

## **EFFECTIVENESS AND LIMITATION OF COMPUTER-BASED THERAPY IN MANAGING LANGUAGE DISORDERS IN NIGERIA**

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### ***Abstract***

*Computers are involved in many facets of daily life, and studies have adjudged computers to be effective tools in the rehabilitation of all forms of language impairments. This study seeks to establish a synergy between traditional therapy and speech-language computer therapy in achieving speech-language therapy in children with language disorder or specific language impairment. Some speech-language pathologists were interviewed, and questionnaire administered on some to know their level of integration of technology-based therapy in managing speech disorder. This work which is largely descriptive reveals that speech-language pathologists prefer targeting the habilitation and rehabilitation of computer skills as a functional endpoint of treatment for many individuals with language disorder. Findings reveal that not all clients are receptive to using computers. Ethical issues may arise with computer-based treatment if speech-language pathologists provide software without appropriate clinical evaluation and teaching. Investigation into therapeutic homes also reveals that the computer-assisted language software cannot be used wholly without the intervention or collaboration of usual traditional skills or approach for optimal result in the management of language disorder.*

*Keywords: habilitation, rehabilitation, pathologists, language impairments*

## **Introduction**

Computers are ubiquitous in the society today. Computer is also recognized as a good learning tool, providing interactive activities, enhanced graphic displays and varied practice. It is no wonder then that the interest in the use of computers in language therapy for individuals with specific language impairment and aphasia is growing and becoming recognized as a potentially useful resource. Nevertheless, there appear to be numerous software programmes offering therapy activities for individuals with language disorder. However, this paper, while acknowledging the efficiency of computer-assisted therapy in language disorder, advocates for the integration of traditional approach and technology-enhanced approach for effective management of language disorder. The research which is largely descriptive is based on the interactive sessions coupled with feedback obtained from interview and questionnaire administered on some language therapists at Enugu therapeutic home.

The term language disorder means any disorder in comprehension and use of spoken, written or other form of communication. The disorder may be spotted in the phonological aspect, morphological/syntactic aspects. It is also noted in the content of language or meaning aspects and the function of language in communication which is pragmatics or combination of any of them. Language disorders or language impairment involve the processing of linguistic information. Problems that may be experienced can involve speech sound (phonetics or phonology), grammar (syntax or morphology), semantics (meaning) or other aspects of language. This problem may be

receptive (involving impaired language comprehension) or expressive (involving language production) or a combination of both. Examples include specific language impairment and aphasia. When a person has trouble understanding others, sharing thoughts, ideas and feelings completely, then such a person has language disorder. Among others, language disorders can affect both spoken and written language and can also affect sign language. In a typical situation, all forms of language will be impaired.

Language therapy is a way or process undertaken by a professional body to rehabilitate language disorder or impairment. It deals with the assessment, analysis, and treatment of communication disorders, cognitive-communication disorders, voice disorders, and swallowing disorders, and plays an important role in the diagnosis and treatment of autism spectrum disorder and other types of language disorder. Language therapy is not just the treatment or modification of a speaker's speech sound articulation to meet the expected normal pronunciation, facilitate people who stammer to speak more fluently. Language therapy is largely concerned with a broad scope of speech, language, and voice issues in communication which include:

- i. Word-finding and other semantic issues, either as a result of specific language impairment such as a language delay or as a secondary characteristic of a more general issue such as dementia.
- ii. Social communication difficulties involving how people communicate or interact with others (pragmatics).
- iii. Structural language impairments, including difficulties creating sentences that are grammatical and modifying word meaning.

- iv. Literacy impairment related to the letter-to-sound relationship (phonics), the word-meaning relationship (semantics), and understanding the ideas presented in a text (reading comprehension).
- v. Voice difficulties, such as raspy voice, a voice that is too soft, or other voice difficulties that negatively impact a person's social and professional performance.
- vi. Cognitive impairment (e.g., attention, memory, executive function) to the extent that they interfere with communication (see Brady et al 2016).

Adams et al (2015) notes that language disorder is failure in processing of linguistic information which may be primary if they have no known aetiology and secondary if they are caused by another condition such as autism, hearing impairment, general developmental difficulties, behavioural or emotional difficulties or neurological impairment. In language therapy, the therapists, before any treatment, have to observe and know the linguistic and communicative performances of the patients.

