Communication is the activity of transmitting information about everything in the world. In everyday life we refer things by employing a number of communicative tools. Language, gestures, facial expressions and non-linguistic vocalization, are often considered as communicative tools. Interestingly, we integrate multiple modalities in our communication and indeed, past research suggest a tight link between these modalities and in particular between speech and gesture. People gesture when they speak. Despite considerable attention from a variety of disciplines, the precise nature of the relation between speech and thought has remained elusive.

Throughout the world, hearing community use spoken language as their primary system of communication, and most have developed a writing system that are based on spoken language. However, hearing impaired people do not acquire spoken language through normal immersion and therefore have difficulty in mastering the written language as well. Thus, for a child with hearing impairment, the lack of hearing separates him from interactions with others, which is the basic stimulus for the mastering of speech and language.

Deaf people comprise a subcultural group (Vernon and Makowsky, 1969) Deaf children with deaf parents have a shared subculture, whereas deaf children with hearing parents do not. Most deaf children's deaf parents are exposed to some form of manual communication from birth. Consequently, they learn manual language in the same natural way that a hearing child normally acquires spoken language, sharing a common communication system with their parents. In contrast, deaf children with hearing parents
typically have only limited communication with their parents, because linguistic communication for these children must wait till oral skills develop through formal instruction. (Liben, 1975). To hearing parents, the term 'deaf culture' may seem strange at first. One of the characteristics of minority culture is that its members share a language that differs from that of the dominant culture; other components of deaf culture include traditions, beliefs, and rules of behaviour, stories and jokes. (Carmen and Reymann, 2002).

**Gestures & Children**

The end of the first year from birth marks an important social-cognitive transition for human infants. Around this time, they start to engage in a new variety of joint attentional behaviors not clearly present in the preceding months. These new social behaviors are thought to index infants' understanding of intentions in others, an understanding that ultimately gives way to an active participation in human culture. Given the importance of such understanding, the question is from where infants' new social-cognitive repertoire may originate. Well before the emergence of joint attention, infants are sophisticated social beings, readily able to form expectations about others and inclined to relate differentially to them.

Research suggests that children's drawings are reflective of their culture. In the drawings of seven and eight year old children from Japan and the United States it was found that Japanese children drew significantly fewer smiles, a higher number of details and larger figures. (LaVoy, 2001)
Much of young children's symbolic play is heavily scaffolded by adult symbolic action models, which children may imitate, and by adult verbal scripts. Different studies attempted to evaluate 18-35-month-old children's symbolic skills in the absence of such scaffolding. In a study of symbol comprehension, children were tested for their ability to comprehend an adult's use of either a replica object or an associated gesture to communicate which object in an array they wanted. In a study of symbol production, children were given some objects that afforded symbolic manipulations, but without adult symbolic action models or verbal scripts. The results of the two studies converged to suggest that children below 2 years of age have symbolic skills with gestures, but not with objects. It was also found that while children at 26 months were able to use an object as a symbol for another object, they had difficulties when the symbol had another conventional use. (Tomasello et al, 1999)

According to the Lexical Retrieval Hypothesis, gesture is involved in generating the surface forms of utterances. Specifically, gesture facilitates access to items in the mental lexicon. According to the Information Packaging Hypothesis, gesture is involved in the conceptual planning of messages. Specifically, gesture helps speakers to "package" spatial information into verifiable units. These hypotheses were tested in 5-year-old children, using two tasks that required comparable lexical access, but different information packaging. In the explanation task, children explained why two items did or did not have the same quality (Piagetian conservation). In the description task, children described how two items looked different. Children provided comparable verbal responses across
tasks; thus, lexical access was comparable. However, the demands for information packaging differed. Participants' gestures also differed across the tasks. In the explanation task, children produced more gestures that conveyed perceptual dimensions of the objects, and more gestures that conveyed information that differed from the accompanying speech. The results suggest that gesture is involved in the conceptual planning of speech. (Alibali, 2000)

People move their hands as they talk - they gesture. Gesturing is a robust phenomenon, found across cultures, ages, and tasks. Gesture is even found in individuals blind from birth. To find the purpose of gestures, Goldin-Meadow (1999) examined gesture when it stands on its own, substituting for speech and clearly serving a communicative function. When called upon to carry the full burden of communication, gesture assumes a language-like form with structure at word and sentence levels. However, when produced along with speech, gesture assumes a different form - it becomes imagistic and analog. Despite its form, the gesture that accompanies speech also communicates. Trained coders can bring substantive information from gesture - information that is not always identical to that gleaned from speech. Gesture can thus serve as a research tool, shedding light on speakers' unspoken thoughts. Gesture serves as both a tool for communication for listeners, and a tool for thinking for speakers.
It has been studied by Reusch (1956) that more than 65% of the conceptual information is conveyed through non-verbal communication in the communication process. According to Allbert (1969) only 7% of a message effect is carried by words, and listeners receive the other 93% through non-verbal means.

