Educational model for Deaf and Hard of hearing children

Report submitted for
2013 Shalini and Dr. Shamsher Prakash Prakash Prize For Creative Design(IITR)

Submitted by –

Name : Ridhima Gupta & Amisha Agrawal
Year : B.Arch IV
Institute : Department of Architecture and Planning, Indian Institute of Technology, Roorkee
Email: ridz.gupta26@gmail.com, mishi4a3@gmail.com
Address: Room no. 510, Kasturba Bhawan, IIT R
Under the Guidance of

Prof. Smriti Saraswat
Assistant Professor
Email: spacefap@iitr.ernet.in

Director
Dr Pradipta Banerjee
Department of Civil Engineering
Indian Institute of Technology, Roorkee
Structure

• Deafness and Muteness
• Learning issues and communication barriers
• Existing Models
• Proposal
  – Vision
  – Interactive software to link students, parents and teachers
  – Foundation years model
  – Higher education model
• Advantages
• Feasibility, cost and future
Deafness & Muteness
Deaf-Mute

- Deafness of hearing loss is the partial or total inability to hear sounds.
- Deafness levels may range from mild (16-40db) to moderate (41-90db) to profound (>91db) hearing loss.
- Hearing loss may be congenital or may be due to other factors like old age, loud noise or accident.
- The words **deaf and mute** are used together frequently as hearing loss inhibits the subject’s ability to identify meaningful sounds and produce the same.
- This leads to a **multiple disability**, where speech is also stunted and the communication barrier is exasperated further.

[International Symbol of the Deaf and Hard of Hearing]
Learning Issues

- **Late detection** of HH/D individuals so lag behind hearing peers in language development.
- **Abstract concepts** e.g. Pythagoras theorem, gravity, fractions et al
- Repetition required
- Slow learning
- **Limited vocabulary** development
- Low self esteem
**Education Models**

**Bilingual-Bicultural education**
- Deaf culture is an important aspect to the curriculum.
- The establishing of ASL as their first language, provides a base, in which English is later taught.

**Auditory-Verbal education**
- Based on the belief that a deaf child can learn to listen and speak so that their families do not need to learn sign language.
- Presented as communication options, and rely on a large amount of parental involvement.

**Inclusion**
- This educational method is what occurs when a deaf child attends public school in regular classes for at least part of the school day.
- Interaction with hearing students and the opportunity to live at home.
- Drawbacks such as isolation.
Lipreading

Why lip reading?

– Generally, these children do have the capacity to speak. They simply do not know what sound to produce.
– Lip reading is based on a visual perception of the sound produced.
– Once the child grasps what sound a lip movement is associated with, he can attempt to reproduce the sound, thus enabling independent, 2-way communication.
Lipreading

Take this example of an every day conversation between Riya who is deaf, and Manik who is hearing.

Step 1: Interpreting expression and gesture
• Manik touched his trouser pocket where he keeps his wallet, he is checking he has money with him, he wants to buy something
• Manik looks eager and he licks his lips – he is hungry

Step 2: Listening
• Riya is listening using her residual hearing. She hears something like this:
  __a__ _e _o_ _o_ _i_ _o__ee a__ a_ a__i__

Step 3: Lipreading
• She is watching Manik and she lipreads something like this:
  \textit{Ch\_ll qu\_ t\_m v\_r qu\_k t\_vv\_nt\_ _p r\_j}

She puts them both together and gets:
  \textit{Chall que tom vora wick toffee anter am rich}
Lipreading

• **Step 3: Calculating**
  – Then she applies common sense to fill in the gaps and correct misunderstandings
    
    _Shall we stop for a quick coffee and a sandwich?_

Then she thinks of an answer!

• Though this may sound cumbersome, these ‘steps‘ occur subconsciously and effectively.

• Lipreading, thus, empowers someone with a hearing loss to lead an independent and fulfilled life. It is often described as a 'third ear'.

Vision

• To realize the "right to language"—a necessity to educational growth and central to the human experience.

• To establish an effective, communication-driven system that meets the social, economic and psychological needs of all deaf and hard of hearing children.

• To help children become self dependent and be able to lead an independent and respectful life.
Module Proposed

Method of Provision:

- **Mainstreaming** refers to the practice of educating deaf students in classes with non-deaf students during specific time periods based on their skills. However, there are also some classes specifically for the deaf students.
- Deaf students should attend the same school as other students.
- Classes may be held separately, but in the same school building; thus common activities such as sports, quizzes etc. will provide ample interaction between both sets of students.
- This will help boost confidence in the children.
Module Proposed

For the foundation years:

• Teaching the children to lip-read is a rigorous process demanding time, patience and repetition.

