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Using Audio-Visual Aids and Computer-Assisted Language Instruction (CALI) to Overcome Learning Difficulties of Grammatical Structure in Students of Special Needs

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Abstract

Background & Objectives: It has been well demonstrated that audio-visual aids and computer-aided language instruction (CALI) significantly reduce language mistakes in normal students. This finding has led to the development of assistive devices in which schools teaching students of special needs enhance speech language therapists (SLTs) to use these educative aids. The purpose of this investigation was to investigate the role of audio-visual aids and CALI to overcome problems of language components, notably those related to grammatical structures in students of special needs.

Methods: Forty subjects of students (males and females) of special needs (all between 8-18 years old) were enrolled in the study and were assigned randomly to an experimental group (n = 40) and the same number of normal students with similar ages was assigned as a control group (n = 40). Both groups studied a course of grammar by the same SLT under similar circumstances. The only exception was that while the first group studied the course using audio-visual aids and CALI, the second group did not (i.e., classical methods). Having the pre-and-posttests administered before and after the course, a qualitative and quantitative analysis was conducted to analyze the results of the two tests.

Results & conclusions: The effect of the audio-visual aids and CALI in the performance of the first group in writing skill was positive and greater than that of the second group (70.97% vs. 32.15%). Compared with females, males' scored were higher (1366 vs. 1473). The pre-and-posttests' assessment revealed that it was the audio-visual aids along with CALI that

made the difference among the students which demonstrates the importance of using such educative aids in particular for educational purposes.

Keywords: Language Components, Grammatical Structures, Audio-Visual Aids, CALI, Special Needs, Students, SLTs.

1. Introduction Chapter

1.1 Introduction

Audio-visual aids and CALI are associated with the improvement of language skills be it receptive skills or productive skills or even language components (Gilakjani, 2012). These educational aids are found to be useful not only for normal students, but also for students with special needs (Iram, 2012; Kirk, et al., 2012). Explaining the reasons behind the new trend, Kirk and his colleagues have rightly observed: "Such tests, in which acoustic variability is highly constrained, may not accurately reflect spoken word recognition abilities under more natural listening situations." (Kirk, et al., 2012: p. 455)

To study how audio-visual aids and CALI affect the ability of the normal students and those of special needs, improve their productive skills, some researchers went further to investigate the process of recognizing the word in the brain before it is articulated. According to them, articulation is the ice-berg of the pronunciation process which is preceded by brain process Bradham (2012). The operation takes place, according to Bradham when "Outer hair cells provide mechanical feedback into the organ of Corti, thus enhancing the input to the inner hair cells, which predominantly send information to the central nervous system." (Bradham, 2012: Abstract)

Such findings inspired researchers to ask legitimate and reasonable questions relating to the ways information are processed in the brain and the relationship between motion representation and the visual motion system (Pavan & Baggio, 2013). More importantly, how and where does this process take place in the brains of students with special needs, especially when it comes to matters relating to deep/ surface reading for example (Wolf, et al., 2012) or those concerning Braille-reading and the way to understand issues like shape and space by blind students (Klingenberg, 2012). Onnis & Thiessen (2013)'s findings suggest that mechanisms of statistical sequential learning are implicated in language across the lifespan, and experience with language may affect cognitive processes and later learning. Others went further by investigating not only the patients, but also the role of the parents and other people around the child which results "in greater exposure to the majority language. (MacLeod, et al., 2013: p. 132)

New trends of the research in this field started to focus on physicians and nurses and the way they read, write, etc. (Khaliq, et al., 2012; Peinhardt & Hagler, 2012). Furthermore, scientists established a new trend whereby language aspects could be linked together. The study of Diaz-Maurin & Giampietro (2013) investigated the impact of grammar for assessing the performance of power-supply systems. Having the nuclear energy and fossil energy compared to each other, the researchers concluded that when considering internal constraints, nuclear energy requires about twice as much power capacity and 5–8 times more labor. Diaz-Maurin

and his colleague confirmed that things do not improve for nuclear energy when looking at external constraints which may explain the difficulties faced by nuclear energy to gain interest from investors. Despite of the fact that audio-visual aids and CALI made better progress in the levels of students, some researchers are still believe in the original methods as effective means through which students can acquire language skills, notably reading, listening and writing (Devimeenakshi & Maheswari, 2012). Additionally, pedagogical-based aids were present with more theoretical views but not with more practical use. Consistent with the existing literature on other audio-visual aids and CALI, at least film is common in the field of education (Swimelar, 2013). Knowing the prevalence of boards, notably for teaching students of special needs supplements educational interpretation and can overcome the learning difficulties they suffer from. Many studies have been conducted in this field like Gessesse & Sileshi (2013)'s study whose purpose was to examine visual semiotic signs and bill-boards and their communication implications, especially if they are used for patients. It appears to in favor of this that Gessesse and her friend have forwarded the following notification: “all the visual semiotic signs on all these billboards would give a much wider picture of the types and applications of visual semiotic signs. For another, it would also provide greater opportunities to identify the genres of messages represented through these visuals semiotic signs" (Gessesse & Sileshi, 2013: p. 246)

Students of special needs frequently encounter learning difficulties related to audio, visual or audio-visual texts. Some difficulties can be subtle but can seriously influence the students' ability to learn. The article of Brown et al., (2013) proposes that differing types of annotation offer a powerful and flexible technique for transferring the benefits of graph-based diagrams, as well as for reducing disorientation while moving around the graph and for tackling some of the inherent disadvantages of using sound. According to Brown and his friends, graph annotation may be performed automatically, creating a graph that evaluation shows requires less mental effort to explore and on which tasks can be achieved more effectively and more efficiently. Such results received high support from Chen & Yen (2013) who concluded their study by providing insights on the design and instruction, not only for written text reading, but also for online reading.

The technological features of reading software that can be used for word recognition have not been explicitly investigated, but they may not be comparable because some techniques do not follow the same distinctive features and other qualities of others. The study of Damoiseaux, et al., (2012) may be a valuable source of information for refining our understanding of some of this software in general. Damoiseaux and his friends discussed the automatic reading of anti-neutrophil cytoplasmic autoantibody (ANCA-Slides). The purpose of the research team was to evaluate the AKLIDES System. The team emphasize that the results are promising in that the pattern recognition software may play an important role in ANCA-associated vasculitis diagnostics. Some researchers investigated the idea of how blogs could be used for language purposes. The article of Álvarez (2012), for example, presents a study on the best ways of using blogs as a tool to improve students' reading and writing skills. The results showed that blogs are reliable tools for the improving students' productive skills.

