 2007).
History of legal recognition:

Deaf people had to wait until the 18th century to see their language considered as a real language. Abbé Épée, sometimes called the father of the Deaf, was the first to claim the validity of Sign Language. He established the first public school for deaf in Paris in the 1760’s (Stokoe, 2005, p. 5). For the purpose of this research, it is legitimate to discuss the legal status of Sign Language historically and globally. Indeed more awareness is needed to understand and protect a language that is underestimated; this research has for side aim to promote Sign Language as an official language.

Linguistic research has shown how sign language is composed of the same structural properties than other human languages and that they have evolved independently from spoken languages (WFD, n.d). Despite that, today all too few countries have been defending Sign Languages as languages of their own rights. In 2003, the European assembly has recognized Sign Languages as part of Europe’s cultural richness and as members of Europe’s linguistic heritage. Therefore the European Parliament has pushed each member state to officially recognize the sign languages used in their country and to make sure that the use of sign language is not hindered in any way (Timmermans, 2005). Currently there are about thirty one countries in the world, mostly in the European Union, who have recognized their sign languages into their laws about language rights. Only eleven countries worldwide have included their sign language at the constitutional level (De Meulder, 2015). Finland did so in 1995, which makes it one of the first countries to inscribe Sign Language into their constitution according to an international comparison (Timmermans, 2005). Nevertheless the Finnish Association of the Deaf still thought that their linguistic rights were not fully guaranteed so they recently requested a new Sign Language Act which passed on March, 12th 2015. This Act acknowledges sign language as a linguistic and cultural group in Finland such as other minorities’ languages like Saami and Roma language (De Meulder, 2015).

Ladd (as cited in Pizer et al., 2007, p. 397) notices that in the past decade Sign Language as become “sexier” among the young people and more popular in high school or Universities as a foreign language. This is probably due to the great
awareness brought for example by some singers who are using sign language like Signmark in Finland or one of the SpiceGirl in USA. This popularity and increased interest in Sign Language is good news for the deaf community and sign language speakers as more awareness will lead to even more recognition and acceptance in the future.

*Particularity of sign language: a visual and kinesthetic language*

Sign Language is not the only non-verbal communication mode that people have used in the history. Gesture languages have not always been associated with the deaf population as it is the case now in the 21st century. Indeed the use of gestures by hearing population is not that innovative after all as already before the 1600’s many visual kinetic systems were in use among hearing people (Bragg, 1997). In the Medieval time for example some monks, who, for religious reasons, forbid themselves to pronounce spoken words were using signs to communicate in silence (Bruce, 2007).

The difference between Sign Languages and spoken languages are in the senses stimulated during the conversation exchange. Number of references define Sign Language as being a visual-gestural, visual-kinetic (Bragg, 1997; De Gruyter, 2008; Prevatte, 2007; WFD, n.d; Timmermans, 2005) or visual-spatial (Bavelier et al., 2001). These terms are in opposition with auditory-vocal languages such as spoken languages (WFD, n.d). The first major characteristic of Sign Language is in the mode of transmission: “While spoken languages use articulatory organs located in the vocal tract in order to produce sounds, sign languages use a completely different set of articulators, namely the hands and the face”. Another major difference between signed and spoken languages is in the way to perceive the information given by the speaker. We use our ears to perceive spoken words pronounced by the speaker when deaf people use their eyes to perceive gestures of the signers (De Gruyter, 2008, p. 188).

The peculiarities of Sign Language makes it more tangible for learning especially when combined with spoken language as the communication between teacher and pupil incorporates various transmission channels: kinesthetic, visual and auditory (Prevatte, 2007).
Exposure to sign language

In an inclusive classroom where a deaf child beneficiates of a personal Sign Language interpreter or of a trained teacher in Sign Language, the other hearing children of the classroom are automatically exposed to sign language in a regular basis. Exposure (n.d) is defined by the Merriam Webster online dictionary as following: “the fact or condition of being affected by something or experiencing something”. As we know from researches on first language acquisition, exposure is the main way for toddlers to learn their mother tongue. Studies have shown that exposure enhances language learning; whether it is a first, second or third language. It seems that more the learner is in contact with a language, more competent he/she becomes in the language in question (Ismail, 1991).

Nevertheless there can be several degrees of exposure. According to Jeffery Braden (1994, p. 27) the degree of exposure depends on two criteria: the duration and the frequency of language exposure. From the researcher’s point of view, “exposure” will be an important factor to take into consideration when trying to evaluate the effects of sign language on hearing children. The exposure can be very intense if the teacher himself supports the deaf child with Sign Language because then even hearing children will have to notice the signs when looking at the teacher. Intensity can be decreased by the use of an interpreter instead of the teacher and the role that he plays in the classroom: if the interpreter only interacts with the deaf child, the effects on hearing children will be hindered. Moreover the frequency of the deaf child’s presence in the classroom can differ as he/she might be integrated in the traditional classroom full time, part time or sporadically, as the case may be.

