Literary and Culture Disability Studies: An Exploration
Prof. Hemachandran Karah
Department of Humanities and Social Sciences
Indian Institute of Technology - Madras

Module No # 07
Lecture No # 35
Teaching Science for Deaf Children: A Personal Experience

Prof. Hemachandran Karah: Hello, welcome all of you again, this is our fifth day of the course. It is certainly a special day for me because I have with me my teachers from my school, Saint Louis Institute for the Deaf and Blind. With me is Mary Jerry madam; she has taught in the school for the last 28 years.

The topic/theme today is 'teaching science for deaf children'. For the last 3, 4 days we have been talking about the creation of new vocabulary practices, methods, frameworks, and even standardization. But this is the place (teaching and learning in school) where foundations are laid. And we are going to have a taste of it from ma'am and her colleagues here and it is certainly a privilege to all of us. Without much speaking I will take the sidelines.

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Ms. Mary Jerry: Good evening viewers. The greatest gift of god on earth is the creation of human beings; that too human beings are endured with a lot of potentialities to prove their worth. The jobs they select count their values in this way teaching has become a nobler task. When it

comes to the level of teaching the special children with hearing difficulties it becomes all the more challenging and entertaining.

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I, Mary Jerry, a representative of Saint Louis Institute, Adyar has come here to enlighten the ways and means of educating the hearing impact children with innovative methods. And equally supported by my colleagues Ms. Celine Rani and Mr. Vasantha Kumar both from my Institute, they are here right now. I have been working in Saint Louis Institute for the deaf and the blind for 28 years handling science for classes 9 and 10. I have found my work quite interesting as children are found to be very much benefiting with the experience gained from this noble institution. I am here to speak about the methodology of teaching science for the deaf. Let us now come to the subject for discussion.

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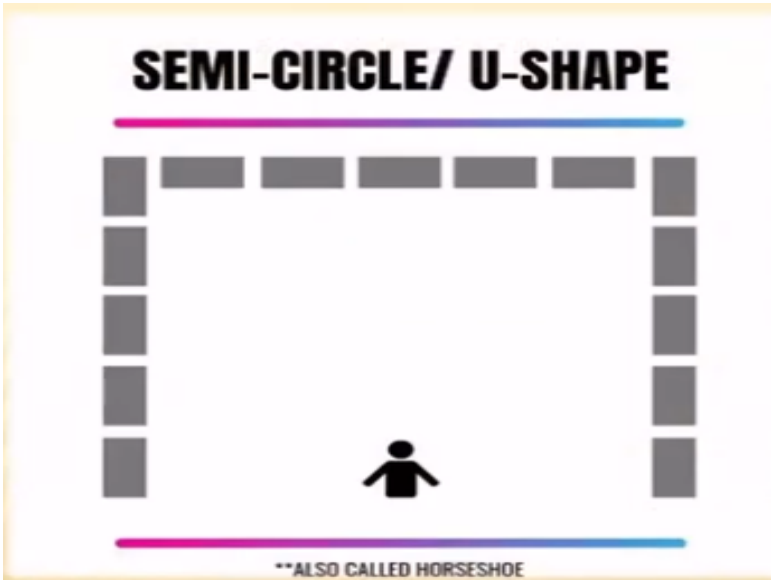

Classroom structure should be in U R square top shape.

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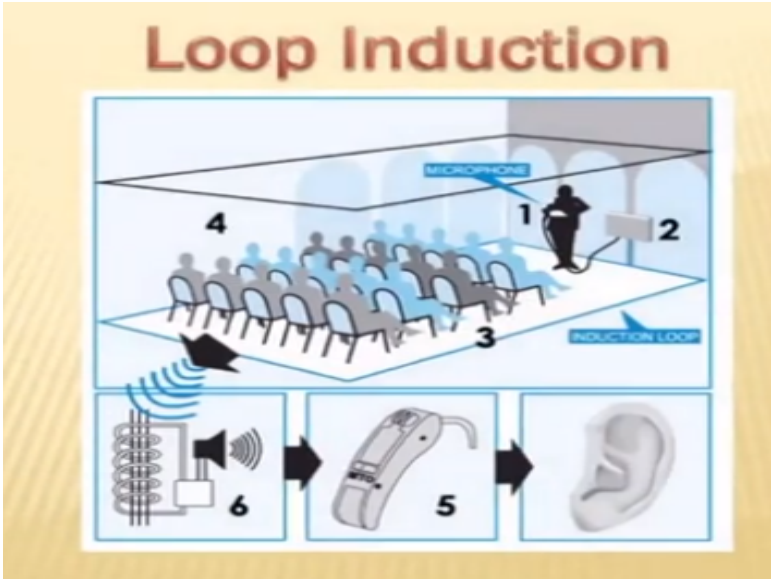

Students should observe teachers lip movement and students should also observe one another's lip movement. Since we are following the total communication method, students should observe the lip moment of the teacher as well as the other students when they speak in the class. In primary classes loop induction hearing aids should be provided. Why this induction is provided? Because the small children move around the classes, so without any distraction they can move here and there; because the induction loop will go on the top of the roof and the children will hear it using this induction a hearing aid.