A total of 186 English as second language (ESL) elementary school subjects underwent the

study of Ismail, et al, (2012). The aim of the study was to dis/prove whether or not using technology helps ESL learners improve their reading and writing skills. There are significant differences in the performances of the ESL students. This can be obviously seen in the outcomes of the qualitative and quantitative analyses of the scores. According to Ismaeil and his team, technology might play crucial role in assisting students to learn reading and writing skills. Other significant results, the researchers added, revealed that technology helped teachers in assigning extracurricular activities and communicating with students.

There has been growing interest recently in the use of multimedia as audio-visual aids to decode information and facilitate messages from high-dimensional scientific facts and present them to English as foreign language (EFL) students. The study of Fuenzalida & Sjöberg (2012) employed a support vector machine-based T.V approach to teach EFL students language skills, especially for young learners. Such results were supported by the study of Ahmed (2012). Gower & McDowall (2012) assessed the role of interactive video games on educating children during the study of language skills and/ or language components. Eleven subjects (9 children and 2 music specialists) underwent the experiment. The two researchers concluded their study by recommending the use of audio-visual aids and computer-assisted/ aided language instruction (CALI) as useful educative means when they are used for teaching EFL students.

In their study, Anson & Schwegler (2012) aimed at investigating tracking mind's eye technique. Anson and his colleague wanted to examine the usefulness of this strategy to be implemented for improving foreign language students' reading skill. Nevertheless, the study also highlighted the need for further research into how to improve such technique in composition studies, especially at the intersection of writing. Although currently only a few randomized controlled studies investigated the efficacy of tracking the movement of the eye, such outcomes received a great support by many researchers in the field who conducted similar studies (Henderson & Luke, 2012; Perea, 2012).

Audio-visual aids and CALI had a strong internal and external consistency on the performance of the students. The test-retest and intra- and inter-rater reliabilities were shown to be adequate when it comes to talk about the effectiveness of the audio-visual aids and CALI, and the same thing applies to discriminant validity which was good in most of the conducted studies. For new techniques related to audio-visual aids and CALI, different outcomes were found: apart from one correlation, the scores on tests assessing a language skill and/ or a language component correlated significantly with outcome measures of similar methods. One of those methods is graphic organizer method designed by Manoli & Papadopoulou in 2012. According to the researchers, the study constitutes an attempt to shed light on the research evidence regarding the effectiveness of graphic organizer on text learning and the various types of graphic organizers, which use different conventions to communicate information and are classified in various ways. The researchers finished their study by recommending ways of integrating them in reading lessons, touches on the issue of strategy instruction and its effects on language learning and leaves room for further exploration.

Research is inconclusive on whether or not grammatical gender differences exist in structural and functional grammar. Furthermore, it is also unclear whether there is a relationship between lexical and syntactic variability. The purpose of Hopp (2013)'s integrative review was to determine the causes of inflectional variability. Participants (n = 40) were recruited from EFL schools before they were divided into experimental and control groups. Participants completed the experiment and outlined results demonstrated clear contingencies (1) between overall accuracy in lexical gender assignment in production and target predictive processing of syntactic gender agreement in comprehension and (2) between the speed of lexical access and predictive syntactic gender agreement. Commenting on the outcomes of the research, Hopp adds:" The observed contingencies between lexical gender assignment in production and syntactic agreement in comprehension suggest that variability in the use of gender agreement in real-time L2 comprehension reflects lower levels of activation of and access to gender nodes in the adult bilingual mental lexicon rather than representational deficits in L2 grammars." (Hopp, 2013: p. 53)

Many experiments investigated the teaching approaches' effect. Using 2 different teaching manipulations, the findings of using both leaner-centered approach and teacher-centered approach in teaching English grammar as a foreign language were compared by Zohrabi & Torabi (2012). Sixty subjects in question were divided into an experimental group and a control group. Both groups undertook a pre-and-posttest. However, it was found that the teacher-centered process for the purpose of developing grammar knowledge of EFL learners is the best which support the idea that such approach should be implemented. Moreover, it was also found that English classes cannot fulfill the learners' needs on communication. The balance of experimental results suggests that the explicit teaching of grammar rules and their use through communicative tasks is needed. Opponents of the above mentioned findings believe that the problem not limited to the teachers and the students. According to them, it expands to include other audio-visual aids and CALI including pictures (visual grammar) (Stanley & Lunn, 2013). To investigate whether grammatical structures, provided by encoder of the message, can provide an effective means of understanding the emotional expressions, Czerwon, et al., (2013) examined the emotional impact of grammatical structures. According to the research team, primes were auditory presented nonsense sentences which included grammatical–syntactic parallelisms. Moreover, visual targets were positive, neutral, and negative faces, to be classified as emotional or non-emotional by the participants. Findings of the research suggested that grammatical structure creates an emotional context that facilitates processing of positive emotional information. Such outcomes were supported by Clément, et al., (2013).

An experimental study was used by Sadeghi & Dousti (2013) to measure the effects of the audio-visual aids and CALL on the performance of Iranian learners who study grammar. Dependent measures included age, individual differences, lessons' characteristics, etc., were all taken into account. Statistically significant improvements in the performance levels were present for all subjects recruited in the study. The study findings provided some insights for teachers and administrators to review their curricula, approaches, and educational tools, and to consider the possibility of incorporating educative aids into their teaching environments.

They also suggested improved audio-visual aids and CALI and more technological treatment. An important conclusion derived from the results of Sadeghi and his work mate is that: “the integration of CALL technology has significant effect on young Iranian elementary EFL learners' grammar gain." (Sadeghi & Dousti: 2013: p. 21)

The quality of using facial expressions and gestures in teaching language components is a recently developed strategy that provides a profile of educative-related quality of learning in domains typically affected by the educational environment. However, for teaching grammatical structures it is desirable to have a useful audio-visual aids and CALI. The study of Crespo, et al., (2013) examined the interaction between facial gestures and intonation in the distinction between information-seeking and incredulity yes/no questions in two languages (i.e., Catalan and Dutch). Outlined results showed that Dutch participants rely more on intonational differences. On the other hand, Catalan participants use the facial expression cues to a greater extent. More importantly, both languages, according to Crespo and his colleagues, express pragmatic contrasts both at the intonation and facial expression levels, and native speakers are highly sensitive to the relative weight of these cues at the perceptual level. Sigrist, et al., (2013) addressed the importance of technical display as means through which motor learning is enhanced, recommending using these audio-visual aids in addition to CALI. According to the research team, such audio-visual aids and CALI are important means that should be extensively used for teaching language skills due to their usefulness that can be clearly seen in the EFL students' multimodal feedback.