4. MULTISENSORY LEARNING THEORIES

The aim in this part is to collect, from different well known theories, opinions showing that children can be various types of learners and use different kinds of intelligences simultaneously to learn. As seen in the previous chapter, Sign Language stimulates
more senses than just the auditory traditional method still mostly used in the classroom. The Multiple Intelligence Theory from Howard Gardner, the VARK (Visual Auditory Reading Kinesthetic) theory from Neil Fleming and the experiential Learning theory among others will be developed in the following chapter.

Howard Gardner back in the 1980’s writes the theory of Multiple Intelligence. He already states that intelligence is not only knowing how to read, write and count but a wider combination of different intellectual competences. In his work, he explains that each strength has its own developmental history, which means that we all have the capabilities in us but that they are more or less trained depending on our interests and learning style (1985, p. 59). It is difficult to create a list of those competences valid everywhere and for everybody because those competences depend on what is valued in different societies (p. 61). Howard Gardner realizes that there is no such a thing as a universal list of human intelligences, nevertheless he creates his own view of what should be valued and praised in the diversity of human minds (p. 60). The following list of intelligences is the one designed by Howard Gardner: Linguistic, Musical, Logical/Mathematical, Spatial, Bodily kinesthetic, Interpersonal and Intrapersonal (Gardner, 1985). People can use all those intelligences at the same time at different level or use a combination of them. Different tasks might require the use of different intelligences as well. According to Gardner (1985), it is important to keep developing and stimulating all the different intelligences. Using many learning styles simultaneously when teaching allow children to learn in the best possible way.

This set of intelligences has been later on associated to different learning styles of the pupils in the classroom setting. The learning styles movement from Dunn & Dunn (as cited in Baines, 2008, p. 21) categorizes students according to their preferred way of receiving and retelling information: auditory, visual, tactile and kinesthetic. The learning styles theory from Fleming and Baume (2006) describes learning styles as being a description of a preference. He classifies people’s abilities into four categories: visual, auditory, reading, and kinesthetic. People have preference for everything in life: colors, shoes, cars, food…etc. It sounds legitimate to think that they can also have a
preference for learning according to their learning style (2006). Though it is good to keep in mind that one’s preferred learning style can vary depending on the context.

When looking at the description of each intelligence given by Howard Gardner and the others, we can easily understand how Sign Language might contribute to the development of certain skills.

Spatial intelligence:

The most obvious one: the spatial intelligence (Gardner, 1985) or the visual one (Fleming&Baume, 2006; Baines, 2008), is defined as being “the capacity to perceive the visual world accurately, but also know how to perform transformations and modifications upon one’s initial perceptions” (Gardner, 1985). Learning styles researches (Baines, 2008) have found out that students tend to prefer visual stimuli than auditory or tactile. When learning to process and produce Sign Language, one needs to pay extra attention to the position, shape, orientation and movement of the hands (Timmermans, 2005). Being spatially gifted also means being able to recognize instances of the same elements (Gardner, 1985, p.176): this is a problem that a signer faces everyday by trying to identify a specific sign which can become tricky depending on the person signing, the amount of light, the view angle...etc. People who have developed their spatial intelligence are often called visual learners. Some of the scientists known through time and fields, like Darwin for the evolution theory or Kekulé for the structure of the Benzin ring used their spatial visualization to formulate their innovations (Gardner, 1985, p.191).

Using Sign Language in the classroom would not only boost the spatial abilities to all the children but would also give one way for the teacher to provide visual support for his/her students who are already advanced in that field and would enjoy stimulation in their preferred learning style.
The second intelligence in connection with Sign Language is the bodily kinesthetic one. Gibson (as cited in Gardner, 1985) has claimed in his research that movement and touch were essential for the good development of the brain, especially in the early years. This was also the opinion of Jean Piaget (as cited in Gardner, 1985) who named the first stage of development the “sensorimotor stage”. Our traditional classroom still requires the students to be sited for an extended period of time. Too often the work is to be done quietly sitting at the desk when pupils would need movement to keep them focused (Baines, 2008, p. 127). The benefits of using more bodily kinesthetic stimuli in teaching are that students feel like active learners literally holding their knowledge in their hands. Most of the time the desire to get involved is enough to become motivated especially in comparison of a teacher-centered learning environment where the child is expected to sit still and listen.