Speech services according to Factor and Weiner (2008) begins with initial screening for communication and swallowing disorders and continue with assessment and diagnosis, consultation for the provision of advice regarding management, intervention, treatment, and providing counselling and other follow up services for these disorders. Services are provided in the following areas:

- i. Cognitive aspects of communication (e.g., attention, memory, problem-solving).
- ii. Speech (phonation, articulation, fluency, resonance, and voice including aeromechanical components of respiration).

- iii. Language (phonology, morphology, syntax, semantics, and pragmatic/social aspect of communication) including comprehension and expression in oral, written, graphic, language processing and language-based literacy.

Specific language impairment (SLI) is diagnosed when a child's language does not develop normally and the difficulties cannot be accounted for by generally slow development, physical abnormality of the speech apparatus, autism, spectrum disorder, aphasia, acquired brain damage or hearing loss.

Aphasia on the other hand is one's inability to comprehend and formulate language because of damage to specific brain regions. This damage is usually caused by a cerebral vascular accident (stroke) or head trauma although this is not the only cause. The difficulties of people with aphasia can range from occasional trouble finding words to losing the ability to speak or write; intelligence however, is not affected. Expressive language and receptive language can both be affected. Aphasia affects visual language such as sign language. To be diagnosed with aphasia implies that a person's speech or language is significantly impaired in one of the four communication modalities which include: auditory comprehension, verbal expression, reading and writing, and functional communication.

Sign language is a language which uses manual communication to convey meaning as opposed to spoken language. This can involve simultaneously combining hand shapes, orientation and movement of the hands, arms or body and facial expressions to express a speaker's thoughts. Sign languages share many similarities with spoken language which depends on speech sounds; linguists consider both as types of natural language.

Spoken language disorders according to Agbedo (2015) are heterogeneous in nature and the severity of the disorder can vary considerably. Each individual with language difficulties has a unique profile based on his or her current level of language functioning, as well as functioning in areas related to language including hearing, cognitive level and speech production skills.

Technology provides a positive outlook to remediation of communication disorders and aids in achievement of speech and language goals for students having language disorders (Green, 2004). According to Cotton (2016), learning disabled, hearing impaired, language disordered, and emotionally disturbed children benefited from technology integration and at times showed more significant gains using technology than their regular education counterparts.

According to Green (2004), computer-assisted speech therapy became more and more frequent in school practice starting with the period 1990-2000 with the development of technology-based applications in a didactic context, for children and adults with or without learning. Some specialised software programs (for the English language) were developed in order to answer to the needs of specialists in the field of language pathology, which provides a wide range of attractive and stimulating formats, as well as didactic games for the vocabulary and the expressive and perceptive language development. The audio feedback completes the visual output, and the audio effects strengthen the impact of the animated visual rewards.

Nevertheless, numerous children are receiving services for speech impairments with a traditional approach. Secord (2015:152) views traditional approach as a wide variety of specific techniques, which may involve listening, imitating, physical modelling, and lots of drill and practice. Many speech-

language pathologists utilize the traditional approach in therapy and believe the traditional approach with drilling and practicing speech sounds are the only avenue to remediate distortions of speech sounds. However, traditional articulation can be motivating and exciting for children, however, it can become tedious. Students may become tired and regress despite reinforcement. To motivate children to practice speech exercises, to improve the progress of students receiving articulation therapy, and to accelerate students' ability to master phonemes were driving forces according to some interviewed speech-language pathologist.

Scholars have worked on the effectiveness of computer in speech therapy in western countries, others have also looked at the effectiveness of the traditional method, however not much has been done considering the use of computers as a tool for speech therapy in Nigeria. Nigeria being a developing country still upholds the traditional approach to language therapy as a more appropriate method for the habilitation of language disorders due to unavailability of technological tools. However, this paper will establish a synergy between traditional therapy and speech-language computer therapy in achieving speech-language therapy in children with language disorder.

### **Empirical studies**

In 2016, Cotton carried out a study in order to evaluate the effect of introducing computer-based technology in the speech therapy of disabled children. It was observed that the strongest effect was recorded in the children with learning disorders, in those with auditory disorders, language disorders or emotional disorders, which determined an orientation of the American governmental clinical research funds towards this field. It is noticeable that in Romania, just like in the USA, most

speech therapists still use traditional speech therapy methods, that can be defined as a set of specific techniques, involving listening, imitation and the physical modelling of the phono-articulatory apparatus and many exercises that have to be practiced systematically (Secord, 2015).