1.2 Aims of the Study

This study attempted to test the main and interaction effects of using audio-visual aids and CALI in the performance of students of special needs in grammatical structres. To this end, the researcher aims to find answers for the following questions:

1. What are the audio-visual aids and CALI that can be used for teaching students of special needs language in general and grammatical structures in particular? To what extent can SLTs benefit from them when teaching this class of students? What are the best methods that can be effectively used for implementing these educative aids in a way that guarantee improving students of special needs' performances.

2. Compared with those who do not use them, do audio-visual aids and CALI make any difference when they are used for teaching grammatical structure to students of special needs? Are there any results of other studies that agree or contradict the findings of the present study?

1.3 Methodology

Eighty students of special needs of both sexes (age ranges between 8-18 years old) were enrolled in this experimental study. The subjects were randomly divided into two groups; each group consists of 40 students. Nearly all students suffer different types of aphasias. They underwent a course on sound system, for a semester (4 months) at al-Malādh school for teaching students of special needs in Dhamar city, republic of Yemen. The purpose of the study was to examine the effectiveness of audio-visual aids and CALI when they are used for

teaching language components in general and grammatical structure in particular. Before and immediately after the first grammar lesson, the subjects under investigation performed a pre-test and at the end of the semester, another post-test was administered to them by their SLT who was teaching the two groups at the same school. In between the treatment, the first group studied using audio-visual aids, while the second group studied using ordinary methods (chalk and black boards). Outcomes of the two tests were linguistically and statistically assessed. In this regard, social program for social sciences (SPSS) was implemented to describe the frequencies.

2. Analysis

2.1 Using audio-visual aids and CALI to teach students of special needs language components in general and grammatical structures in particular

Educative aids are frequently used in language practice to help students learn very well. Recently, psychoneurolinguists and speech language therapists (SLTs) have realized that using these aids is of special importance to students of speech needs. They believe that such educative aids can be effectively used to teach those who are suffering from motor as well as mental impairments like word blindness, encephalomyelopathy, encephalomyeloradiculopathy, laloneurosis, neuromyelitis optica, ophalmodynia, parachromatism (parachromatopsia), paramnesia, and other language deficits. These divided the practical part of these educational aids into two broad categories:

1. Conventional aids. Normally, these aids fit the students of special needs, mainly those who are suffering from neuromyositis, neuropsychopathy, neurosclerosis, myoatrophy (myatrophy), myocellulitis, myoclonia, myodiastasis, myodynia, etc.

2. Computer learning in language teaching. These educational aids are found to be useful for those who are suffering from pararthria, parahotacism, parasigmatism, periglottic, phocomelia, etc.

A very legitimate question that poses itself in this regard is the following:

Why do we use aids in language teaching in general and what are the benefits of using them for students of special needs? To answer such reasonable questions, one needs to understand that aids can be used for many language purposes. Some of these purposes can be listed as follows:

1. Attracting attention.
2. Maintaining attention.
3. Clarifying concepts and meanings of words and utterances.
4. Increasing chances of remembrance.
5. Time saving (1 picture is worth 1000 words).
6. Adding varieties to class activities.

7. Compensation for the lack of experience in teachers (e.g., bringing pictures for throat to compensate for his inability to draw).

8. Individualizing learning and teaching (e.g., giving students cassettes to be listened to at home or program instruction which takes forms like the book, for example, which is the simplest form and which contains some forms that have some bits of information and each bit of information has its feedback in the margins, etc.

9. Involving learners: Either by asking them to participate in class activities or by using pattern practice which can be done by computer recording. Consider:

- John is reading a book.

- Mary……

(Instant feedback varies according to the situation e.g., I'm sorry, good answer, well done, excellent, try again, etc.).

10. Presenting authentic language e.g., listening to a native speaker, giving menus to the students, recordings of airport's announcements, news, etc.

11. Simulation of language use (e.g., acting, dramatization, etc.).

Clearly, educational aids can be used for different purposes. We can use them for teaching language skills and language components. In detail, educational aids can be used for teaching oral skills (listening and speaking) and written skills (reading and writing) and components of language (sound system, grammatical structures and vocabulary building). Educational aids for teaching language skills and language components fall into five major types: Visual aids, audio aids, audio-visual aids, action (e.g., dramatization, field trips, debating, etc.), and multi-media (CALL/I/T).

A: Visual aids: This type takes different forms and shapes:

1. Realia (Real things). This includes chalk, board, chair, etc.

2. Three dimensions models (e.g., trains).

3. Pictures or drawings: These can be photographic or hand drawn. There are different types of pictures:

- Simple pictures: Pictures of cars, pens, books, etc.

- Composite pictures: Pictures of scenes in classes, movies, etc.

- Series or sets: For example, telling stories, process of doing something (cooking, manufacturing, experiment, etc.), pictures of transportation means, etc.

4. Posters: Usually consists of picture and text (e.g., posters of "No Smoking").

5. Maps: These include geographical maps (used for topographical purposes), political maps, city plans, floor plans, etc. SLT can use city plan for example and ask the student who

suffers from dyslexia to follow his instructions by drawing lines on the places he/ she is talking about.

6. Boards: There are many of them like smart boards, white boards, black boards, etc.

7. Cards: These include flash cards (where the picture is in one side and the word is in the other side), reading cards, and question & answer cards, etc.

8. Graphs: One of the most famous graphs is the pie graphs. Pie graphs are normally used for statistical purposes.

9. Forms: To be used by students who are suffering from dysgraphia for example. Examples of forms: Immigration forms, customs forms, hotel forms, etc.

10. Menus: Restaurant menus that can be used to teach mentally handicapped students something about cultures, traditions, folklores, etc.

11. Slides: Overhead projectors (OHP) slides and 35 mm slides are some of the example for this type of visual aids. Many of the above mentioned visual aids can be converted into slide forms and then presented to the students of special needs to achieve some class activities.

12. Film strips: It is a set of slides like picture series. SLTs can also make use of silent films.

13. Comic books: Examples of this type are children books, stories, etc. that can be used to entertain children, notably those who have problems relating to dyscalculia. Such type also attracts the attention of students suffering from dysarthria and prompts them to speak.

14. Facial diagrams: Diagrams to be taken from books like phonological books or even by drawing them on the boards for teaching purposes like teaching articulation for those who are suffering from pronunciation problems.

15. Clock, face, and hands: By asking the students to assign the time according to the question or vice versa. Such types of activities help dyscalculic students learn better.

16. Calendars: For counting days of the week, months of the year, numbers, etc. Again, such drill helps those who suffer from dyscalculia.