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In higher classes group hearing aid or portable hearing aid should be provided. This portable hearing aid is very much useful; we can teach the class anywhere; we can teach out of the class, we can teach on the ground. In some other places we can carry the portable hearing aid and we can teach the children; only plug is needed to connect the hearing aid. Now, the aims of teaching science for deaf students.

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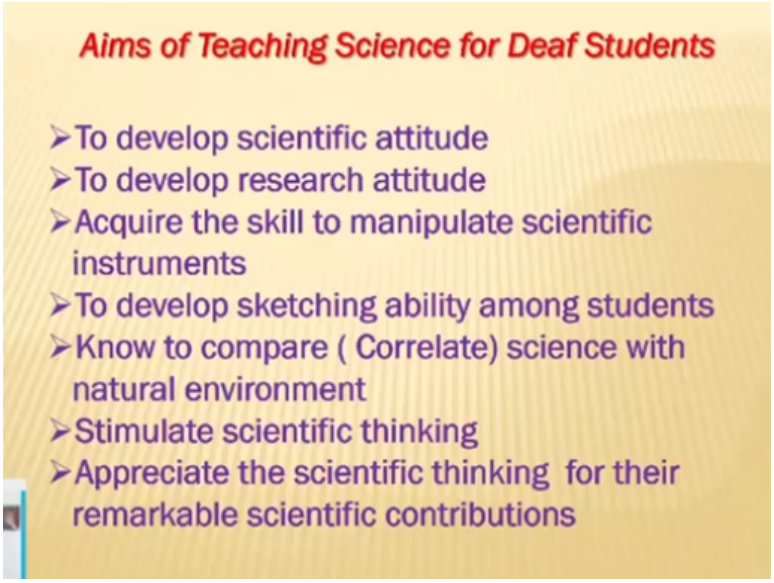

To develop scientific attitude, to develop a research attitude, acquire the skill to manipulate scientific instruments; our children are very much interested in minute things. They can operate a computer, they can give connections in the electrical circuits and all, so they develop their scientific instruments in their field. To develop sketching ability among students; to know to compare or correlate science with natural environment; stimulate scientific thinking; appreciate the scientific thinking for their remarkable scientific contributions.

What are the teaching aids I used in the science for teaching the science. We use the following teaching aids to science.

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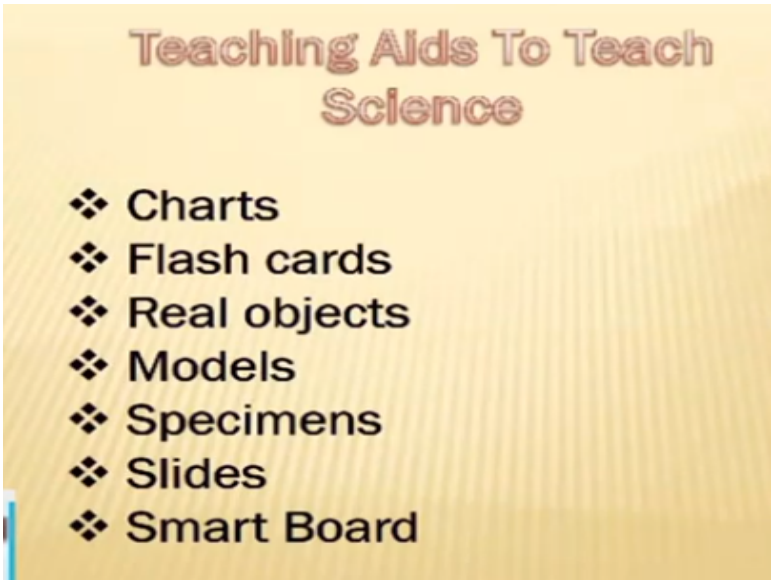

It is visual aids like charts, flash cards, real objects, smart board, powerpoint presentation etc. Field trips will be arranged; we take the children out of the school and show the various scientific connected places and then the children will be getting the knowledge of science. Science club will be organized and cultural program for awareness will be initiated enacting the part, visit to the garden and lab.

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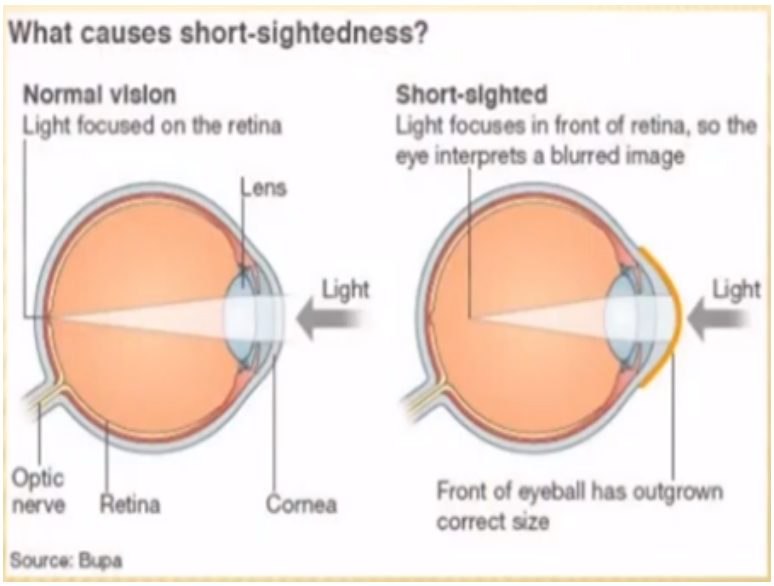