Sign language could recreate a balance between mind and body that our culture seems to have lost for a more academic orientated society. This way of thinking is one of the ground bases for experiential learning: an approach which has students actively engaged leading their own learning by connecting their heads and their bodies (Warren, 1995, p. 239). Bodily kinesthetic intelligence is defined by Gardner as being “the ability to use one’s body in highly differentiated and skilled ways [...] involving fine motor movements of one’s fingers and hands but also gross motor movement of the body.” (1985, p. 206). Sign Language requires a good coordination of the fingers, hands, wrist and arms. Very often the whole body is involved as movement of the upper torso, heads and legs are combined with the signs for specific meanings or to set a context. The lack of interest towards the bodily kinesthetic intelligence has not always been a reality, as for example in Ancient Greece where people really valued the body as a mark for respect (Gardner, 1985, p. 208). Even if recently some methods advocate for more use of the tactile sense in the teaching (such as the Montessori exercise of touching letters with different surfaces or tracing in the sand) (Baines, 2008, p. 22), we need more tools to respond to the needs of our bodily kinesthetic learners.
Inter and Intrapersonal Intelligence:

The third aspect of human intelligence which connects strongly with Sign Language instruction is the Inter and Intrapersonal abilities. Gardner (1985, p. 237) defines it as being “the capacity of recognizing feelings and ability to label them”. The personal intelligence involves understanding of one’s own emotion but also other people’s emotions, mood and intentions.

As facial expression is a key element of mastering sign language communication (De Gruyter, 2008), one could think that being exposed to it in a daily basis would develop the personal intelligence of the signers and viewers. Indeed signers are not only moving their hands and body but are also transmitting information with the movement of their lips, the shape of their eyes and all the other muscles present in the face communication (De Gruyter, 2008). Think about a mime, like Charlie Chaplin in the mute movies for example, most of the emotions and messages go through the facial expression. Learning and following sign language might allow students to become more aware of their own feelings and the ones of others; how to interpret them and how to control them. This is what already many schools are doing with including social and emotional education to their curriculum (Elias et al, 1997). With the rise of social and behavioral disorders among the children of our classroom, Emotional Intelligence is nowadays an essential skill for them to develop in order to be able to participate efficiently into our society. I believe it is the school’s duty to give the necessary inter and intra personal skills to children. By its emphasis on facial expression and body language, Sign Language is a way to train children on the importance and meaning of nonverbal communication.

Howard Gardner (1985, p. 385) claims: “Individuals are not all alike in their cognitive potentials and their intellectual styles. Education can be more properly carried out if it is tailored to the abilities and the needs of the particular individuals involved”. It is true that in our modern secular education settings, a major emphasis is put on logical mathematical knowledge and linguistic competences. Rare are the curriculum which are
praising and promoting the development of all the other kinds of intelligences (1985, p. 337). Often the remaining intellectual capacities are only dealt during after-school activities (1985, p. 351).

We already know that multisensory rooms are beneficial for disabled or emotional disturbed children according to Hope, Hutchinson, Kewin and Pagliano, (as cited in Baines, 2008). Based on the multisensory learning theories, we can imagine that using method stimulating all the senses would be beneficial with all the children. Still nowadays, Sign Language in Education has been mainly present among disabled and not really used with hearing students. By using Sign Language in the classroom, students would get visual support by having the instructions provided in both an auditory and gestural mode of communication. Students who need to move and take part fully in their learning would benefit from the bodily kinesthetic aspect of producing speech with their hands. And finally, those who need more help on behaving with friends and fitting into a social situation would have another mean of expressing themselves which might suit better their personalities.

5. **SIGN LANGUAGE USED WITH HEARING PEOPLE**

To my knowledge little is to be found in the literature on hearing children in an inclusive classroom comporting deaf and hearing students in the same environment. To cope with the lack of research in an inclusive setting as it is the focus of my research question, I have extended my search to literature on any kind of gestural communication used with hearing people. By analyzing the conclusion of those researches, there seem to be concrete benefits that a bilingual instruction in spoken and signed language would generate for hearing students.

The most easily available knowledge about Sign Language used in hearing context is about methods used exclusively with babies. Sign language has become recently popular to use with hearing toddlers as a way to communicate before the infant can produce spoken language. The first part will focus on the consequences of using a
gestural language with babies. The following chapter will then discuss studies which combine the use of Sign Language in a classroom setting with school age children (but not in inclusive setting). Those researches will be divided in two parts. At first I will present the researches showing how the use of Sign Language can influence literacy skills: such as vocabulary, reading, reading comprehension and letter names knowledge. And finally I will analyze studies which focus on the non-cognitive skills of students and how teachers have used Sign Language to manage behavior and/or to support students with specific needs. This last chapter will show how the use of Sign Language helps the teacher to keep a good working atmosphere in the classroom, hence affect the social well-being of the students. Happy and relaxed students are more likely to succeed academically (Lyubomirsky, King & Diener, 2005).