17. Letters of the alphabet and numbers: For teaching spelling, recognition of the letter, etc.

18. Cross-word puzzle: For teaching vocabularies. We also have scrabbles. Learning vocabulary items is very helpful for those who have developmental aphasia.

19. Tables & schedules: These include time table, flight schedules, tec. Linking information to each other helps those who have global aphasia as it strengthens their abilities to speak and comprehend.

B: Audio-aids: Some audio aids that can be used for students who have language difficulties are:

1. Cassette recorder or radio: Such audio aid is typical, notably for those who have problems related to Wernicke's aphasia as it helps them comprehend what they are listening

to. Those who suffer from conduction aphasia may benefit from these cassettes also as they have to repeat the words and / or phrases they are listening to. In others, they do not have to listen to themselves and repeat their own sentences more than one time.

2. Phonograph records: It is an old version of compact discs (CDs).

3. CDs.

4. Conversional language labs: In this kind of labs, one can have all the above mentioned audio aids.

C: Audio-visual aids: The most obvious types are T.V, videos, and also digital versatile disc (DVD) which has almost the same function as the video tape. Sophisticated language lab is another audio-visual aid. In this kind of labs, students of special needs can have both recording and playing. They can also have the facility to speak and listen at the same time and then compare that. Another characteristic of these labs is the facility of instant repetition.

Sound movies are also some other types of audio-visual aids. These movies are now replaced by video tapes. Sound movies are the opposite of silent movies. SLTs can mute the sounds so that movies can be functioned for speaking or with the sound for listening. Slide/ sound synchronization is another type of audio-visual aids. In this type, students of special needs can have both sound and picture and this is used to be one of the methods used in the past and is called in French "La method audio-visuelle".

D: Action: This takes different shapes and forms:

1. Dramatization (physical action) like walking, standing up, etc. Such exercises are helpful for students suffering from Alalia. However, if the SLTs notices that his/ her student cannot act the action, then they can ask them (using sign language when necessary) to pantomime or imitate.

2. Charade: Charade is a good exercise due to those students of special needs enjoy it so much. In this type of exercises, SLTs are supposed to play a role of something and their students predict what it is.

3. Party games: Many of them can be used be used as means for teaching language skills in general.

4. Language teaching games: They can be found in magazines, etc.

5. Field trips: They teach students of special needs some vocabularies. Students of special needs can also get practical experiences with them.

6. Role playing: It is a good example of actions.

7. Physical response: It is considered one of the ways of performing actions.

E: Multi-media aids (Computer-assisted language learning/ teaching (CALL/ CALT)): They are combination of all the above mentioned aids including the use of internet, etc. Nor must we forget some general programs like T.V, radio, etc. SLTs should also pay attention to the

use of computer as only one aspect of aids in language learning. It is important, however, that SLTs know the best ways to use the above mentioned educative aids in teaching language to their students of special needs. In addition, they have to know the target group of students of special needs who will benefit from these educative aids. Clearly, students who are suffering from monochromasia (monochromasy), myeloencephalitis, myopsychopathy, protanomaly, etc., are the target group here. Some requirements for proper use of these educational aids (selection & use) are as follows:

1. Aim (objective): In this regard, SLT should ask himself/ herself "Why am I using this aid in particular (a picture for instance)? Why not another/ other aid(s)?"

2. Effectiveness: Again, SLTs should ask themselves questions regarding to the effects (positive, negative, or side effects). Examples of these questions are: How effective is the use of this educative aid? What shall I do to make that educational aid more effective bearing in mind time, environment, students' levels, individual differences, types of language disorders, etc. For example, a documentary art subject will help students with dysmnesia remember things: Should I use it as a whole or just segment it in sections? When shall I use it? Shall I use it at the beginning, in the middle or at the end of the class?

3. Resources: Questions relating to the availability of the educational aids. These include: Where can I get the educative aid (s)? Are they available in toys' stores, bookstores, or internet?

4. Preparation: Making sure whether this educational aid is useable or not (usability of the educative aids and the best way (s) to use it.

Let's take an example of using these educational aids for teaching grammatical structures to students of special needs. Prior to any further discussion about such topic, a distinction ought to be made between grammar and grammatical structure. Linguistically speaking, grammar is the description of grammatical structures, while grammatical structure is used only of communicative purposes. In that sense, it can be said that everyone knows about grammatical structure, but not about grammar. There are three drills and exercises that can be used as characteristics (criteria) for teaching grammatical structures. These drills and exercises can be listed as follows:

A. Mechanical drills/ Semi-mechanical drills (Pattern drills):

1. Combination (Reduction): Examples of this type:

- Sadeq entered the room. Sadeq sat down. ⟶ Sadeq entered the room and sat down.

- Ali did the assignment. Ali watched T.V. ⟶ Ali did the assignment and watched T.V.

Some SLTs may mix between what they have learnt in grammar (After-before rules in perfect present tense) and the idea of the above mentioned exercise (reduction). While in the former an event occurs after the other in a grammatical accordance, in the latter, the idea is more or less a reduction. Compare:

- After Ali had done the assignment, he watched T.V.

- Ali did the assignment and watched T.V.

2. Expansion: Examples of this types:

- Yesterday, I read a book/ a good English book/ a good English psychoneurolinguistic book, etc.

3. Substitution (Changing functional slots): Substitution does not require any other change. Compare:

- Ahmad is reading a book (Simple).

- Nada is writing a letter (double).

- Sara is reading a new book/ an old book, etc. (Required modification).

4. Transformation: Changing from affirmative form, for example, into a negative, interrogative, exclamative or imperative forms. Compare:

- He is reading the book (Affirmative).

-He is not reading the book (Negative).

-Is he reading the book (Interrogative)

-Read the book (Imperative)

-He is reading the book! (Exclamatory device/ exclamation)

Audio-visual aids including realia, action, miming, boards, drawings, pictures, etc., are some of the important educational aids that SLTs can use for teaching grammatical structures to their students of special needs. SLTs should also understand an important remark. It is related to the difference between mechanical drills and other types of drills. In mechanical drills, students of special needs do not have to understand everything, especially when some audio-visual aids and CALI are used; otherwise, these drills become less mechanical (semi-mechanical). Among the audio-visual aids that SLTs can use in mechanical drills are the tape recorders. Consider:

- Model:

- Example:

- Answer:

- Cue: Answer:

One of the advantages of this kind of drills is that students of special needs will not be boring. In addition, mechanical drills become more meaningful when vocabularies are added to them through pictures (especially with nouns). Consider:

- He went to the school by (A picture of a bus).