This therapeutic approach has undoubtedly the efficiency and the value demonstrated by the numerous children that improved or healed their language disorders, but any practitioner speech therapist can admit that this sustainable repetition technique for the correct pronunciation of sounds, syllables, words and sentences entails a decrease in the interest and motivation for practicing, since it involves a certain tiring monotony and regress.

David and Copeland (2016), worked on computer use in the management of aphasia. According to them the study surveyed speech language pathologists (henceforth SLPs) to determine patterns and frequency of computer use associated with aphasia rehabilitation. The survey instrument was mixed format, with multiple choice, yes–no, and open-ended questions, and all items were related to various aspects of the use of computer-based technology in aphasia rehabilitation. Survey results indicated that SLPs use computers more often for indirect or supplemental purposes than for direct therapy. When SLPs implemented computers in direct treatment, the amount accounted for less than 25% of the total session time. Identified barriers to using computers include a lack of access and training. Training for using computers in aphasia management occurs most often after graduate school through continuing education or self-study. In conclusion, results indicated that computer-based treatment of aphasia is being implemented to varying degrees and more often for supplemental and administrative purposes



than for direct therapy. Additionally, SLPs generally perceive computers as useful and important but not critical to successful outcomes.

Earley (2016) worked on a recovery solution for a stroke victim suffering from dysphasia from a technology perspective. This analysis of solutions addresses the needs of an affluent 81-yearold woman (Sandra) suffering with dysphasia (an impairment of the ability to use or comprehend words) as a result of stroke. It is presented from a technology perspective and its contents are only intended as recommendations to be considered by the client, her husband Joe, and her rehabilitation team. Sandra's primary needs include speech therapy, reinforcement for speech therapy, and assistance becoming comfortable and familiar with technology to allow her to use computer programs that may be recommended. According to the researcher, Sandra made significant improvement and was fortunate to have a speech therapist that is supportive of technology use in her therapy. This therapist was willing to orientate and assist Sandra in the use of selected technology programs.

The paper examined 5 available dysphasia treatment computer programs. Tigtalk Words is an inexpensive basic tool that focuses on one type of development. Computerized Home Aphasia Therapy is reasonably priced and addresses more types of development, but is designed to be used during or after the conclusion of therapy. Aphasia Mate is a thorough program and is designed to be used along with therapy, but is very expensive. Aphasia Tutor is a motivating program which works on six types of development but offers limited lessons and exercises. Parrot software offers an internet treatment service with numerous lessons which are updated constantly. It is offered online for a monthly subscription fee, allows therapist involvement, and

provides support for its users. The paper recommended that the Rehabilitation Team be convened to consider the addition of technology programs to the therapy plan. It recommends the use of Tigtalk words to build Sandra's comfort level with technology therapy and to allow therapists to assess the benefits of its use. If the use of Tigtalk words is beneficial and shows that the client may continue to benefit from more advanced programs this paper recommends that Parrot Software Internet Treatment Service be used as a reinforcement tool by the clients outside of therapy sessions.

It is strongly recommended that Sandra's clinical psychologist be very active in monitoring and addressing her psychological needs and any depression issues. The paper recommends that Joe her husband explore technology options that may provide him with information on dysphasia and support as a primary caregiver. All of these recommendations are made with the intention of Sandra's speech therapist providing orientation and assistance. These are services the therapist has already offered and agreed to provide. This paper concludes that technology offers many assistance options to Sandra and Joe, and that with proper support it may be used as an important component of a rehabilitation plan.

Katz and Wertz (1997) work presents an initial evaluation of the use of a comprehensive computer-based language therapy, Aphasia Mate. As a pilot study, the purpose was to establish positive benefits to individuals with aphasia when Aphasia Mate was added to their existing therapy program in a clinic. The study was conducted in a university-based research-teaching clinic in London, Canada. Standard care for individuals with aphasia in the clinic involves the options of individual therapy addressing specific goals and group therapy

focusing on general communication skills and participation. Computer-based language therapy had not been employed prior to the study, and Aphasia Mate was the only computer therapy program used in the clinic throughout the study. As this was an initial exploratory study and the effectiveness of Aphasia Mate had not been established previously, involvement in regular therapies in the clinic was not withdrawn during the course of the study.

