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# TEACHING TECHNIQUE TO TEACH STUDENTS WITH HEARING IMPAIRMENT USING KEYWORD VOCABULARY METHOD

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## Abstract

Communication plays a major role in the academic and professional growth of students with hearing impairment pursuing a Diploma and Engineering Education. Students with special needs have to exhibit good communication skills to achieve success in their careers. Written communication plays a major role in boosting the communication capabilities of students with hearing impairment since written communication is a common and popular form of communication in the professional environment. To inculcate good communication skills and strong subject knowledge, it is essential to use & adopt good teaching-learning practices to teach students with hearing impairment.

The present paper introduces a new technique of teaching based on a keyword-based concept. In this approach, the teacher prepares a list of keywords from the chapter/ subject to be taught. The next step is to define, describe, and make a visual interpretation of the listed keyword. The sign representation of the keyword is essentially based on concept-oriented sign language derivation. The effectiveness of this method depends on the list of keywords being prepared or extracted from the subject. The list should be prepared in such a manner that it should highlight the concept of the subject effectively.

***Keywords****: Keywords, Vocabulary, Teaching, Hearing Impairment, Sign Language, Learning Outcome, Communication.*

## Introduction

The interpreters' role in the classroom included translating teacher speech, voicing student sign language, mediating communication between students with hearing impairment and their peers, and monitoring overall classroom behavior [1]. Learners with hearing impairment are a highly heterogeneous group who demonstrate varying levels of academic achievement and attainment [2]. Research Methods in sign language studies is a landmark work on sign language research, which spans the fields of linguistics, experimental and developmental psychology, brain research, and language assessment [3]. Sign language research is a multidisciplinary research area involving pattern recognition, computer vision, natural language processing, and psychology [4]. Educational research is a useful tool for effecting positive change through innovation. Discovering new ways to synthesize meaningful research findings and translating them to improved access and success for students with hearing impairment in higher education should be a priority [5]. As we better understand the cognitive foundation of learning by students with hearing impairment and the challenges presented by various educational settings. We will better able to match instructional methods and support services to students' strengths and needs. Only then can we provide them with full access to information in the classroom and optimal opportunities for lifelong learning [6].

Today approximately 65% of the school programs serving children with hearing impairment uses some kind of simultaneous communication which consists of both an oral and a manual component [7]. Sign language recognition is a very important area. This would be helpful in the teaching and communication of persons with hearing impairment [8].

We need to use innovative and effective teaching methods to teach students with hearing impairment to attain the desired learning outcomes. Students with hearing impairment are more enthusiastic about visual form of presentation techniques which includes PPT presentation, charts, model presentation, poster presentation, pictures, and animation, etc. But written communication is the most common form of communication being used among professionals in the Engineering and Technological fields. But the art of communication needs knowledge of the language, grammar, and subject knowledge. These qualities and attributes can be inculcated in students with hearing impairment by training them using a very effective technique that is being used by students with hard of hearing in their daily life for normal and common communication. This mode of communication is sign language. Sign

language plays a major role in teaching students with hearing impairment. In signed English, we need to sign each word of the chapter being taught including articles, prepositions, verbs, and technical words which is a very time-consuming process. Signed English is very important for each student with hard of hearing and should have a strong base of signed English.

**Teaching methods for teaching students with hearing impairment:**

The most common teaching techniques include the following:

1. Written communication
2. Use of Assistive technology
3. Visual presentation
4. Sign language
5. Lip-reading or speech reading and
6. Total Communication

**Proposed Teaching Technique:**

Keyword Vocabulary based Teaching Technique for Students with Hearing Impairment :

A Teacher working in institutes working for Differently Abled at Diploma or Engineering needs to use innovative teaching techniques to teach engineering and technological subjects with a minimum period without needing to sign each word of the lesson being taught. The solution for this is a " keyword-based teaching technique". The proposed paper describes a new innovative method of teaching techniques for teaching students with Hearing Impairment pursuing a Diploma and Engineering Education.

**Aim and objectives of the Research:**

The aim of the research is to investigate the viability and profitability of a technical sign repository for polytechnic and engineering students with hearing impairment.

The above aim shall be achieved through the realization of the following objectives:

- To compile an essential list of technical vocabulary pertaining to the polytechnic

courses of computer science, and electronics and communication engineering.

- To develop indigenous technical signs for the vocabulary and record them in the form of a video repository.
- To provide practical training in the signs to polytechnic students with hearing impairment.
- To assess students' competence in learning the technical signs
- To study the consequent influence of students' competence in technical signs on academic learning.
- To obtain student feedback on the practicability and utility of the technical signs developed in the project.

**Scope of the Research:**

Successful completion of the research shall lead to:

- Streamlining technical instruction to students with hearing impairment in computer science, and electronics and communication engineering programs
- Enhancing academic learning and outcomes in these students.
- Further development of sign language repositories for diverse polytechnic programs will enhance the quality of technical education provided to persons with hearing impairment.

**Procedure**

The Research project was undertaken to develop a digital repository of manual signs for technical terms from the polytechnic and engineering course in computer science as a means of enhancing the efficiency of instruction to differently-abled youth with hearing impairment. The process of realizing the ultimate purpose was achieved through the manifestation of the following objectives –

(1) Identifying key technical terms related to the course in computer science and validating their essentiality by the faculty handling the course;

(2) Developing manual signs for these terms and validating their clarity and handiness by sign language experts;

(3) Instructing polytechnic and engineering students with hearing impairment in these technical signs and determining success in learning.