- She played ……..with her team (A picture of a football).
- Sam drank …..(A picture of a cup of tea).

In fact, mechanical drills can be done through acting (especially with verbs) as action is a good aid for mechanical drills. Examples:

- The man is …… (A picture for a man swimming).
- The girl is…….ballet (A picture for a girl dancing).
- The boy is…… (A picture for a boy riding his bicycle).

Language labs can be effectively implemented in such types of drills. As a matter of fact, not only language labs can be used here. Other audio-visual aids and CALI can be used also. These include: clock, face and hand, graphs (especially for comparative structures) Consider:

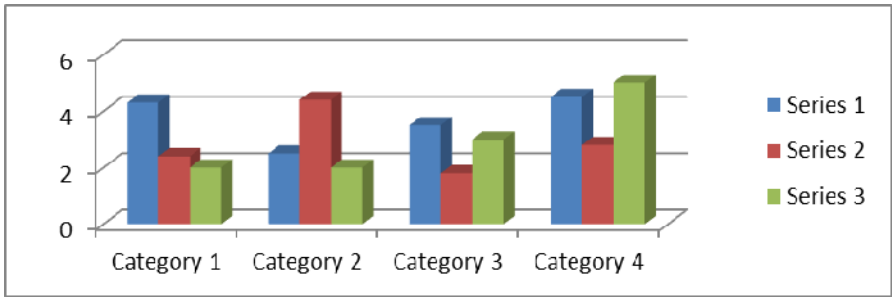

Figure 1. An example of using graphs for comparative structures (e.g., statistical purposes)

Maps, miming, realia, etc., can be used, notably for substitution exercises. Projector can be implemented in mechanical drills by converting the picture into transparent slides either by printing or photocopying or even by scanning (In this case, SLTs should make sure of the type of transparency e.g., laser, ink jet, etc.). Computers can also be used, namely in matters related to data shows projectors. They may not need that, of course, if they scan the picture and apply it directly. Semi-mechanical drills mean that some understanding and thinking are required. However, sometimes, it is possible to have less understanding and thinking by using meaningless words for meaningful grammar.

B. Meaningful exercises: In this type of exercises, many audio-visual aids including reading comprehension questions, clock, face and hand exercises, etc. SLTs can also teach structures by giving them in form of meanings in enjoyable ways. Psychoneurolinguistically speaking, meaningful exercises require using questions-answers (Q-A) exercises, questions based on common knowledge (e.g., where does the sun rise/ set?), present a text and then give questions. Some instructions to be considered in such drills are:

- Response by the learners.
- Provide correct answers.

- Present graphics.
- Give questions on basis of information in graphics. Since we are talking here about CALI, graphics here indicate to any visual thing (e.g., maps, pictures, etc.).

C. Communicative exercises: The difference between meaningful exercises and this type of exercises is that in the former, the information is available, while in this type of exercises, it is not. Consider:

- What color is this pen?
- Describe the colors of the clothes I wear.
- What is your name?
- How many steps are there from the board to the door?

Such type of questions is suitable for students who are suffering from dyschromatopsia (dyschromasia), paraphasia, dyscalculia, and dysmetria. In other words, it is unnecessary for the SLT (as a questioner) to know the information in meaningful exercises, but here in communicative exercises, it is. Compare:

- Are you from Riyadh? (Meaningful exercise).
- Where are you from? (Communicative exercise).

Games like role plays can be used in communicative exercises because they create interaction. Pictures or interactions can be used for teaching prepositions, hand drawings can be used for distinguishing grammatical items from each other like distinguishing simple present from perfect present, and so forth.

Some games, psychoneurolinguistically speaking, can be used to cover more than one skill. For example, dictoglass game (dividing students into groups, giving them a passage, and then asking them to reconstruct its paragraphs) combines grammatical structures with all language four skills altogether. Undoubtedly, evaluation is based on how accurate the students of special needs have reconstructed the paragraphs. Note here that SLT can use the first category to teach grammatical structures to students of special needs, while the other two categories are more preferably to be used for teaching vocabularies than for teaching grammatical structures. Questions based on personal information are also required. These include exercises similar to those of speaking and writing (e.g., combinations of tables (Click/ copy and paste), scrambled sentences with modification: Consider:

- boy, the, read- Did-the- book?
- are-old-how-old?
- Is-table-the-on—pen-the.

It should be noted here that SLPTs can use exercises like the above mentioned ones with or without modification (based on the type of aphasia). SLTs can also combine exercises with theoretical information, exercises with possibility of inferring to grammatical information when necessary or desired (e.g., on the net). The above mentioned exercises and drills can be effectively used for those who are suffering from protanopia, peudopsia, psychophonasthenia, retrolingual, myodystonia, myodystrophia, myo-edema, etc.

2.2 Audio-visual aids and CALI: Effects in the performance of students of special needs

As is mentioned in the methodology of this research, eighty (80) subjects suffering from different aphasias types and language disorders received brief and intensive therapy course on grammatical structures. As per the methodological instructions of the current study, a pre-test was administered prior to course. Table 1 below reports the results of the two groups under investigation (Experimental and control groups). Consider:

Table 1. Performance of the subjects in the pre-test: Comparison between the treatment and control groups

No	*Treatment/ Experimental group*				*Control group*			
	Subject Name	*Subject Sex*	*Subject Age*	*Subject Score*	*Subject Name*	*Subject Sex*	*Subject Age*	*Subject Score*
1	Saleh	M	18	26	Nada	F	15	38
2	Majed	M	12	27	Hajar	F	14	23
3	Saqr	M	14	28	Hamas	F	8	29
4	Ali	M	8	39	Rashad	M	12	25
5	Amatallateef	F	12	49	Omar	M	9	18
6	Amatala'leem	F	9	35	Ashraf	M	16	14
7	Badr	M	13	35	Mohammad	M	11	15
8	Tareq	M	14	36	Montaha	F	14	37
9	Parees	F	15	18	Ayman	M	13	36
10	Bayrout	F	9	19	Aayah	F	10	25
11	Tammaah	M	9	7	Adham	M	10	23
12	Taher	M	17	39	Nasser	M	11	39
13	Baraah	F	16	39	Haylah	F	17	28
14	Abrar	F	11	50	Tawfeeq	M	13	28
15	Ahmad	M	13	37	Nour	F	12	17
16	Fatimah	F	16	48	Najeebah	F	18	9
17	Amatillah	F	18	39	Radha'a	F	16	12
18	Abdullateef	M	8	25	Wafa'a	F	15	19
19	Amriyah	F	12	13	Wajedah	F	15	22
20	Abduljaleel	M	12	18	Sultan	M	9	25
21	Kareemah	F	11	19	A'simah	F	12	28
22	Nadiyah	F	11	36	Adalah	F	11	16
23	Sariyah	F	13	38	Abulwali	M	8	33
24	Sarah	F	13	47	A'amal	F	8	32
25	Huda	F	18	15	Salah	M	12	23
26	Sulayman	M	15	28	Ammar	M	13	39
27	Amjad	M	14	29	Luluah	F	18	37
28	Abdullah	M	11	38	Bilal	M	14	26