5.1. Sign Language used with babies

5.1.1. Context and definition

As a result of Sign Language becoming “cool” and popular, more and more hearing parents of hearing children decide to use Sign Language or gestures code with their infants before they are able to produce coherent language. This is a rather new phenomenon as even just back in the 1980’s, the society viewed Sign Language as inferior to spoken language. The attitude towards this non-verbal form of communication was so negative that even some parents of deaf children chose not to teach them Sign Language and instead to encourage oral communication (Pizer et al., 2007). Until the 1960’s the common belief was that any type of bilingualism would have negative effect on intelligence (Baker, 1988). But since the 1960’s research have proved that bilingualism has a positive correlation on intelligence (Peal & Lambert, 1962) and around the same time Sign Language started to be used with disabled hearing children. The first cases of Sign Language used with disabled hearing children were with children who had a speech delay or a connection with the deaf community (such as deaf relative). Recently parents in different context (often educated adults) are curious of trying the “baby signs” technique with their young beloved before they can speak. “Baby
“Baby signing is the use of visual-gestural signs between hearing parents and their young hearing children with the goal of earlier and clearer communication, often guided by parenting books, videos, and workshops that are available in the United States and other countries around the world.” (Pizer et al., 2007)

Despite being sometimes based on a real Sign Language used by deaf people, it is not always the case of baby signs. They can also be a set of simple gestures provided by books, instructors or videos dedicated to the use with babies. In some cases, the parents themselves come up with signs that are relevant for their daily life and create their own code of gestures to communicate.

5.1.2. Baby signs and language development

Susan Goodwin and Linda Acredolo are both major authors of books providing materials and advices to parents who wish to use signs with their babies. In one of their joint work with Abrams (as cited in Pizer et al., 2007. p 390) they affirm that benefits of this method would be to accelerate spoken language development and increase IQ performances. Indeed in a research made by Goodwin, Acredolo and Brown (2000), babies who had signed during their early time of life showed better skills in expressive and receptive verbal language tests than babies who haven’t been exposed to signs at all. To realize this study, Goodwin et al. followed three groups of children: one was trained with symbolic gestures and the two others were not taught any kind of signs. Among the two control groups, one was provided with verbal training as the researchers were concerned about the fact that parents focusing on using signs will also automatically spend more time on verbally labelling things around them. The children were between 11 and 36 months, the parents were interviewed and the children tested in laboratory for their receptive and expressive verbal language development. The verbal training control group did not outperform the non-trained control group which tells
that emphasizing verbal labeling does not enhance children’s language skills. According to the researchers, this finding might be explained that the fact that the non-trained parents naturally used labeling. Regarding the group using signs, the study showed that they had better expressive language skills than others at the same age. This conclusion confirms that Baby signs do not delay the production of language as it was the fear of some parents but on the contrary improves it (Goodwin et al., 2000).

Baby signing being a rather recent field of research, not enough studies have been done to fully acknowledge the benefits of signs, especially on children’s language development. Moreover the review of the previous reference by Johnston, Durieux-Smith and Bloom (2005, p. 241-242) accused Goodwin et al. for methodological weaknesses which challenges their conclusion of baby signing enhancing children’s language performances later on. They criticized the lack of information on parent’s level of education and on child-parents interaction factor which could explain that the children in the sign trained group were already more skilled than the others from the start. Like in many other researches on baby signing, Goodwin et al.’s research is not describing the selection process of the subjects. Also the critical literature review of Jennifer Paling (2007) reveals that there is no scientific proof of the benefits of using sign language with babies to develop their language acquisition. Paling denounces the lack of scientific methods to analyze data in three main researches dealing with baby sign language: Holmes & Holmes, Goodwin, Acredolo & Brown; Johnston et al. Paling thinks that the researches are lacking knowledge about parental education and number of adults each child interacts with. Nevertheless Paling does not discourage parents to use sign language with young children as there is no evidence either that it can be harmful to their linguistic development.

The researches mentioned above focused on proving the advantage of using baby signs for pure linguistic purposes. By taking into considerations the criticism made about those researches we can have doubts on the benefits of Sign Language for increasing language abilities of children. However, researchers have also dug out several other relevant gains by introducing gestures in the early years of children. These other
aspects of Sign Language instruction for babies will be presented in the following chapters.

5.1.3. Positive social effects of signing with infants learners:

The practice of using signs with babies before they can talk leads indeed to more efficient parent-child communication. It then results in less frustration from both parts as communication happens earlier and in a clearer way than in a traditional case where children often do not acquire clear language skills before the age of 2 or 3 years old (Acredolo et al., 2009). The use of a gestured system of communication also enhances the parent-child interaction because parents tend to spend more time interacting with their children. Eye contact and tactile contacts are longer and more frequent which deepens the relationship. Moreover signing parents consider their baby as a communicative partner earlier than in normal cases, therefore seeing the baby already as an independent individual with needs and desire. In the same way, using Sign Language in the classroom would indeed increase the interaction between the teacher and the students. Considering that a teacher needs to interact with in average 20 to 30 students, it gives very limited time per child to be acknowledged by the teacher. Using Sign Language seems to increase communication by having longer more frequent eye contacts.