Conducting science exhibition.. Now these are the way we teach science in for our hearing impaired children. Suppose I take the topic on health and hygiene, I should make the students to understand the following ways of maintaining health. They must know about the healthy and

unhealthy appearance of a child; to know about the measures of maintaining a healthy body to know more about the healthy state of eyes. Because hearing impaired children need eyes as a vital organ. Because for the hearing impaired children, eyes are the main source of learning and gathering information. With regards to maintaining the power of the eyes, the children should be advised to take nutritious food. They should not strain the eyes too much watching TV, mobile, computer, gadgets etc. for long hours and it should be avoided.

Then constituents of food will be explained through flow chart and real objects will be brought for explanation. While teaching higher class students a bit more elaborate explanation of the eye should be taught like functioning of the eyes, effect of it and rectification of the eye. To explain this topic a model of the eye, types of lenses like concave and convex lenses would be used. Students are asked to touch the concave and the convex lenses and identify the same.

We will also ask about the other usage of these lenses in various other fields. All these will be replaced visually and with real objects.

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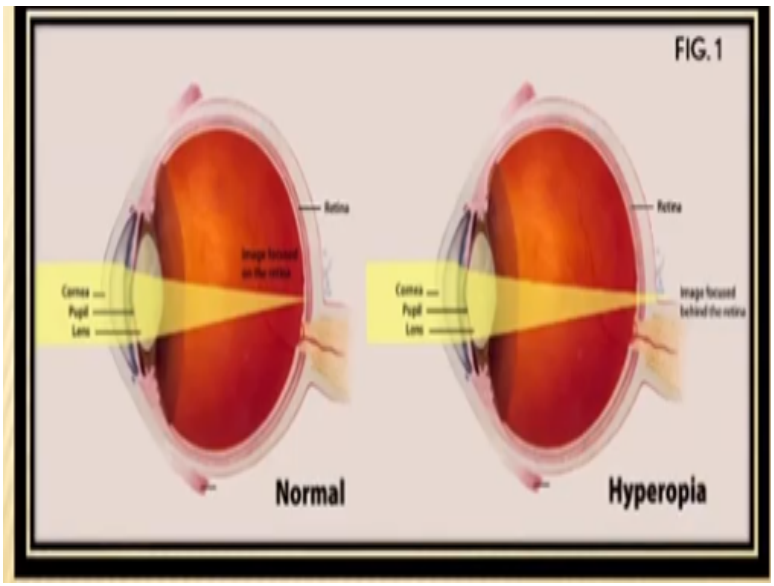

Awareness measures to protect the eyes: we should avoid fast food, eat lots of vitamin rich foods like vegetables and fruits.

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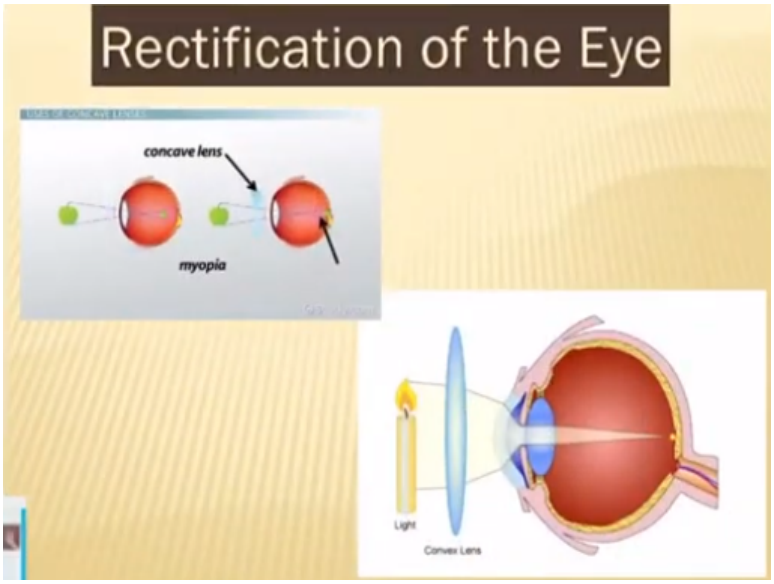

The teachers of our institution are given the responsibility to check whether the students are not wasting food, especially vegetables, during lunch break. So we explain the eye with a model and its rectification these are given in this picture.