29	Abdulmajeed	M	16	27	Ziad	M	12	34
30	Raghad	F	15	37	Ruqayah	F	18	57
31	Hafsah	F	14	39	Asma'a	F	15	8
32	Abdurrahman	M	14	25	Sumayah	F	17	16
33	Akram	M	14	17	Kawthar	F	13	29
34	Taqwa	F	13	28	Khawlah	F	14	38
35	Salma	F	12	39	Tasneem	F	18	26
36	Hadiyah	F	18	36	Amal	F	10	26
37	Sayda	F	18	37	Sami	M	10	34
38	Abdulkareem	M	16	28	Haneen	F	10	56
39	Sadeq	M	8	29	Ayham	M	16	45
40	Motaz	M	10	35	Sajidah	F	18	34
Total	40 (20 M+20 F)		530	1254	40 (20 M +20 F)		525	1119
Mean		- -	13.25	31.35%		- -	13.12	27.97%

As is clearly observed in the outcomes of the two groups, the pre-test played the role of diagnostic tool which is proved to be valid and reliable. Statistical analysis showed that differences in the outcomes of the experimental and control groups were not big (1254 vs. 1119). Such results are normal, especially if we consider the worst performance levels (below 10 scores) where only one subject from the treatment group failed in crossing the 10 score (Tammah, 7) and two only from the control group shared the same feature (Najeebah, 9 and Asma'a, 8).

Pre-test's scores of both sexes were not similar in both treatments groups (573 scores for males vs. 681 scores for females). Control groups' scores followed the same pattern wherein the control group of males scored 457 while the control group of the females scored 662. Such scores only ensure the validity of the research as they prove the randomness in selecting the samples. However, these scores will better be explained in light of the posttest's outcomes. Consider:

Table 2. Performance of the subjects in the post-test: Comparison between the treatment and control groups

No	*Treatment/ Experimental group*				*Control group*			
	Subject Name	*Subject Sex*	*Subject Age*	*Subject Score*	*Subject Name*	*Subject Sex*	*Subject Age*	*Subject Score*
1	Saleh	M	18	78	Nada	F	15	45
2	Majed	M	12	79	Hajar	F	14	25

3	Saqr	M	14	90	Hamas	F	8	45
4	Ali	M	8	98	Rashad	M	12	18
5	Amatallateef	F	12	78	Omar	M	9	28
6	Amatala'leem	F	9	56	Ashraf	M	16	27
7	Badr	M	13	74	Mohammad	M	11	45
8	Tareq	M	14	47	Montaha	F	14	36
9	Parees	F	15	68	Ayman	M	13	39
10	Bayrout	F	9	96	Aayah	F	10	38
11	Tammaah	M	9	56	Adham	M	10	48
12	Taher	M	17	74	Nasser	M	11	29
13	Baraah	F	16	47	Haylah	F	17	27
14	Abrar	F	11	57	Tawfeeq	M	13	28
15	Ahmad	M	13	89	Nour	F	12	14
16	Fatimah	F	16	50	Najeebah	F	18	16
17	Amatillah	F	18	97	Radha'a	F	16	28
18	Abdullateef	M	8	68	Wafa'a	F	15	24
19	Amriyah	F	12	50	Wajedah	F	15	27
20	Abduljaleel	M	12	88	Sultan	M	9	12
21	Kareemah	F	11	45	A'simah	F	12	33
22	Nadiyah	F	11	47	Adalah	F	11	45
23	Sariyah	F	13	89	Abulwali	M	8	38
24	Sarah	F	13	78	A'amal	F	8	33
25	Huda	F	18	56	Salah	M	12	37
26	Sulayman	M	15	78	Ammar	M	13	16
27	Amjad	M	14	45	Luluah	F	18	49
28	Abdullah	M	11	68	Bilal	M	14	30
29	Abdulmajeed	M	16	98	Ziad	M	12	28
30	Raghad	F	15	78	Ruqayah	F	18	17
31	Hafsah	F	14	69	Asma'a	F	15	55
32	Abdurrahman	M	14	56	Sumayah	F	17	43
33	Akram	M	14	79	Kawthar	F	13	34
34	Taqwa	F	13	94	Khawlah	F	14	15
35	Salma	F	12	57	Tasneem	F	18	38
36	Hadiyah	F	18	69	Amal	F	10	37
37	Sayda	F	18	85	Sami	M	10	25
38	Abdulkareem	M	16	69	Haneen	F	10	23
39	Sadeq	M	8	80	Ayham	M	16	57
40	Motaz	M	10	59	Sajidah	F	18	34
Total	40 (20 M+20 F)		530	2839	40 (20 M +20 F)		525	1286

Mean	- -	13.25	70.97%	- -	13.12	32.15%

The two groups underwent the posttest (the experimental group and the control group); group1 received the treatment, while group 1 did not. Using descriptive frequencies, statistical analysis showed that the overall outcomes of the two groups under investigation were characterized by (a) a significant differences between improvement in the grammatical structures of the first group's performance (2839 scores, i.e., 70.97%) compared with the performance of the first group before the experiment (1254 scores, i.e., 31.35%), and (b) little improvement in the performance of the control group (1286 scores, i.e., 32.15%) in comparison to the performance of the same group in the pre-test (1119 scores, i.e., 27.97%). Strictly, the scores of the treatment group in the posttest are incomparable. They achieved nearly double scores than those of the control group (70.97% vs. 32.15%).

Both males and females registered more than double scores in their posttest (compared with their performance in the pre-test) (Males= 1473 vs. 573 and females= 1366 vs. 681). It has been observed also that the scores of the control groups of both gender witnessed a remarkable increase (Males= 457 (pre-test) and 505 (posttest), while females= 662 (pre-test) and 781 (posttest), but they remain no more than control groups' scores which decrease their significance in comparison to that of experimental groups. In comparison to each other, males' performance level was higher than that of the females' (1473 vs. 1366). This might be referred to as their language impairments were not at the same degree of seriousness as that of the females; that is why they have learnt the grammar course faster.