Another major benefit of toddlers to communicate with their hands is to give them a concrete way to communicate their feelings and manage their emotions. One thing kids need to learn when entering our world is comply with the social and behavioral expectation of the society. It is sometimes difficult for an infant to understand and accept the adult's request for socially accepted attitude. Parents in Pizer et al.'s study (2007, p. 408) for example used baby signs to make sure their daughter, Rebecca, would, already before one year old, be able to request something politely without using the “primitive gestures and screaming” technique usually used by non speaking children. The parents noticed that it was later on very easy for Rebecca to use the words “please” and “thank you” according to the social norms.
In the article from Kirk, Howlett, Pine and Fletcher (2013, p. 30), we learn that particular children might be more positively affected by the use of Sign Language in the early years: those were for example male infants with low baseline expressive communication scores or children coming from low socioeconomic status families where the resources and time for healthy language development are sometimes lacking. Using signs allows parents to practice labeling skills with children earlier, which prepares them better for the later on educational expectations (Pizer et al., 2007, p. 393).

Research also showed that parents who use signs with their children gain more awareness towards deaf culture and sign language as a valid language (Pizer et al., 2007). Although Pizer et. al warns us that the deaf community has expressed their concerns that the use of signs for toddlers might lead to a misunderstanding of the complexity of their communication system because hearing people see it as a simple body language that is easier than spoken language for somebody to acquire, including babies. The above researchers are aware that Baby signing vogue might increases the gap between the status of spoken and signed languages.

All in all, introducing a gestural mode of communication with children under 3 years old seems to make many parents happy for various reasons depending on their values. Increased interaction time, bounding, eye contact, joint attention, emotion intelligence, politeness training, early spoken language abilities etc… are all mentioned in the above studies. Knowing the virtue of early bilingualism (Peal & Lambert, 1962) we can easily imagine that exposing children in their first year of life to a foreign language can only be beneficial (Pizer et al., 2007). Many parents and children drop the signs once the child is enough efficient and comfortable with using only spoken words, though Claire Valloton (n.d) tells us that continuing using the signs with children who are talking is not harmful later on in kindergarten and preschool as it aids them in their literacy development. In Sign Language used with babies, I see the possibility to strengthen the communication in the classroom in the same way that it helps parents to communicate with their children, not only linguistically but socially.
5.2. Developing different skills of students with Sign Language

Despite the lack of research done in an inclusive setting of hearing and deaf children working in the same environment, there have been researches done about school age exclusively hearing children who were taught with some sort of gestural method. Most of the quantitative researches done in that field are focusing on cognitive skills of the children exposed to a gestural form of instruction. The researchers tried to figure out if the use of such method with hearing children could somehow enhance their cognitive abilities such as reading, writing, spelling but also memory and visual spatial cognition. Often the studies are designed around two groups of children in a similar environment taught the same content: one experimental group using ASL (American Sign Language) or other kinds of gestures and the control group being taught traditionally.

In the following chapter I have categorized the different studies available in that context according to their focus on different cognitive abilities. We will see how children at school using Sign Language could develop those different cognitive abilities more efficiently thanks to the signs. First we will discuss studies done about visual spatial cognitive skills, then about literacy skills and last vocabulary skills.

5.2.1. Visual Spatial cognition

Young children mostly use their visual intelligence for the six first years of their life (Daniels, 2010), which means that Sign Language for them is just a way to continue to develop their visual abilities. The use of some sort of body language is rather natural for children (2010). When ASL (or other gestural code) and spoken English are used at the same time to teach something to children, the message is presented into various communication modes: visual, aural and physical. Therefore both sides of the hemisphere are stimulated: the left one for processing language and the right one for the visual-spatial abilities. This double stimulation of the brain allows children to later retrieve information from both memories as spoken and visual stimuli are stored in different places (Rush, 2010-2011; Daniels, 1994).
As deaf people in general seem to be better at visual and spatial tasks (Emmorey, Kosslyn and Bellugi, 1993), several studies aimed to find out if the deafness itself or instead the use of Sign Language is responsible for those extraordinary visual and spatial abilities. Most studies in that field concluded that deafness is not the deciding factor in the enhancement of their visual spatial skills but rather the fact of practicing a spatial language in a daily basis such as ASL for example (Parasnis, Samar, Bettger and Sathe, 1996; Emmorey et al., 1993; McCullough & Emmorey, 1997). For instance, one study compared deaf non signing children with hearing children as control group. All the children proceeded to five tests measuring visual spatial skills. The results were that deaf and hearing did not differ in their performances suggesting that being deaf only does not enhance this kind of abilities particularly (Parasnis et al., 1996). Moreover another study found out that both hearing and deaf subjects were equally good at facial recognition when they were both users of Sign Language at a similar advanced level (McCullough & Emmorey, 1997) which shows that an individual does not need to be deaf to learn visual abilities from using Sign Language.