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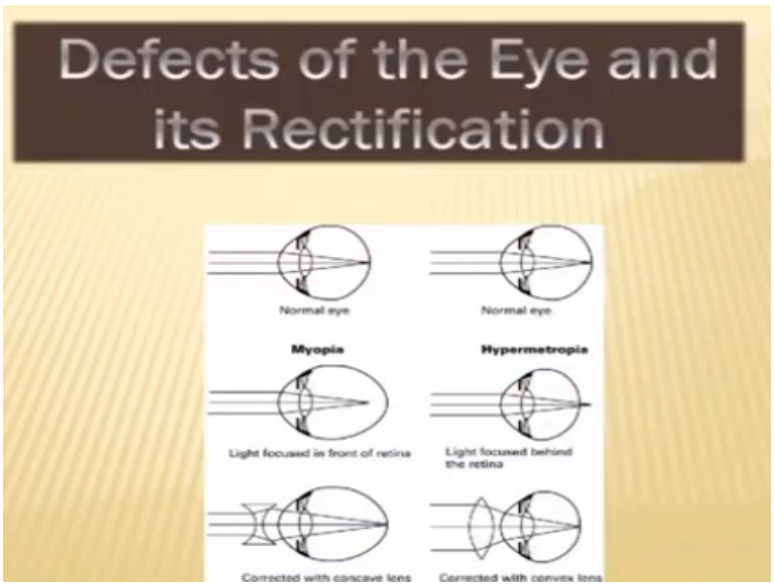

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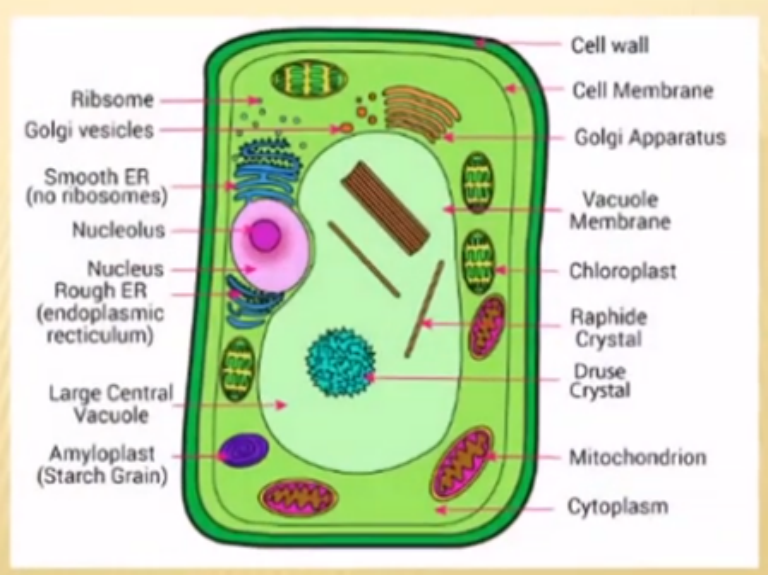

Suppose if I were to take a topic on plant cell, initially I would be drawing plant cell diagram on the blackboard, label the diagram and then explain the cell organelles and their functions. Later I would be dividing this assignment among the students in such a way that one student gets to draw the diagram and another student will label the diagram. Then I would be giving the role play to the students where in which each of them would enact the different parts of the cell organelles such as mitochondria, nucleus etc.,

A student will come in front of the class and they explain the function of the mitochondria. They start like this, “I am mitochondria. I am in oval shape, I am in peanut shape, I am the powerhouse of the cell”. Similarly, each boy, according to the topic given will talk about the function of those cell organelles. So the other students will observe it and they can learn from the other students itself. So they learn it easily in the classroom itself to explain the concept of breathing mechanism of the plants.

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The students would be taken to a garden area and the practical demonstration would be conducted for the students.

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As part of this I would be asking the students to tie a plastic cover on top of the plants branches and instruct them to have a constant observation. Then the students will observe them and record their findings.

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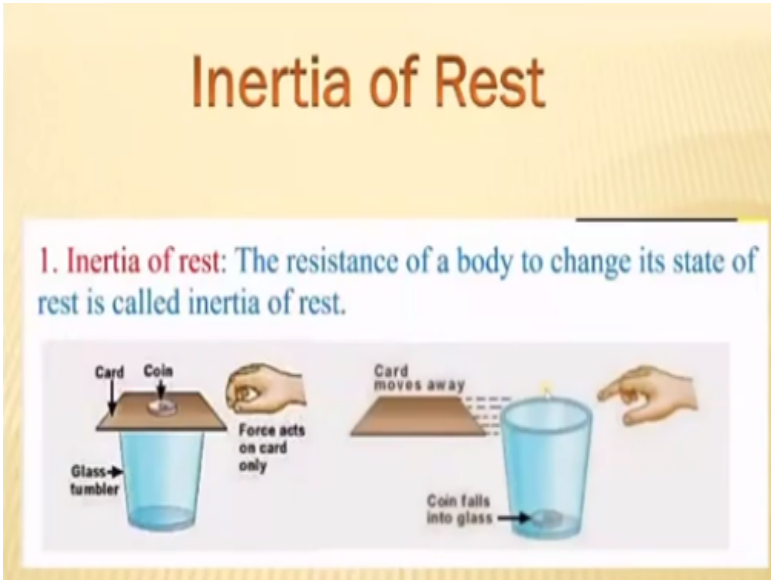