3. Conclusions & Recommendations

Aids to language teaching are of three broad categories: Conventional aids, technological aids (machines other than computer) and CALL. There are some techniques that can be effectively used for teaching language in general. These strategies can be used for teaching nearly all language aspects including the sound system, grammatical structures and vocabulary (language components) as well as teaching the four language skills and culture. Generally, educative aids are of three types. The first type includes visual aids: (e.g., realia, models, pictures/ drawings, posters, maps (geographic and city plans), boards, cards (flash cards, reading cards- Questions & Answers), graphs, forms, menus, slides (35 mm and OHP), film strips, silent films, comic books and strips, facial diagrams, clock faces and hands, calendars, charts, letters of the alphabet and numbers, cross-word puzzles, etc.). The second type is related to audio aids (including lab) (e.g., audio cassette/ tape (reel) recorders, radio, phonograph records (record albums), CDs, conventional labs. The third type is that of audio-visual aids (e.g., video tapes, TV, DVD, sound films, synchronized audio recording with visual presentations (slides), action aids (e.g., dramatization, field trips, games, pantomime, etc.) and multimedia (e.g., CALT/ L), the use of internet, interactive or not, etc.).

A very legitimate question here is: What is the importance of educative aids (Audio-visual aids and CALI) in speech language pathology? To answer such question, SLTs need to know

the characteristics and benefits of audio-visual aids and CALI. Some of these features are relating to attracting attention, maintaining attention. Some SLTs emphasize that audio- visual aids and CALI can be used in matters relating to the clarification of concepts/ meanings of words and utterances. According to these SLTs, these educative aids participate in increasing the chances of remembrance by increasing means of association, saving time, simulation of language use, and presenting authentic language and natural settings for language use. Others add that audio-visual aids and CALI can be exploited to compensate for lack of experience of teachers, individualize learning and instruction, involve of learners, give variety to the lesson, and provide instant feedback.

Computers in general and computer programs in particular were found to be successful in achieving transfer of trained language abilities in speed of processing to similar untrained tasks. They can be used as means of presentation of text and also as means of presentation of exercises and feedback (and/or evaluation). Moreover, one can implement them for other educational purposes where they can be effectively used as sources of texts and also as a means of providing a record of students' progress. In addition, computers are the best educative environments where one can easily find all types of electronic dictionaries (e.g., Thesauri, Sakhr, Atlas, Longman, Contemporary, Webster, etc.). Other available electronic references include grammatical/ usage information, information sources (encyclopedia, etc.), and internet access where communication takes place with others. Strictly, internet facilities found to be useful for teaching, references, consultation, interaction with others, practicing through chatting, learning individually or through collaboration (on assignments, etc.).

CALI requires some procedures to be undertaken before therapeutic sessions take place. Standing alone is the first procedure and this refers to two important points: Considering class complementary work, and language course (autonomous learning). Network is another procedure that SLTs should pay attention to. They should make sure that all necessary networks (e.g., local area network), internet access, supplementary materials, language course (Autonomous learning), etc., are available. Nor must we forget to add also the feature of benefiting from computer mediated communications (CMC) (e.g., e-mail, chat, distant learning), information tools (different topics, language aids like dictionaries, and/ or using computer as a tool (word processing, spell checkers, grammar checker, word count).

Programmed instruction (self-teaching/ learning) can be used to break learning task/ information into small bits, present these in frames which require response by the learner and then provide feedback by the system. In fact, a connection ought to be made between the uses of programmed instruction and CALI since the former is a part of the latter. Such uses of the programmed instruction require us to mention something about the advantages of CALI. These include: Individualization, instant feedback, combining efforts of different experts, assessment, follow-up learner's progress , providing diagnostic report on learners, provision of authentic materials, use of multimedia, combination of different resources (lexical, grammatical, cultural…) and use of corpus linguistic facilities (such as concordancers- key word in context (KWIC)).

There are some guidelines and requirements SLTs should consider when teaching

grammatical structure to their students of special needs. Below are four major rules:

1. Mechanical/Semi-mechanical drills: In this type of drills, no understanding is necessary. It can be differently done. For example, it can be done in terms of patterns like substitution (sentence, cues, reinforcement, etc.). Transformation (sentence(s) and examples, feedback, etc.) is another shape of this type. Alternatively, the SLT can do it in the sort of combining (sentences with/ without the conjunctions or other means, such as relative pronouns, etc.) or expansion (sentence and words to be inserted/ added).
2. Meaningful exercises: Unlike mechanical/ semi-mechanical drills where understanding is not necessary, here understanding the information is necessary (e.g., Questions- Answers exercises). Meaningful exercises can be presented in two forms: Substitution (pictures used instead of words and questions based on a text or picture(s)). The second form of this type of exercises is related to scrambled sentences (with/ without modification).
3. Communicative exercises: (Understanding is required, but more personalized and purposeful- Questions requiring personal information e.g., how old are you?). This type of exercises requires interaction between the student and the rules presented (Interactive grammar). In this type of exercises, rules of grammar are supposed to be given in conversations, dialogues, etc.
4. Computer: The computer can provide hints or explanation of rules to help learners. It can also give us examples of the use of certain function words in context (concordance).

Audio-visual aids and CALI for teaching grammatical structures include: Boards, drawings (such as time line), realia, and pictures as cues (in pattern practice / drills). Drills on substitution are also important (e.g., the boy is writing a letter). For transformation, graphs, maps, acting/ mime, OHP, audio (including labs), computers (power point presentation), games, etc., are necessary. SLTs can also make use of combination of tables (Click/copy and paste) and scrambled sentences (with or without modifications). Moreover, they can combine exercises with theoretical information. In addition, they can implement exercises with possibility of referring to grammatical information when necessary or desired. Finally, consultation of digitized information is necessary (e.g., on the net).

The criteria for efficacious treatment were the increase in the level of performance between the experimental and control groups. Based on these criteria, the success rate for any group depends on the differences the treatment tool does on the levels of the subjects in matters relating to grammatical structures.