Non-verbal cues, such as facial expression, posture and tone of voice are part of all interpersonal relatedness. Non-verbal cues not only express emotion, but also regulate the body physiology, emotions and behaviors between individuals. The homeostatic regulatory mechanisms and affective exchanges between mother and infant proceed non-verbally. Neuroscience data now indicates these same non-verbal mechanisms occur between adults to facilitate attachment to regulate affect and physiology and to provide a sense of being understood. The impact of non-verbal cues is mediated by circuits involving limbic structures in the brain which activate non-verbal cues along with changes in hormone levels, neurotransmitters and the autonomic nervous system. Clinical vignettes are used to illustrate how non-verbal cues function in the analytic treatment setting to shape both transference and counter transference phenomena. Since non-verbal mechanisms can be activated without conscious awareness, neither patient nor analyst may be directly aware of their impact. Analysts must pay attention to their own feelings, behaviors and body sensations as indirect indicators of the affective state and meanings of the patient. (Pally, 2001).
Gestures are used by everybody in communication. Common people use gestures as a supplement for speech. There are a particular minority that cannot use verbal communication. They are the hearing impaired. Hearing impaired people rely mainly on gestures for communications.

In 1995, WHO estimated that there were at least 120 million people in the world with disabling hearing impairment. Seventy eight million were in developing countries of which approximately 25 million (1.8% of the population) were estimated to be in South East Asian region. Approximately 2.5 million children and adolescents aged under 18 years in this region are hearing impaired (0.45% of all children in this region had disabling hearing impairment). The world wide population of hearing impaired is appended.

**Indian Scenario.**

In India, a deaf child has two broad educational options:

a. education in a school for the deaf
b. integrated education in a 'hearing'/ regular school.

In a school of deaf the child has no opportunity to mix with hearing children and thus can be fearful/reluctant to mix with the hearing especially an adult. As there are no hearing children around, the deaf child does not have the motivation to develop profound communication skills, e.g. speaking and concentrated lip-reading. The lack of such skills will surface later on in adult life.
But in a regular school a deaf child is better motivated to learn skills in speaking and lip-reading, because without them communication can be very difficult with hearing friends. The ‘hearing School/College’ is considered to be a miniature of the ‘real outside world’. The deaf child has the opportunity to learn and develop stable social skills and knowledge in order to move and mingle in the hearing world.

It is imperative that in early years educational experts and psychologists, with the help of the concerned family, arrive at the right decision as to whether the deaf child should go through the ‘Deaf School’ system or the Integrated Education System. (Stillman, 2002).

Job, (2002) states that hearing impaired children should not be put in a deaf school unless under special circumstances. As a general rule, they ought to be mainstreamed. If total integration is not possible, these children can at least be partially integrated. Instead of setting up special schools for the deaf, provision can be made in regular schools to help these children by employing special educators and teaching the children in a self-contained class room. It is noted that if children with a lesser degree of hearing loss and who can communicate orally are put in a special school, they shift to gestural communication because their friends might be unable to communicate orally.
Miles (1994) cites the establishment of the first formal school in India for people with hearing impairment at Bombay in 1882. There are a few schools in India that are adopting the 'Total Communication' method. Total communication is a philosophy defined as the 'use of any and all modes of communication'. It includes speech and finger spelling, lip-reading, amplification, gestures, facial expression and body language. Sign system and sign-supported speech, viz., sign English and sign-supported examples of Total Communication (Destimukh, 2002).