Now if I were to take a topic on physics I would be explaining the types of inertia to the students. The types of inertia include inertia of rest, inertia of motion and inertia of direction. To explain the concept of inertia of rest the students are instructed to fill the glass tumbler with water and place the cardboard on the top of the glass tumbler. A coin to be placed at the middle of the cardboard and ask the students to flip the cardboard alone. As a result of this experiment the coin falls into the water and the cardboard falls to the ground. By this way I can explain the inertia of rest. The same way I would be explaining the other two types of inertia related to our day-to-day life that is inertia of motion and inertia of direction.

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I would be explaining the inertia of motion in the long jump event where the athletes run to a distance and then jump. This is to increase the distance and their jump. Our students are very good in sports, so I can tell by showing a student and explain this inertia of motion. I would be explaining the inertia of direction with the shaking of her tree.

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When you vigorously shake the branches of the tree some dry leaves and fruits fall down, by doing this the student will understand the concept of inertia of direction. In order to explain Newton's third law I would be using the example of birds flying, swimmers swimming, bullet from the gun, etc., These instances show and prove the third law. And I ask the students to collect pictures of scientists so the pictures of scientists are to be collected and the students are motivated to do so.

While teaching chemistry I will explain the topic by showing real objects and taking the students to the lab to do the experiment.

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If I would be teaching the electronic configuration in chemistry, to explain this we take into account the three-color house division in our school. We have 3 houses in our school Montfort, Gabriel and Louis groups and they wear different colored t-shirts. So I bring the children to the ground and ask them to draw a concentric circle as a model of an atom one color t-shirt represents proton and other neutron and the third color represents electrons.

Protons and neutrons stand together in the center of the circle. In the first orbit, two electrons and in the second orbit eight electrons and in the third orbit remaining electrons. I ask the students to stand likewise and the students will easily understand the electronic configuration. By this students understand the concept of electronic configuration and arrive at the result.

Once in two years we conduct a science exhibition in our school. This will promote the innovative ideas of the students under the guidance of teachers. Through this exhibition they not only improve their skills but also understand so many other new ideas. This purpose of science exhibition is achieved successfully.

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This is our school. You see this exhibition and they are appreciated our students. The boy one who is standing here is very good in doing electronic mechanisms. All these are working models are done by our students. These children are from tenth standard and now they are studying in twelveth standard **(Video Ends: 25:43)**

Since the deaf children have a short term memory they are given short question answers and objective type questions. More writing work is allotted for retaining the memory. This is done with the exam point of view. We have to teach the student very slowly and only then they can understand easily.

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Nowadays online class is found to be effective because of the covid pandemic. And you can have a glimpse of it.

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In this way we take the class for the children through online class. So the students are benefited by taking the online class. The steps taken to impart the knowledge of science to the deaf children are equally a tiresome task. Models are brought, charts are displayed, PowerPoint program is on, this session in progress and science club made effective.

Though these are effective steps the deaf children will have a lasting memory only when things are visually displayed. It is only with the grasping power with the power of the eye the students retain the fact. So great effort has to be put in for virtual display. The students understand and observe the content as the theme gets fully portrayed in visual form. So, dear friends by now you will be in a position to understand the method of teaching the deaf. So the method is quite challenging it is made effective and interesting only by the approach that you have.

Take up the work with a sense of dedication, leave out your personal problems. Be in one with the level of the children and try to gain their favor. If you achieve this your method works out successfully. Through trial and error method this could be achieved. To conclude I would like to thank the IIT professionals for offering me this fruitful chance of interaction. Thanks for your cooperation. Let us make the nation strong with gifted children more effective. Thank you. Do you have any questions?

Nita: thank you so much, madam I think it is a really nice presentation of how a science class would look like. Like you said, at the end it is not all easy going and there are definitely a lot of challenges. So what according to you is the biggest challenge that you have faced?

Ms. Mary Jerry: Initially I struggled a lot in communicating the subject through sign language. I was new to the school and I initially joined the blind section. After this I was taken to deaf section. And formally it was very difficult for me; only through trial and error did I succeed.

Nita: So I was curious to ask that question because I am an educator of deaf children as well. So I see the biggest challenge we face is the language. When we have to go into higher classes it depends heavily on what language they have come with from the lower classes right. Because hearing ability is not there, so a lot of information, a lot of what we call as the 'incidental learning' is missing; which we find as educators sometimes very challenging and you have to adopt - like you said - a lot of activities and lot of visual aids lot of experiential learning with a lot of discussions with children as to what they have experienced drawing from them.