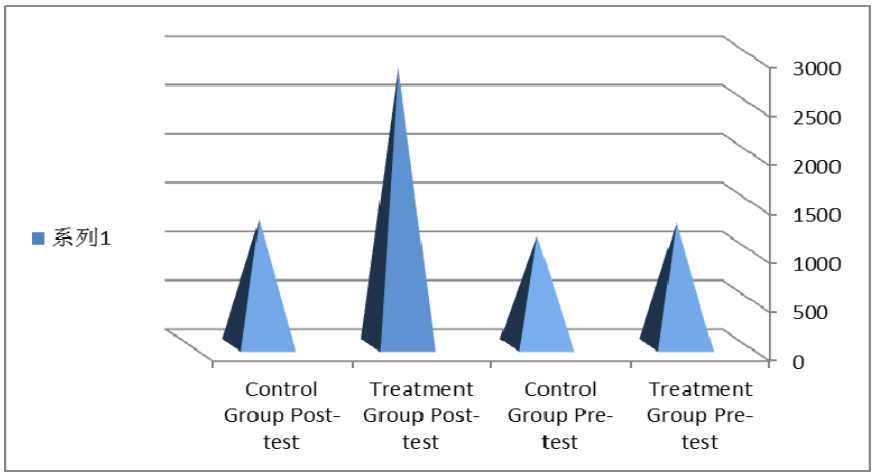

Figure 2. Results of the treatment and control group's pre-and-posttests: Comparison

Based on the data presented in Figure 2, the performance of the treatment group in the posttest was higher (2893) compared to control group's subjects having shown less improvement who scored (1119 and 1286) in both tests (pre-and-posttests). The results of the present study suggest that a significant improvement in the performance of the treatment group in question could indicate the use of audio-visual aids and CALI. Our results agree with similar outcomes of some other studies (Zohrabi & Torabi, 2012; Hopp, 2013; Czerwon, et al., 2013; Clément, et al., 2013; Sadeghi & Dousti, 2013).

It should be noted here that males' scores in the posttest were better than those of females'. The difference is, to some extent, big as it reaches nearly 100 scores (Males= 1473 and females= 1366). High performance indicates to high achievement which may be accounted for because of the type of aphasias males are suffering from. All in all, these scores are better be represented in a visual diagram for better understanding. Compare:

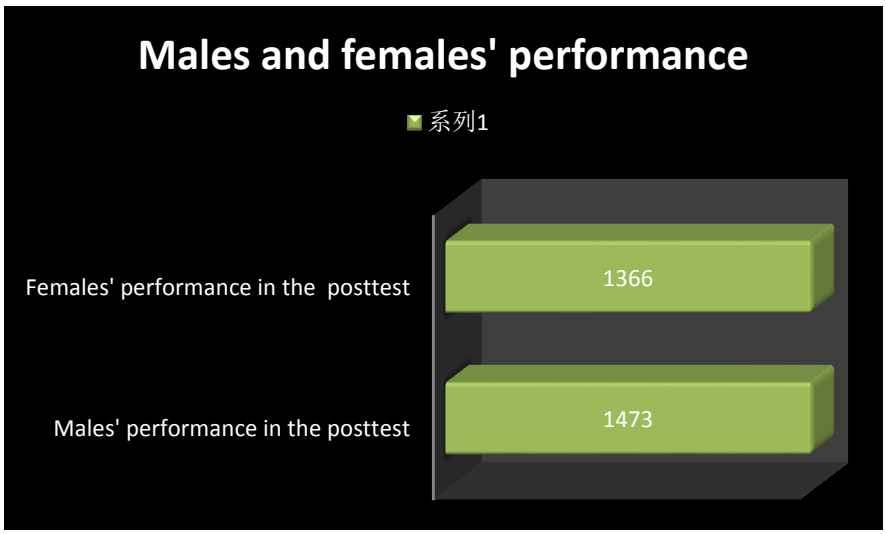

Figure 3. Performance of both males and females: Comparison

Our results recommend using the file of the patient as a basic for accurate and scientific diagnosis. Also our results suggest that audio-visual aids and CALI are highly recommended for teaching grammatical structures to students of special needs.

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Glossary

ANCA (Anti-neutrophil cytoplasmic antibodies) = These are a group of autoantibodies

and monocytes that are detected as a blood test in a number of autoimmune disorders, but are particularly associated with systemic vasculitis. ANCA often "show combinations of both cytoplasmic and perinuclear staining." (Mead, et al., 1999: p.1).

CALL/I/T (Computer-assisted/aided language learning/instruction/teaching) = It is defined as "the search for and study of applications of the computer in language, teaching and learning." (Levy, 1997: p.1). While CALL is related to students, CALT and CALI "fell out of favor among teachers". In that sense, it can be said that while in the former term, the student-centered approach is the dominant perspective, in the latter; a teacher-centered approach is more preferred. CALI/T exhibits all characteristics of English language teaching (ELT) (Davies G. & Higgins, 1992: p.3).

CD (Compact Disc) = It is used for storage of data. It was in March 1974, during a meeting of the audio group, two engineers from the Philips research laboratory recommended the use of a digital format on the 20 cm optical disc, because an error-correcting code could be added." (Peek, 2010: p. 10).

CMC (Computer-mediated communication) = According to McQuail (2005), CMC is seen as "any communication that occurs through the use of two or more electronic devices." (McQuail, 2005: p.1)

DVD (Digital versatile disc) = It is a digital optical disc storage format. The DVD specification provided a storage capacity of 4.7 GB for a single-layered, single-sided disc and 8.5 GB for a "dual-layered, single-sided disc." (Thrasher, 1996: p. 16).

ESL/ EFL (English as a second/ foreign language) = It can be defined as the use or study of English by speakers with different native languages in English speaking countries. Unlike ESL, EFl refers to the teaching of English in a non–English-speaking region. Such differences occurred "during the development of English in the 1930s." (Harcourt & Templer, 2005: p.2).

KWIC (Key word in Context) = It is considered the most common format for concordance lines "especially in the phrase" (Collins English Dictionary, 2003).

OHP (overhead projector) = It is a variant of slide projector that is used to display images to an audience. In the definition of dictionary, "overhead projector is capable of projecting enlarged images of written or pictorial material onto a screen or wall from a transparency placed horizontally below the projector and lighted from underneath"(The American heritage dictionary of the English language, 2009).

SLI (Specific Language Impairments) = It is considered one of the commonest causes of childhood developmental disabilities (Webster, et al., 2008: p. 871).

SLTs (Speech-Language Therapists) = They are specialized in communication disorders as well as swallowing disorders. They are also called Speech Pathologists (Block et al., 1993, P. 23).

SPSS (Statistical program/package/product/ for social sciences/ and service solution) = It is a

software package used for statistical analysis and is among the most widely used programs for statistical analysis in social science. Levesque (2007) listed some statistical operations that are normally undertaken by SPSS software. These include: "Descriptive statistics (Cross tabulation, descriptive frequencies, exploration, etc.), descriptive ratio statistics, bivariate statistics (means, t-test, ANOVA, correlation (e.g., bivariate, and partial distances), and nonparametric tests.), and prediction for numerical outcomes (linear regression and prediction for identifying groups (actor analysis, and cluster analysis.)"(Levesque, 2007: p. 392)