One of the aims of the work was to evaluate the extent to which participant progress was specific to certain areas, or resulted in more generalized improvements (across a range of skills). Focused areas of improvement may point to the need for a close match between identified deficits and intervention methods whereas general improvements would reflect an overall therapeutic benefit. A second goal was to examine both language and functional communication outcomes as a result of using Aphasia Mate. Ten individuals with aphasia were recruited from a university-based clinic in London, Canada. Participants met the following criteria:

- aphasia resulting from a single cerebral vascular stroke to the left cerebral hemisphere;
- at least 6-months post-stroke;
- a Boston Aphasia Severity Rating Scale score greater than 0 (1 to 5 scores);
- right-handed on self-report;
- English as primary language; and
- pass a hearing screening at 40 dB HL at 0.5, 1 and 2 kHz.

All participants except one were involved jointly in individual and/or group therapy at the clinic during the course of the study. Six participants lived in their own residence. Two

lived in nursing care homes. Participants used AphasiaMate at least one hour per week over an average of 15 weeks. Several options for using the program were offered in order to maximize use. These options included using it independently on the participant's own computer at his/her home or on a computer in the clinic, or with a trained person either on a computer in the clinic or on a laptop computer brought to the participant's home. The trained person assisted the participant with computer operation only, sometimes responding using mouse-clicks when participants pointed to an item on the screen.

The trained person included either graduate students in speech-language pathology, research assistants, or one of the authors. Each participant began the program at the first level of a recommended section or subsection and progressed to other tasks when a criterion of at least 80% accuracy over two consecutive sessions was reached. Once the recommended sections and subsections were completed, participants progressed through other sections according to this criterion. For those using the program independently, progress was reviewed via saved data records every 2 weeks. Tasks on which the participant did not receive a score of 80% or better over two sessions were highlighted on a list for the participant's reference.

It was discovered that computer-based language therapy can lead to positive changes in the language and functional communication skills of individuals with chronic aphasia. As a group, study participants improved significantly and reliably on standardized measures of auditory comprehension, and showed a pattern of improvement in naming, spontaneous speech, overall ratings of communication and qualitative dimensions of communication.

The results of the study also provided early indications as to the types of patients who can benefit from using AphasiaMate and similar programs. According to the researcher, findings also suggest that patients can benefit from using AphasiaMate regardless of their time post-onset. The researcher states that it has long been held that a patient's recovery and response to treatment is best in the early period (less than 2 years) post-onset. There was little indication in the study that the amount of time spent on computer therapy is linked directly with outcomes. The participant who spent the most time in computer-based language therapy in the study, participant 1, had a small decline in WAB AQ although showed a considerable improvement in reading and writing. Conversely, the participant who spent the least time, participant 8, had the second highest WAB AQ change. Thus, response to therapy may be linked to some other as yet unspecified variable rather than exclusively to time in therapy.

The work also demonstrates that a sufficiently comprehensive program such as AphasiaMate has the scope to provide adequate and ample therapy activities within specific domains potentially precluding the need to design individual programs for each rehabilitative goal. Crerar, Ellis and Dean, (2016) worked on impairment of word comprehension and retrieval in aphasia. The purpose of this study was to investigate the effects of the Multi-Mode Matching Exercises module of Moss Talk Words for improving word comprehension and retrieval in individuals with aphasia. Effects of training were contrasted for two treatment schedules. Five individuals with word retrieval impairments associated with aphasia participated. Two had word comprehension difficulties suggesting semantic anomia, and three others with intact comprehension had

impairments suggesting phonologic anomia. In a single-participant design, the researchers investigated effects of training provided via computer with Moss Talk multi-mode matching exercises (spoken and written word/picture matching) paired with spoken rehearsal.