Prof. Hemachandran: Actually Nita the thing that what all children need of their disability. We cannot take children and dump them in the class and use a 'I speak, you listen' method; it is what is happening in the mainstream school. Besides, learning by doing is the best way forward for all learning environments. In fact this trials and errors can inform this mode of learning by teachers and can actually inform mainstream education. What do you think?

Nita: Yes, you are right and I think madam clearly has a great attitude and feeling that a teacher should have or an educator should have. The attitude that I am going to take failures with a pinch of salt but then learn from it and then just do better. So that is a very great attitude and a skill to be able to reflect upon oneself and work. So I absolutely second what you said.

Prof. Hemachandran: I particularly like these two examples: the t-shirts of different colors, circles, atom structure, atom electron neutron proton and all that, and the idea of shaking tree branch and learning directional principles. So I was sort of visualizing myself doing it.

Nita: Yes that is really interesting, I mean these are like you said Dr Hem, whatever we do for as special things that we think are special but are useful for everybody. It is the way education is today which probably needs to accommodate this and ensure everybody is benefited.

Prof. Hemachandran: Yes and teaching my passion and the long commitment that also makes everything possible. But I have a question madam: is there any particular subject or subjects which you noticed that your students were more interested in?. I mean are they more keen on sciences than say History or English or is there anything you found out by experience about somebody taking to certain fields of inquiry more fondly than others?

Ms. Mary Jerry: Maths. They do maths. They are very much interested in the practical part of science, but not the theory part; they are very much interested in doing the repair works and all, so I can say they prefer more science.

Prof. Hemachandran: Actually it is a great statement; there are strong foundations in school but higher education is not catching up for science and engineering education.

Ms. Mary Jerry: Because for higher studies they have to take science in the higher secondary classes and all but they find chemistry equations and physics laws and all difficult sometimes. For deaf children they don't have a college for science and all; only arts, economics and third group can they select. That is the only way.

Prof. Hemachandran: Same holds for blind people and many other disabilities at higher level; there is not enough support to do science.

Nita: So if I may add, I think it is like you asked math and science and sometimes geography. Because some things that they can relate to and they can visualize and see immediately are tangible. All these theories, if you do not talk to them in a way that they can relate to, that is where we lose those children. We lose their understanding and they are away from that subject. So I personally place a lot of onus on the teachers because I am a teacher myself so we place the onus on the teacher on how we make the subject interesting for children. And to your other question Dr Hem about why they find it very difficult going to the higher classes. The underlying

challenge that I have seen is the case of language. Language is the biggest challenge. For the children, delayed language input is the biggest challenge. They may find it difficult for the children. Like we have been looking at in this workshop for the last 3, 4 days of how language is accessed by deaf children. So because 95% of them are born to hearing families, a lack of hearing and identification that they deaf itself happens late.

So either the assistive devices or the different way of language starts very late starting with a negative scorecard if I may say so. So it is always a catching up, but going side by side until and unless the language is input earlier; which is why we have been saying sign language is very visual and very important to start with so it can go along with any other form of communication.

So that is what all of the seniors there and all of them are advocating for to see that deaf children do not lose out on the world race that they will be getting into. So they do not take up higher education so passionately because they do not have that foundational base. Because when they go to school for first standard usually a lot of the other children have prerequisite information before they go in some language already ready with them - either English or whatever language is used at home - while formal reading and writing happens in school.

But deaf children get into school without that language base and they are completely lost when they have to start reading and writing in a formal way already and of a language that they are not introduced to. So that is a big challenge that we find and it is something that we all need to work together - the professional, paraprofessional, medical professionals and also the teachers.

Ms. Mary Jerry: Definitely. Parent cooperation is also important. Parents have to accept that the child is a deaf. Some parents would not accept it. They keep them at home and wait for a long time and they will not get that language acquisition, so that is the main problem. But in the beginning stage itself, 0 to 3 years is the crucial period at that time only that child might just get this language acquisition.

Prof. Hemachandran: This is a very important point because the more we delay, the more unnatural language acquisition becomes.

Nita: So we have a question from Navin, “Do you have blind or deaf teachers to teach the blind or deaf children in your institution?”

Ms. Mary Jerry: We have blind teachers teaching the blind children; they use braille. For the deaf students we have a drawing teacher who is deaf; he was a our own student and is now appointed as a drawing teacher. And they are very good at drawing also. Drawing classes are allotted and it is included in our timetable, once in 2 days in a week. Again I have been training my hands to visualize and come up with pictures. It has become a very important trend. We have to make charts, flash cards etc we have to carry when you go to class. Otherwise, we find it difficult to teach and communicate that subject. As I said earlier they have short term memory; now they study and soon they forget. Maybe they are distracted more, maybe they cannot register in the mind because of the lack of hearing. Blind children can hear all the sounds and vocabulary, so acquisition is there; they find difficulty mainly in locomotor ability. But this is not the case with deaf children; we say the hearing impairedness is a hidden disability. One cannot see by his/her appearance since they look normal. Only when we approach can we find that this boy/girl is deaf.