Other studies designed exclusively for hearing students focused on the visual spatial cognition of ASL learners. Twenty six college students who were taking ASL courses as beginners were compared to students who chose to start learning another foreign language. Students were tested about their spatial memory and mental rotation skills for example in the very beginning of the courses and then at different points of progression during their learning process. This research showed that longer the ASL exposure was and more it was increasing the hearing students’ spatial cognitive skills (Melvin, 2013). A similar study has been conducted by Cattani, Rossini and Volterra (2014) in Italy. A group of hearing children in first and second grade were followed during two years: the experimental group was taking Italian Sign Language (LIS) as a second language, the control group was not. Despite a similar starting level in the beginning of the two years on the Raven PM 47 test (a test that measures visual perception and level of mental development), the LIS group’s performance on the same test after the two years were significantly higher than the controlled group.
Learning Sign Language as second language for hearing people shows an increase of visual spatial cognitive skills such as mental rotation, mirror reversal detection, facial recognition…etc (Vercellotti, 2007). The studies mentioned above prove that the visual stimulation offered by Sign Language leads to beneficial effects on the related cognitive abilities of the learner.

5.2.2. Alphabet knowledge and memory

Learning to recognize alphabets is a major task for young children. Janice Wood and Bronwyn McLemore (2001) confirm that letter knowledge is a strong predictor of literacy success at school. The teachers are constantly in search of different ways to make the connection happen between the sounds and the visual representation of the alphabets, words and logos. The alphabet song is a very used tool around the world to teach children name and alphabetic order of the letter (Worden & Boettcher, 1990). Other strategies such as the Montessori Method use the tactile sense to transmit the information to children: as for example with the “draw letter in the sand” exercise or the “touch letters made out of sand paper” activity. Sign Language finger spelling can also be used to teach the letter names and written form, especially because at least in ASL some of the letters signs are iconic, which means the hand shape is close to the letter shape (Wood & McLemore, 2001. p 6). The use of finger spelling could become a mnemonic technique for children to remember letters as the correspondence between sounds and visual features of the alphabets is very abstract concept. One study by Brown (2007) has tried to compare a group of preschoolers learning alphabets letters only with sounds and cardboard cues and another group learning with the addition of Sign language. No significant difference was found but the researcher is convinced that we should not abandon this idea, as once the limiting factors are removed, the difference might be more relevant.

Other researchers have been done in the field of memory and American Sign Language, such as the study conducted by Larson and Chang (2007). They read the same story to two groups of hearing children (33 in totals) for four months. In the experimental group American Sign Language was used to illustrate the story but not in the control group. A very small difference was noticed in favor of the ASL group about
the children’s ability to understand and recall the story. Though this difference has not been considered enough significant to conclude anything, the researchers still think that a bigger sample size and engaging the students to model the signs themselves during the storytelling would show a more important difference in the data analysis.

In the studies found about alphabet knowledge and memory, there has been no mention on negative effects of ASL use with children. Those studies should serve as a starting point for more investigation in the use of gestural language for the development of alphabet knowledge and memory. As a conclusion I would say that as long as it does not do any harms to children, teachers should consider using gestural communication as a method to support student’s memory skills.

5.2.3. Vocabulary development

Sign Language is not usually a one to one sign-written word correspondence but it is possible to isolate signs for specific words. Therefore it is possible for a teacher to emphasize some words by using the sign simultaneously with speech. Marylin Daniels encounters in her study (as cited in Valloton, n.d) preschool teachers who are using both sign language and speech. Unfortunately the study does not precise if the teacher is fully interpreting in Sign Language or only signing isolated words. The results showed that preschoolers taught with both signs and speech, had a bigger spoken vocabulary collection toward the ends of the school year than the others. In fact, Marylin Daniels (2010) claims that in nine months of using sign language with the children, they reached the equivalent of two full years of normal vocabulary acquisition.

Nevertheless vocabulary acquisition related to Sign Language instruction still needs to be researched as other researchers who attempt to associate signs and new vocabulary words did not find any specific difference between the experimental and control groups (Zdrojewski & Kay, 1998).

Despite the inconstancy in some studies’ result regarding cognitive effects of Sign language on school age children, studies mentioned above have not shown the use of
gestural communication as a dangerous or hindering method for children’s learning. The bi stimulation of the brain created by the act of signing and speaking can only be understood as a boost for children’s neurological development.