(4) Ultimately studying the influence of the use of these technical signs in instruction on the learning outcomes in the polytechnic and engineering course in technical signs.

**Proposed participants in the study**:

Two major groups of participants have been involved in the study.

- Students with hearing impairment in the computer science program, and
- Students with hearing impairment in electronics and communication engineering program

**Materials and Tools Employed:**

- A video repository of essential technical signs to be employed in the instruction of computer science, and electronics and communication engineering courses handled by the research investigator.
- Schedule and criteria for testing the practical competence of students with hearing impairment in technical signs.
- Pro forma to collect details of pre and post-intervention academic performance of student-participants.
- Pro forma to collect qualitative feedback from student-participants about the experiment with technical signs.

**Process of Research:**

- Phase I: Development of Materials and Tools
- Compilation of essential technical vocabulary in computer science, and electronics and communication engineering courses handled by the project investigator and validation of the list by subject experts.
- Development of manual signs for the vocabulary and validation by sign language

experts.

- Development of pro forma to collect data on academic performance of student-participants, as well as qualitative feedback from them.
- Phase II: Experimentation with Developed Signs
- Pre-intervention academic performance from students of computer science and electronics and communication engineering courses handled by the research coordinator shall be collected.
- Students of computer science and electronics and communication engineering courses handled by the research coordinator shall be randomly assigned to control and experimental groups.
- Students of both control and experimental groups shall undergo regular instruction in the classroom.
- Students of the experimental group alone shall attend supplementary instruction using the technical signs developed in the project by the research coordinator.
- After a specified period for one unit of instruction, data has been collected with respect to Competence in sign language of student-participants in the experimental group.
- Academic performance of both the student-participants in control and experimental groups.
- After completion of data collected, keeping with ethical considerations of not denying any student-participant opportunity of any beneficial exposure or experience, student-participants in the control group shall also be exposed to training in the technical signs.
- Qualitative feedback about the usefulness of the technical signs has been collected from the student-participants in the experimental group.

**Result Analysis:**

We selected around 130 words in computer science belonging to various computer science domains.

Step 1:

We took the expert feedback from Professors who have been involved in teaching computer science subjects for more than 20 years. They validated our vocabulary and gave feedback that the selected keyword is effective for teaching various computer topics.

Step 2:

We developed PPT including a definition for each keyword, Image, and Sign for the selected keyword based on the inputs and feedback from Academic experts dealing with Special Education, Sign language experts, Psychologists, and teaching faculty handling classes for students with hearing impairment. Based on our research on sign language, and feedback from senior students with hearing impairment, we prepared a Video CD for computer science vocabulary.

Step 3:

The sign language being developed has been validated by the Sign Language Expert. Based on the feedback by the Expert, corrections have been incorporated and the final sign language repository was prepared.

Step 4 :

Students with Hearing Impairment have been taught about the developed computer vocabulary. The understanding capability of the students about the sign language that was developed has been tested.

Step 5:

Now the next stage involves the actual teaching process. The selected students have been taught computer science topics without using sign language or a plain teaching approach. Now the performance of the students about the subject has been tested by conducting a series of tests on the above topics and results were noted down.

The subjects were taught to the same group of students using the sign language that has been developed. The performance of the students was tested by conducting a series of tests on the above topics and the results were noted down.

The performance of the students was compared and the outcome shows that the learning outcome of the students has been increased significantly with the use of the new teaching method.

Thus the proposed research produced significant improvements in the learning outcomes of the student with hearing impairment.

The number of students with hearing impairment being considered for testing the effectiveness of the proposed teaching method is 30.

**Topic taught: Fundamentals of computers**

**Method 1:** Plain teaching method / Normal mode of teaching

Performance analysis: Conducted an MCQ test for 100 marks

Result: The aggregate performance is 36 %.

**Method 2:** Keyword based vocabulary teaching method

Topic taught: Fundamentals of computers

List of keywords: 100

Performance analysis: Conducted an MCQ test for 100 marks.

Result: The aggregate performance is 78 %.

**Impact Analysis:**

The keyword-based teaching technique has resulted in the enhancement of a 42 % increase in the academic performance of students with hearing impairment.

Table: Academic Improvement of Students with Hearing Impairment

| No of students | Performance in % [Plain Teaching Method] | Performance in % [Keyword Vocabulary-based Teaching Method ] | % increase in Performance due to the Proposed Teaching Method |
|---|---|---|---|
| 30 | 36 | 78 | 42 |

## Conclusion

It is not worth teaching students with hearing impairment with plain teaching methods, since they can not hear. They can't understand the contents delivered through the auditory approach. Hence we need a set of teaching methods preferably a visual approach through which we can effectively teach students with hearing impairment. The common visual teaching technique includes lip reading, sign language, cued speech, written communication, total communication, poster presentation, ppt presentation, etc. The proposed keyword-based teaching technique is one such visual method that can be used effectively to teach students with hearing impairment pursuing diploma and engineering education. Since the proposed method is helpful for enhancing learning outcomes, it can be considered one of the effective teaching methods for teaching students with hearing impairment. The effectiveness of the system depends on the listing of keywords and the development of the concept-oriented sign gesture for the listed keywords.

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