Nita: It is definitely a hidden disability. I would like to also talk a little about the short-term memory that you mentioned. Is it that all deaf people having short-term memory? Or is it because of the delay in language, the lack of vocabulary and language and the way of teaching to ensure that they remember concepts for long and constant use of that knowledge. I think that would be the case because in my experience also I have seen a lot of people say that the deaf cannot remember and they will forget. I sometimes feel that it may be a stereotype that we all are giving. It is probably time for us to reflect and see why it is that they are unable to remember. I do not think it is something neurological but it is probably the way that they receive information.

Prof. Hemachandran: And also delay in language...

Ms. Mary Jerry: Yeah, that is the main problem. They do not have the language. We have only one language we teach in the school. We do not have 2 languages. The blind and the normal students have 2 languages; if they study in English medium they have to learn Tamil also; but for

deaf children they follow only one language. And moreover at school they use that language and at home they use some other language. The parents communicate with the children with some other language and then there is again a problem.

Nita: What sign language do you use?

Ms. Mary Jerry: Not any in particular because we have children from different states and sometimes different countries. Earlier, we had a children from different parts of the world, some from Sri Lanka. Though nowadays we have a reduced number yet we still have children from other states. They follow their sign language in their place. And when they come here we cannot follow their sign language. They have to adapt the sign language that we use.

Nita: How important do you feel madam is sign language for teaching?

Ms. Mary Jerry: Without sign languages you cannot teach; it is fundamental.

Prof. Hemachandran: This is said by a teacher; that means sign language is the basic thing and it cannot be violated.

Nita: I wish all teachers would say this, and I really wish they will take up sign language the way it is, and not use it as an aid and second to a spoken language. Because then the intent of wanting them to build on a language is lost. What I need to say is that sign language should be taken as the first language for them, and then we can teach a second language like how we learn mother tongue at home and then when we go to school then we learn 2 or 3 other languages. But currently it is the other way round.

I have another question, “I know that there are implications involved in disabled teaching but considering only imparting of education, is it more simpler and useful and educative for them than usual kids?”

If you are asking about the practical ways and methods of teaching that are adopted for deaf or blind or any other students you said differently abled students. So all of these methods that are

used for teaching are simpler and useful to also use for other students; if that is your question then definitely yes, Dr Hem and madam would also agree.

Prof. Hemachandran: Any teaching method which involves practical hands-on experience always benefits everybody. It is a magical way: learning by doing and learning by playing - the rest is excess.

Nita: We have Sarita asking us a question, “Is there any special training which teachers undergo before teaching there for blind kids to train in ISL as well.

Ms. Mary Jerry:Yes, if we want to teach the deaf and blind, we have to undergo deaf training or blind training. And the deaf trained teacher cannot teach the blind students and vice versa.

Nita: Yes. There are D.Ed. and B.Ed. courses. Apart from that we have to undergo training for the deaf children D.Ed. in HI (Hearing Impaired) or D.Ed. in VI (Visually Impaired)?
There is a diploma in education and it is called the DSC diploma in special education.

So yes, we do have formal training that teachers have to undergo to become teachers of deaf and added to that do you get trained in ISL? Earlier it was not there but it has been introduced in the B.Ed. Courses and D.Ed. courses for 60 hours, which is very minimal but still it is an introduction and we need to try and improve that.

But I would like to clarify that is not at all enough. Those many hours of training is just not enough; you cannot learn a language like that. Karthika has got another question which says “why are the deaf learners not taught English from the primary classes itself? Why are they exempted from learning languages?”

Prof. Hemachandran: I think we answered this same problem. Because they come to school there is a language. So it is a social and not a neuro-mnemonic problem; that I think that is the reason.

Nita: And there is an added element to this which is you have got two different schools that a deaf child can go to: either a deaf school or to a mainstream school. So if it is the deaf school you

have to see which language or medium that it is being taught in; is it an English deaf school or a Tamil or whatever that regional language is being used. Same goes for the mainstream school. The other question I see along with what you are asking is why is there language exemption for deaf children?

Ms. Mary Jerry: Many students find it difficult to learn one language itself. Because some children speak Tamil at home and when they come to school, if they are taking the English medium classes and they find it difficult. After this they go back and they do not understand what the parents talk, so that is the problem and so we cannot go for two languages for deaf children.

Prof. Hemachandran: I think I can also relate to that because even to this day, even if somebody is doing a PhD in chemistry, English still remains terrorizing when they are coming from certain backgrounds. And they have not internalized English and all their life they have been speaking Tamil or Hindi and English remains foreign and frightening for many of us who cannot practice English culturally. It just remains a formal language and therefore it remains frightening to most of us. I think something similar is happening here. What do you think?