5.3. Developing school environment with Sign Language

Many of the researchers in the previous chapter who were initially focusing on cognitive skills of hearing students using gestural communication ended up looking at the non-cognitive effects. They acknowledge that Sign Language seems to increase pupil’s motivation, focus, pleasure to learn and ability to listen instruction (Daniels, 2003; Zdrojweski & Kay, 1998).

5.3.1. Embracing Learning styles

In relation to the Multiple Intelligence theory of Howard Gardner mentioned earlier, we know that one way to explain the positive attitude fostered by the use of Sign Language with students is the versatility of the communication between teacher and students when signs are used. While Gardner is not directly discussing the use of Sign Language, I would like to cite a couple of researches in that paragraph which show that teachers who use two modes of communication – with both their mouths and their hands – in the classroom can help their students learn and retain information better. Susan Cook and her colleagues (2008) confirm the theory of multiple intelligence of Howard Gardner (1985) when showing that using gestures while explaining a lesson helps the students who have a more developed spatial intelligence to learn and to retain the new information. According to Prevatte (2007), the addition of a visual stimulus to the traditional aural input allows a teacher to reach every single child in the classroom. In that case Sign Language is not used with the goal of teaching Sign Language but as a tool for satisfying and supporting more learning styles in the teaching.
5.3.2. Supporting special needs children

Beyond the use of Sign Language with disable children touched by Down syndrome for example, the teacher in the traditional classroom is facing more and more the challenges to support special needs children in his/her own class. Due to the inclusion trend, it is now the teacher’s duty, responsibility and concern to make sure every individual is able to learn efficiently in the same environment. Studies mentioned later in this chapter have shown that different learning disabilities have their gain to get from Sign Language instruction. Autistic kids for example get support with Sign Language to learn both receptive and expressive vocabulary. Signs, and more specifically finger spelling, help kids who struggle with reading and spelling (Valloton, n.d). ADHD kids learn better when the information is presented visually and kinesthetically. The use of signs gives them a sense of grasping the concepts in a more concrete way. Moreover the fact of moving the arms and the hands helps the ADHD child to handle their need to move (Orfano, 2012).

5.3.3. Fostering intercultural education

Similarly to parents using baby signs becoming more aware about deaf culture, the same phenomenon occurs with school age children. In his study Brereton (2009) noticed that teaching Sign Language to preschool students helps them to realize that there is other ways of communication in the world than their own mother tongue. Using Sign Language in the classroom allows teachers to open up topics about deaf culture and children with disabilities who need to use Sign Language to communicate. Claire Valloton (n.d) adds that hearing children show more compassion towards somebody who differs from them when they have been exposed to Sign Language. As a result children are more culturally aware and able to celebrate diversity.
5.3.4. Developing Emotional Intelligence

Emotional Intelligence involves “recognizing emotion, reasoning both with emotion and emotion-related information, and processing emotional information as a part of general problem-solving ability” (Mayer & Geher, 1996, p. 90). Being emotionally intelligent requires being aware and being able to manage one's own emotions and the ones of others (Emotional Intelligence, 2015). The non-verbal feature of Sign Language can allow students to show their feelings in a safer way.

Brereton (2008) analyses how a hearing child used sign language to move from disruptive child to classroom expert. This case study displays a preschool child named Alana. She was in the beginning of the year a disruptive child as she often reacted violently with her classmates. She also had trouble sitting still and quietly for an extended period of time. Her teachers were concerned about her developing a negative self-image of herself due to the constant reprimand that she was getting during the day. Sign Language helped her in several ways; it provided her with an effective communication tool to solve conflicts. She found easier to use signs to communicate with her peers especially in situation where she was angry and upset. Becoming a real expert in sign language also allowed her to be praised and seen as a positive image by her teachers and classmates. And last, using gestures with her hands during circle time enabled her to stay focused and still for the whole instruction time as Sign Language was an acceptable mean of movement. This research shows how useful a tool sign language can be for teachers and students. This active and additional way of communication can help some of our students to handle their emotions, to excel in one certain area and to keep their attention high.

5.3.5. Improving classroom atmosphere

Classroom environment is crucial when discussing pupils’ learning. Space design, light, temperature, colors, noise are all environmental factors that can influence learning. From this list, noise is the one that Sign Language can greatly affect. In several studies the noise level of the classroom reveals to be decisive to the pupils’ well being in the
class and therefore to their ability to focus. Research shows that students in high noise level perform worse than pupils in lower noise level (Spencer & Blades, 2005; Dockrell & Shield, 2006). Moreover using fun methods to learn makes pupils feel happier and more relaxed. The well being and the motivation of students are essential for successful and life-long learning.