Children acquire speech and language skills over an extended period of more than a decade, starting from birth to at least the early adolescent years. With the increasing awareness of the subtleties of language acquisition, the upper age for the completion of process has been periodically extended by different authors. During this process a normal child who has all his senses intact and has adequate interactions with others, gradually masters the use of language speech sounds (phonology) meaningful units of language (Lexicon), rules of combining words into larger units (syntax) and the usage of different units in different contexts (Pragmatics). For a child with hearing impairment however, the lack of hearing separates him from interactions with others, which is the basic stimulus of mastering the speech and language. (Thomas, 2002).
Need and Significance of the study

When we look at the statistical data of the hearing impaired we can see the alarming rates of hearing impaired all over the world. According to the world health organisation an estimated 2.5 million children and adolescents aged under 18 years (0.45% of all children) in South East Asian Region (Bangladesh, Bhutan, Democratic and People's Republic of Korea, India, Indonesia and Maldives, Myanmar, Nepal, Sri Lanka and Thailand) had disabling hearing impairment (WHO, 1995). As per the human power development document of Rehabilitation council of India (1996), the hearing impaired children requiring services are 4.48 million and the teachers needed are 45,000 in the next ten years. 95% of the existing deaf adults in India have not received any formal education. Every day 70 children are born deaf in India. (Abidi, 2002). In Kerala also the situation is not much different, here according to the 1991 census 49106 people suffers from hearing impairment of which 25183 are males are 23923 are females.

While the magnitude of the problem is gigantic, the pace of expansion of services is rather slow. The constitution of India Guarantees equality and non discrimination for the handicapped from the point of view of not only education, but also employment. The state and central governments have framed policies for the upliftment of the millions of children who suffer from hearing impairment. Year 2000 was observed as the year of disability. But people with hearing impairment are still virtually denied the rights of equality and non-discrimination guaranteed under the constitution. India has successful national programmes for Leprosy, tuberculosis etc. It would be equally important to have such a programme for hearing impairment and deafness.
Hearing impaired children should be particularly targeted in order to prevent problems with language development. Otherwise these impairments may lead to a life long handicap. The drawback is that public regard the hearing impaired being slow and unintelligent.

It is seen that in social situations, public in general seems to be helpful and sympathetic towards hearing impaired. But there are several cases where the normal people could resort to mocking, teasing and bullying the deaf. As they cannot fight back verbally, the long term consequences could be disastrous. This makes the hearing impaired person withdraw into their own world.

Thus the hearing impaired children often live in isolation and are vulnerable to depression and other adjustment problems. Lack of communication threatens the core qualities of life and results in emotional stress and isolation making these people more dependent and are susceptible to become a burden to the society.

Thus, neglected by the society, ignorant of their own potentials, and deprived of facilities of education and training, the lives of many hearing impaired people are often an ordeal. The absence or limitation of support or co-operation in today's competitive world means that many deaf people are at a big disadvantage. For all these reasons there is need to empower the hearing impaired with new communication systems. But in our country 95% of the hearing impaired adults are not receiving formal education. There are only very few institutions which trains the hearing impaired children and in them, there is no uniform methodology for training. Some institutions teach sign language, some teach lip reading and some others communicate in their own improvised way.
Almost all European countries have their own versions of sign language. In our country many attempts were made to develop a sign language but studies have shown that all such attempts have not been successful. Although a number of researches have been undertaken to study the problem of speech and communication of the hearing impaired, not much ground has been covered as to what should be done to effectively enhance their communication skills.

Each country's response to the needs of children with deafness and hearing impaired is unique. These differences are due to many factors, including local cultural beliefs, traditions, historical development and patterns of education. Developing a sign language in India is a very difficult task because of the cultural diversity.

Like all languages, sign language too is bound to have some regional variations and dialects. This is essentially due to the fact that signs are derived from life. As life depends upon customs, and customs vary from place to place, variations in the signs used by the deaf from different places and different countries are bound to occur. However, in developed countries, sign language has been codified, researched and recorded. There is thus uniformity and also a scientific base. In India several efforts have been made to record signs that could be used nationally. However, the impact of such efforts has been limiting. The result is that signs used by deaf people across the country vary from place to place. Nonetheless, with a little introductory explanation to the sign language user, these can be followed easily.
This diversity has not been a blessing. In fact, it has retarded the growth and development of sign language. At the same time, it has led to confusion among those not directly using it: themselves. Several books are available which record some of the common signs used by deaf people in different parts of the country. However, the signs recorded are limited and do not equip deaf or hearing people with a total understanding of sign language used in India today (be it Hindi, English or any of the other numerous regional languages). In addition, the books published to date do not have sufficient signs recorded for use in schools for grammar or grammatical terms, etc. This deficiency has led to great difficulty in the education of deaf children. Of the less than 1% population of deaf children fortunate enough to receive a formal education in India, very few can write grammatically correct language, even in their mother-tongue (Gopalakrishnan, 1999).