According to Raymer, Kohen, and Saffell (2015), all participants participated in two phases of training administered 1–2 times/week and 3–4 times/week, with order of phases counter-balanced across participants. Results showed improvements in word/picture yes/no verification for trained and some untrained words associated with large effect sizes ( $d > 2.5$ ) were evident in one of two participants when trained 1–2 times/week. Increases in picture naming associated with large effect sizes for trained words were noted in 5/5 participants when trained 4–5 times/week, and in 2/5 participants when trained 1–2 times/week. Increases in picture naming for untrained words were evident in 2/5 participants in the more frequent training schedule. At 1 month post training, picture naming performance remained above baseline levels, with little difference evident between sets trained with the two different training schedules. The researcher concluded that computerised lexical training exercises may lead to increases in word comprehension and production, particularly for the target words trained. More frequent training leads to greater improvements during acquisition than less frequent training, but that advantage diminishes at 1 month post treatment, suggesting that a less frequent training schedule may be just as useful as more frequent training for promoting long-term effects of lexical training.

### **Methodology**

The survey instrument (questionnaire) was mixed with multiple choice, yes–no, and open-ended questions, and all items

were related to various aspects of the use of computer-based technology in language disorder rehabilitation. The choice of mixing questionnaire with multichoice question is to avail the aphasic persons the opportunity to express their feelings on the kind of therapy they are receiving and how such therapy is enhancing or otherwise their speech production. Survey questions were developed by the researchers through a review of the literature regarding current trends in aphasia management and technological trends in speech language pathology and other allied health fields. Needs assessments at state and local conferences yielded requests for training and information on integrating computers into rehabilitation for various kinds of language disorder, and a survey was determined to be a means of reaching a broader sample of speech language pathologists to identify needs and current usage patterns. The survey questions were reviewed for content validity. On the basis of their review and input, revisions were made by the authors to more closely reflect current practice patterns in medical speech-language pathology. Observation and interview were equally adopted for exhaustive collection of needed data.

### **Impairment on language structure**

Five basic areas of language impairments have been identified by scholars. These are phonological disorders, morphological disorders, semantic disorders, syntactical deficits, and pragmatic difficulties (see Tobolce. K, & Hutuleac, C. (2008); Cotton 2016).

- i. **Phonological disorders:** are defined as the abnormal organization of the phonological system, or a significant deficit in speech production or perception. A child with a phonological disorder may be described as hard to understand or as not saying the sounds correctly.

Apraxia of speech is a specific phonological disorder where the student may want to speak but has difficulty planning what to say and the motor movements to use.

- ii. **Morphological disorders:** are defined as difficulties with morphological inflections (inflections on nouns, verbs, and adjectives that signal different kinds of meanings).
- iii. **Semantic disorders:** are characterized by poor vocabulary development, inappropriate use of word meanings, and/or inability to comprehend word meanings. These students will demonstrate restrictions in word meanings, difficulty with multiple word meanings, excessive use of nonspecific terms (e.g., thing and stuff), and indefinite references (e.g., that and there).
- iv. **Syntactic deficits** are characterized by difficulty in acquiring the rules that govern word order and others aspects of grammar such as subject-verb agreement. Typically, these students produce shorter and less elaborate sentences with fewer cohesive conjunctions than their peers.
- v. **Pragmatic difficulties** are characterized as problems in understanding and using language in different social contexts. These students may lack an understanding of the rules for making eye contact, respecting personal space, requesting information, and introducing topics.

### **Language disorders and method of therapy/intervention**

A visit to a therapeutic home at Enugu justifies the need for a dual therapy in the management of language disorder. An observation of individuals with aphasia on whom computer-based treatment system was used to determine if gains in spoken language beyond spontaneous recovery was made in Enugu



therapeutic home. Results showed that verbal language performance increased after using a computer-based treatment program in therapy sessions with speech language therapists. However, this therapy was done after some significant improvements made through traditional approach. The foregoing buttresses Raymer, Kohen, and Saffell(2015)opinion that computer-based speech or language therapy software can be seen as clinical tools. The speech therapist uses his/her clinical skill (traditional approach) in conjunction with the computer, to advise and encourage the patient. Computer-based speech or language therapy software can aid diagnosis of speech or language disorders and provide visual feedback during treatment.

Analysis from the interview shows that there is no benchmark treatment for Broca's aphasia. Its treatment is personalized according to a patient's condition and needs to observe by a language pathologist. The foregoing is confirmed by the recovery attitude of Mr. Udochukwu (27years) who went through a period of spontaneous recovery following brain injury in which he regained a great deal of language function. Few months after the injury or stroke, he received treatment in traditional way hourly based on how his case was. Udochukwu could not talk at the first three years of condition but with time he has improved significantly. Mrs. Ndidi, a language pathologist at Enugu home says the patient's gradual recovery is further aided by some computer software like Video Voice Speech Training System, Aphasia Mate, and Talk-Time-with-Tucker.