• To aid this, we propose to develop an interactive software with a carefully designed curriculum and a visually stimulating interface that will use images, text, videos to reach out to the children.

• The software will also aim to breach the gap between the teacher and the parent and establish an effective channel of communication.
About the software

- An interactive learning platform with a **huge online database of carefully planned lessons**.
- Lessons also include a **video of a person clearly speaking the word along with consonant symbols** so that the child may become familiar with the associated lip-movement.
- **Lessons can be repeated as many times**, for convenience of teachers, parents and students.
- Instructors may plan lessons themselves and upload them to the online database.
- **Will also provide a channel of communication between the parent and instructor.**
An initial login will be required; separate for parents and for teachers.
Teachers will land on this page. They shall post how much has been covered each day, which the parents can make their ward revise. They can plan their own lessons, apart from the pre-loaded ones. They should maintain a student’s records and can also message a parent separately.
Parents will land on this page.
- They can view the teachers daily posts.
- They receive regular communication from the teacher.
- The required lessons on the LHS can be taught to the child.

Parents’ Login Page

- Anjali Tanna
- Class: H. KG.
- 24 March, 2013

Notifications

Teacher Name
Today's we covered concepts of _________ (Topic 3: Lesson 2)

Teacher Name
Children should practice exercise 3 today.

See previous dates

Parent-teacher Communication
- Anjali: Weekly report
- Extra attention to animal names
- See older

Lessons
- Simple Questions
- Sense Training
- Pattern Making
- Alphabets
- Words
- Numbers
- Activity
Lesson Page

- Take for example, the page on Sense Training.
- Choose a lesson.
- Choose a concept to explain.
Lesson Page

• Select any concept to enlarge it.
Lesson Page

- Select any concept to enlarge it.
Each concept shall be accompanied by an audio and visual clip of a person intoning each word to enable the child to follow the lip movement. Also facilitates repeated practice.
Use of physical models should be made as far as possible.

- This ensures maximum retention of imparted knowledge.
- Science fairs may be regularly conducted to create a large model inventory.
- Schools can also opt for mutual exchange of physical models.
Module Proposed

For higher studies

• Our intention is that the child becomes proficient at lip reading and cued speech.
• Once this is achieved, he can adequately follow lectures, and even take part in discussions.
• To overcome such difficulties as may occur during lip-reading, we propose to use a transcription software.
Module Proposed

• This software must be **portable**.

• It requires
  – A powerful microphone (for input) (may be integrated with the hearing aid)
  – A screen, for output. (may be on hearing aid, phone, wrist watch etc.)

• The purpose is to produce a **transcript** of whatever is being said.

• This transcript is, however, not to be used as the primary source of understanding. It is only to be used as we would **use subtitles** in a movie; i.e., for a quick reference.

• It can also **act as a dictionary** (click on a difficult word to display its meaning)

• It can also be used to **record a lecture** so that the student may refer to it later.
Lip reading acts as a third ear for the child and helps in better communication and understanding. If lip reading is taught effectively and parent involvement is through, the child can get empowered.

Communication: to talk
empowered: make powerful
Once synchronised with your cell phone, hearing aid can transcribe and display on the screen and also activate incoming calls, control volume, and more.

Hearing aids act as both microphone (picking up your voice and sending it to the person you’re talking to) and receiver (their voice streams directly to your hearing aids).
Module Advantages

- This module will enable our students to communicate with almost all people, and not restrict their circles to only those who understand sign language.
- Thus, it enables social inclusion and creates confidence and self-dependency.
- Often, hearing parents face problems when it comes to teaching their deaf children. This software can guide hearing parents.
- Lip readers sometimes lose track of conversations (esp in groups) due to one incorrect interpretation. This can be eliminated by use of a transcription software.
Cost, Success and Future
Feasibility, Cost and Future

• The model we propose relies on lip reading, and to a limited extent, on cued speech.
  – Lip reading, by itself, requires no specialized equipment and is inexpensive.

• Use of physical models
  – Science fairs and inter school model exchange programs

• We have proposed 2 software models for education:
  – A learning Platform (for younger students)
  – A transcription software (for higher studies)
Feasibility, Cost and Future

- The cost of buying shall be one time. And teachers, educators and professionals can contribute to the online pool of lessons, making the content rich and comprehensive with use.
- In schools where there is shortage of resources and computers are not available, teachers should make a conscious effort to include more visual media and physical model demonstrations.
- Cued speech and lip reading can help in empowerment of children.
- Greater accuracy in understanding words as opposed to mere dependence on lip reading.
- With phones and computers becoming affordable and powerful day by day, the next 5-10 years may see this software as a necessity.
- Future of computers and technology, so important to work with technology and use it for empowerment.
THANK YOU