Stockoe (2001) proposed a new kind of interpretation of language origin. Language may have begun with gestural expression. Instrumental normal actions may have been transformed into symbolic gestures, and vision would have been the key of language evolution, human world have begun to represent the world they would see. This shows the importance of gestures in language origin. Thus, for developing a sign language understanding of gestures is necessary. If one attempts to make a sign language with out considering gestures hearing impaired children will be able to communicate with their own group only.
Gesture is defined as a notion of the limbs or body made to express or help express thought or to emphasize speech, the use of such motions as a means of expression, any act or expression made as a sign, often formal, of intention or attitude, a gesture of friendship, a mere gesture (Reader's digest universal dictionary, 1988).

According to Morris (1984), a gesture is any action that sends a visual signal to an onlooker. To become a gesture, an act has to be seen by someone else and has to communicate some piece of information to them. It can be done either when the gestures deliberately sets out to send a signal – as when he waves his hand – or it can be done incidentally.

Most people tend to limit their use of the term ‘gesture’ to the primary form-the hand wave type – but this misses an important point what matters with gesturing is not what signals we think we are sending out, but what signals are being received. In some ways, our Incidental Gestures are the more illuminating of the two, if only for the very fact that we do not think of them as gestures, and therefore do not censor and manipulate them so strictly. This is why it is preferable to use the term ‘gesture’ in its wider meaning as observed action.

Leading scholars, including Psychologists, Linguists and Anthropologists, offer state-of-the-art analyses to demonstrate that gestures are not merely an embellishment of speech but are integral parts of language itself. Language and gesture offers a wide range of theoretical approaches, with emphasis not simply on behavioral descriptions but also on the underlying process. (McNeill, 2000).
All gestures can be categorised as Representational Gestures - gestures that depict objects or actions and Beat Gestures - Rhythmic movements of hands (Alibali, 1998).

Interaction with peers is an important part of normal development and it is necessary that even a hearing impaired child be able to communicate freely and easily. The present study acts as a guideline to evolve a new system of communication for the hearing impaired, the study is basically for the faculties who are in the task of creating a set of communication strategies. Thus the study may serve as a stepping stone in mainstreaming the hearing impaired children.

If a hearing impaired child is taught the language of gestures, especially one with a supportive family, it is more likely to develop friendships with people of normal hearing. This helps to gain more confidence and social skills that would greatly benefit him in future. The investigator feels that a scientific study of gestures is highly beneficial for the professionals and special educators working in this field to evolve a new and ideal system of communication system for the hearing impaired children. The present study is an effort to identify a data bank of gestures used by Hearing impaired, normal children and adults. Hence the study is stated as "A STUDY OF GESTURES AMONG CHILDREN WITH HEARING IMPAIRMENTS, NORMAL CHILDREN AND ADULTS".
OBJECTIVES OF THE STUDY

1. To study whether children with hearing impairments, normal children and adults differ in detecting conceptual information conveyed through representational gestures.

2. To study whether children with hearing impairments, normal children and adults differ in identifying gestures.

3. To find out whether children with hearing impairments, normal children and adults differ in the gestures used.

4. To develop a data bank of gestures.

Based on the objectives, following hypotheses are formulated for the study.
HYPOTHESES

1. There will be significant differences among children with hearing impairments, normal children and adults in the ability to detect conceptual information conveyed through representational gestures.

2. There will be significant differences among children with hearing impairments, normal children and adults in the identification of gestures.

3. There will be significant differences in the gestures used by children with hearing impairments, normal children and adults.

4. There will be significant correlations among gesture recognition, gesture identification and gesture usage of hearing impaired children, normal hearing children and normal hearing adults.
OPERATIONAL DEFINITIONS

1. **Gestures**

   A gesture is any action that sends a visual signal to an onlooker. To become a gesture, an act has to be seen by some one else and has to communicate some piece of information to them.

2. **Representational gestures**

   Gestures which are meant for specific purposes i.e. to specify objects, things etc. They are more symbolic.

3. **Beat gestures**

   Gestures which are used as a supplement in oral communication. Gestures which are not symbolic.

4. **Hearing impaired**

   A person with a profound hearing impairment, who cannot hear sounds without amplification.