Aphasia Mate consists of eight main sections containing 146 different therapy tasks and more than 1700 individual exercises. Exercises incorporate text, graphics, and video clips and work on skills including comprehension of written and

auditory material, spelling, solving problems of time and money, and classifying semantically-related items. Tasks range from a basic to high level of difficulty, so Aphasia Mate may be used repeatedly by clients from early to late stages of treatment. Talk-time-with-tucker is a voice-activated speech therapy software program that is appropriate for children from pre-kindergarten through the fourth grade. This program's primary function is to encourage vocalization in reluctant talkers. Children can make Tucker, an animated character, move and talk by speaking into a microphone. The program keeps children engaged by encouraging them to guide Tucker through various adventures. For video voice speech training system, it is appropriate for children of all ages, as well as adults. Video Voice is easy to navigate and offers complementary software updates. A child can use the various games and displays in this software to work on his or her articulation, sound production, rate of speech, and more. Video Voice is intended to be used by those with a wide range of speech disorders and related, conditions, including apraxia, hearing impairment, oral motor articulation deficits, autism, head injuries, and more.

Similarly, melodic intonation therapy is equally often applied based on the observation that aphasic patients most at times can sing words or phrases that they normally cannot speak. Mrs. Ndidi notes that this therapy started as an attempt to use the intact melodic/prosodic processing skills of the right hemisphere in those with aphasia to help cue retrieval words and expressive language. It is so because singing capabilities are stored in the right hemisphere of the brain, which is likely to remain unaffected after a stroke in the left hemisphere. But she quickly added that all these computer-induced therapies are usually

applied much after the traditional approach/skills must have been used on the patients.

The foregoing notwithstanding, evidence from the survey questionnaire which was further corroborated by the oral interview show that cost of maintenance and inadequate knowledge of computer applications coupled with appropriate usage of relevant computer software are some of the banes of efficient utilizations of computer-based therapy for the management of language disorder.

Evidence from Enugu therapeutic home suggests the following therapeutic interventions

i. Direct interventions

This focuses on the treatment of the child individually, or within a group, depending on the age and needs of the children requiring therapy and the facilities available. In group treatment, it is thought that children benefit from the opportunities to interact and learn from one another.

ii. Indirect interventions

These are viewed to be more naturalistic in approach, allowing adults that are already within the child's environment to facilitate communication. Traditionally, these approaches create an optimum communicative environment for the child by promoting positive parent-child interaction. Riches (2017) note that indirect approaches are increasingly being adopted within a range of settings where speech and language therapists train professionals and career that work with the children, and provide programmes or advice on how to maximize the child's communicative environment and enhance communicative attempts.

iii. Parents interventions

It is observed that parents are often actively engaged in delivering interventions to younger children since most intervention models target behaviours using play to enhance generalization, but tend to be less actively involved in the administration of the intervention as the child gets older.

iv. Reinforcement interventions

This intervention involves rewards of some form, most often praise. The assumption behind overt behavioural techniques is that language or speech can explicitly be taught and that gaps in the child's skills be filled by instruction. Miller (2014) opines that majority of interventions involve the training of specific behaviours like speech sounds, vocabulary, sentence structures. Feedback from our survey shows that most therapy have shifted from explicit training paradigms to those based on social learning theory which assumes that children learn most effectively if they are trained within a social context.

**Software for managing language disorders:**

According to O'Kelly (2016) there are a number of software programs manufactured for speech and language therapy. These include:

i. **Clicker 6**

Clicker 6 is a software program that can benefit children who struggle with expressive language disorder. A child can use the sentence builder grids to learn proper sentence structure. He can also use the "forced order" grids, in which he is given a sample of words to put in the correct order. Clicker 6 also offers tools for a child to record his voice. He may listen to a model

sentence and then attempt to imitate it. This software program also offers sound matching games and additional activities to strengthen a child's expressive language abilities. Children who have little to no speech may also use the program as an augmentive and alternative (AAC) communication device.