Nita: You are right. I will just give you a small brief about what happened. When we had the 1995 PWD Act (People With Disabilities Act) and it was around that time where many people felt that deaf children should have exemptions for languages. Because they were finding it very difficult to learn the second or third language systems that we have in India, the three language system. So that is the point when they said that the deaf children should learn just one language and we should not burden them to learn a second or third language. So that was the intention at that point in time but even going on from then problems persisted; they were not very fluent or very good at the language that was being taught to them simply because it was already a second language for them, a hearing language or a spoken language. The first sign language was not taught in schools or it was not used as a medium to teach the second language. So that is the underlying thing and also to add Mr. Gopala Krishna who was there for the first 3 days is a big advocate of English being a common language for deaf students to learn right from beginning. We know that there are challenges for rural children coming from rural areas or any other places also but he strongly advocates that English should be there. Because of the fact that when they

grow up and go into colleges it is very difficult to find local language colleges like Tamil medium. So it is mostly English and they are suddenly having to shift from a very different language to English and college level. So ideally if all schools for deaf have English maybe it will be good and I do not know because I debate myself in my head about the language they use at home.

Prof. Hemachandran: We do not have the right answer for it. On the one hand English is hard for many from certain places and backgrounds and on the other hand we need that for global connectivity. So we have to work somewhere in between to teach and also to keep it in control and so we have to work somewhere in between teachers and professionals and parents and all the stakeholders.

Nita: Yes. A question from Rithika, “What is the contribution of parents for the deaf children? Do they pick up ISL after their children start school? If not, how does communication at home take place?

Ms. Mary Jerry: They use sign language with the parents. They communicate with the parents only through sign language. It is not necessary to follow ISL. It is just their home local sign language.

Nita: Another question from Karthika, “Madam, can you tell us how long you took to learn sign language and your journey as well and it would be nice if Mr. Amresh could also narrate his journey as well. It will be very inspiring for us.”

Ms. Mary Jerry: I learned sign language from my students. I did not go for any sign language course.

Nita: So Karthika. today I am going to break a surprise or something that you did not know earlier. Amresh who is here interpreting is actually my brother and both of us are born to deaf parents, deaf adults.

So we also have another acronym attached to our name which is called CODA which means ‘child or children of deaf adults’. So sign language was our first language at home because both my parents used sign language. And we learned our second language later on. The first language that we spoke at home was sign language.

In fact we prefer to sign to each other. We really like and are more comfortable using sign language when we speak to each other. Also, we would just talk in sign language rather than anything else.

Prof. Hemachandran: And did you have your own home sign language apart from ISL?

Nita: Not that specific but yes, there are some which we share with our friends and so Amaresh is saying that probably may come under slang. But what Amaresh is saying is because our father Mr. Gopala Krishnan used a lot of proper sign language so we did not have home signs per se because we were directly using ISL from him.

Nithisha has another question, “Madam, as we see the representation of differently abled people to be low in public offices or any institutions is less than maybe 5%. How much is the representation of such differently disabled people in working positions of your institute or even in the places you have worked? Is it enough or do you think it should further improve?”

Ms. Mary Jerry: One of my students is working in the Rajya Sabha in Delhi. He is very good in English and he is deaf.

Nita: So I think this is probably our last question it is an interesting one and this has caused a lot of debate around but I will read it out. It says, “What is the right terminology to refer to deaf learners? Is it hearing impaired or deaf? What is appropriate? Should we call them deaf children or hearing impaired children?

Ms. Mary Jerry: Earlier we called them as deaf; now we call them as hearing impaired. Similarly, we use the term ‘Visually Impaired’ instead of ‘blind’ which we used earlier.

Nita: To give my perspective on that from looking at the deaf community, many of them prefer to be called ‘deaf’ instead of hearing impaired if it is in the English terminology. Because over the years and after understanding the English language a little better they feel that the word ‘impaired’ word talks about something that is not right or missing, but deaf seems to be more neutral and positive. But in our laws and in our government documents and all of it ‘hearing impaired’ is very much used. ‘Speech and hearing impaired’ is also another term that is being used. The term ‘handicapped’ is used much less now. But deaf has gotten its way into the 2016 RPWD Act (Rights of the People With Disabilities Act).

Prof. Hemachandran: One of the things is that parents, teachers, primary caregivers of children also go through a journey. Accepting deafness of the child is not going to happen overnight. So probably during those days of non-acceptance they would rather prefer a medically neutral term and then when that child grows up and becomes an adult, say Rajya Sabha member and so on, deafness, deaf culture, deprived linguistic minority and other emotions come in. I think it is also a personal journey people make and when they make such a journey they also pick up different terms as they go. that may be an explanation, I am not sure.

I think we are done. Thank you madam and thank you all. We went to the foundations today. For me personally it is like going back to my school.

Nita: Thank you so much madam. I really enjoyed watching your presentation and I am so inspired that you have been working for 28 years. And you talk about trial and error method even after so many years of experience, that shows a true teacher's attitude.

So thank you so much for being here and inspiring. I enjoy this discussion with you. Thank you doctor for arranging this. Thank you for all the beautiful questions.