In the study from Mottley (2012) a teacher has introduced signs into the daily routine of her classroom. She, for example, taught to the children the signs for “toilets”, “wash hands”, “line up”, “sit down”… The children were interviewed before the introduction of signs and after. Most of them described the classroom as being less noisy and more fun with the use of the signs. They also mention that it is easier to understand what the teacher wants and that children are more focused because they need to constantly look at the teacher. The researcher also discovered as a result of her observations that children needed less time to respond to some instructions (such as sit down, line up…) when the signs were used than only with aural instruction.

I have myself noticed during my teaching practice in USA that the use of the sign for “toilet” for example was especially useful when the teacher does not want to be interrupted during his/her teaching for such request from a child. As a teacher, I could nod my head while making eye contact with the child who was signing the letter T for toilet without stopping my verbal explanation of a lesson. Signs can also be used by pupils to answer simple questions or give feedbacks. Indeed using signs is a quieter and faster strategy than using a paper and a pencil or than discussing with peers.
6. **DISCUSSION**

The different literature sources presented in this research form a comprehensive unit showing how sign language can influence hearing people and more precisely hearing students. The major findings of this research demonstrate a variety of ways in which gestural communication has been discovered to be an efficient, useful and valuable method when used with hearing subjects. This research has focused on different age groups starting from toddlers to school age children and has explored cases with and without disabilities. Most of the findings found great benefits from using Sign Language or some sort of gestural communication with hearing participants. Those benefits were both relevant in terms of cognitive and non-cognitive skills.

Related to the recent multisensory teaching trend, the characteristics of Sign Language make it a valid way to transmit information in a visual and kinesthetic style which could definitely help a large part of the students in nowadays classrooms. The different results obtained in the studies above confirm that Sign Language in many ways improves the learning experience of hearing people by supporting language development, enhancing memory and vocabulary acquisition, developing both sides of the brain, stimulating several learning styles, fostering intercultural awareness and developing emotional intelligence.

Due to the global policies of Inclusion in Education, more and more deaf students share their learning environment with hearing students. The attempts of this research was to find out in which way Sign Language could be viewed as an asset for hearing students when they are being exposed and/or are using Sign Language in an inclusive classroom. Despite the fact that none of these studies were done in an inclusive setting but rather within hearing communities, we can expect the same kind of benefits emerging from an inclusive classroom where Sign Language would be displayed in a regular basis. Nevertheless the conclusion of this study gives a good starting point for teachers who would like to diverse their teaching style. By being aware of the benefits of gestural communication, teachers can be more efficient on teaching and on maintaining a pleasant learning atmosphere.
Inclusion, by definition, is not only about filling the needs of children with disabilities but supporting every single individual in the classroom. Diversify the teaching method is one way to achieve this goal; this is why Sign Language as a learning tool is relevant for any teacher who wishes to follow the current philosophy of pedagogy. It is legitimate to think that especially visual and kinesthetic learners will find the use of Sign Language more engaging than traditional methods, which should inferentially boost their motivation and their capacities to learn.

Different actors of education can find significant information in this study. Hearing students can become aware of the opportunity they get from learning along with Sign Language, but they can also see the role that their preferred learning style plays in their education. Deaf students and deaf community should see in this study an effort to increase the status of Sign Languages and the lessons that can be learned from their culture. I do not attempt to oppress or undermine the deaf culture and Sign Languages by writing this paper but on the opposite I aim to show how we can learn from their rich mode of communication and culture.

Teachers and educators can read this research as an eye opening experience to develop their skills in terms of fostering different learning styles, engaging students and improving their classroom management and atmosphere. The entire society can hopefully gain understanding on the concept of Inclusion but also awareness on the complexity and relevancy of Sign Languages. Eventually valuing Sign Language in the classroom might even encourage the society to appreciate visual and kinesthetic skills. Indeed when children are from a very young age encouraged to use their eyes and their hands to think, they might be more willing to choose handwork based careers that are nowadays dramatically declining in popularity.

This study will be carried out into a master’s thesis where data will be collected in the field. As a case study, the researcher will observe and interview children who are learning in an inclusive setting merging hearing and deaf students together. The data will help to find out if the conclusion of the literature review fit with the reality. To the researcher’s knowledge, no study has been done in this context so the results would be
very valuable for teachers, educators, parents and policy makers who believe and care about inclusion.

I personally believe in the power of non verbal communication. As a future teacher, I am planning to integrate Sign Language into my teaching in order to enhance my pupils’ learning and give them inspiration for valuing diversity in the broader context. It is important for me to put an emphasis on communication as it is one of the key elements of human life. Skills acquired by students due to Sign Language to exposure will help them in their future for any type of profession and for personal development. Preparing them to be active participants of our society is, I think, the ultimate goals of teachers. I wish to further experiment the use of Sign Language in the classroom and if at all possible with the cooperation of deaf students and qualified interpreters.
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