## **ii. Fast-for-word**

It is an interactive, computer-based training program that builds the fundamental language skills critical for reading success and communicating in and out of the classroom. Fast-for-Word stimulates rapid language skill development as children learn to distinguish the various components of speech. The program consists of five 20-minute training sessions a day, five days a week. Results from the exercises are analysed daily and compared with the student's progress to date. Fast-For-Word software has been adopted nationwide by Speech and Language Pathologists as a speech therapy program, now online, that improves language processing and phonological skills using self-paced exercises that work on all aspects of expressive language:

- sound discrimination
- phonemic awareness
- listening comprehension
- vocabulary
- language structure

Fast-For-Word is one of the most widely used speech and language programs in the world, because of its ability to help as follows:

- **Participation in conversation.** Improved processing improves receptive language skills, effectively slowing

conversation and teacher instruction down, making it easier to participate.

- **Significant vocabulary gains.** Because a child will be able to listen more accurately, more words will be absorbed and then used. This applies particularly to longer words and words with blends, both of which will be easier to pick up and words relating to intangibles, that without a concrete item to point to, were hard for a child with processing difficulties to pick up.
- **Improved articulation.** Improved listening will help a child hear the sounds inside words more clearly, leading to better pronunciation.
- **Conversational skills,** relating a story. Fast-For-Word can eventually help children with speech delays learn how to relate a story, in sequence and with detail. Improved listening will allow a child to improve the ability to hear how others communicate, and over time this will translate into better communication skills, although given the integration with other aspects like reasoning, knowledge, perception improvements in communication, relating a story in particular, will occur more slowly over the year or so after completing our online speech software.

### iii. Sentence-Shaper

This can help people with aphasia to create better speech, and that this effect may carry over into spontaneous speech. The program was developed for non-fluent aphasia, but the rich support it provides for speech production may be helpful with conditions such as apraxia, children's language disorders, and even fluent aphasia. And the integration of text may allow it

to play a role in reading programs. Thus the program can be used as a communication aid, a therapy tool, or both.

#### **iv. Speech Viewer III**

Speech Viewer III is a speech and language tool that transforms spoken words and sounds into imaginative graphics. Speech Viewer III increases the effectiveness of speech therapy and speech modification for people who have speech, language or hearing impairments. You can select from over a dozen Speech Viewer exercises. Each exercise responds to your voice input with immediate, clear and meaningful feedback that helps you “see how to speak.” In addition, Speech Viewer III provides animated rewards that reinforce successful responses. The software incorporates SVGA graphics, a revised menu bar format for access to clinical exercises, point-and-click capability, pull-down menus, and enhanced phoneme (a word, phrase, or sound) model creation. The program's clinical management functions automatically collect pertinent data that allow therapists to easily document progress and see and hear results. Speech Viewer III is designed to help people of all ages who have a variety of disabilities, such as speech or language impairments, cerebral palsy, developmental delay, traumatic brain injury, and speech disorders resulting from a stroke. It is ideal for professional speech language pathologists, special education teachers, teachers of the deaf, English as a second language instructors, professionals working with accent reduction and others.

#### **iv. Sight n' Sounds**

This is a speech therapy software that helps to improve articulation and word retrieval. It is useful for aphasia and oral apraxia. It displays a word and/or picture and speaks the word (using pre-recorded human speech). It records the user speaking

the model and plays back the users' speech and the model speech for comparison. The professional version allows you to enter your own words. There are different levels of use: Single syllable words, Shortwords, organised by beginning sound, Short words organised by ending sound, pictures and words for verbs.

### **Benefits of computer use in speech-language-therapy**

The existing works on speech-language therapy vary in terms of scope, the nature of the research and also the control measures recommended. The foregoing notwithstanding, some benefits of technology-based therapy have been highlighted. For instance, some computer software programs which can improve the language skills like reading and writing of an aphasic patient have been developed (Katz, 2001, and Mortley, Wade, Davies, & Enderby, 2003). The extension of computer-based therapy to treat language disorder offers increased practice opportunities that consolidate gains in language performance (Kinsey, 1986; Loverso, Prescott, & Selinger, 1992; Mortley et al., 2003; Wallesch & Johannsen-Horbach, 2004). Aftonomos, Steele, and Wertz (1997) corroborated this in their study that verbal language performance increases after using a computer-based treatment program in individual therapy sessions with an SLP.

Other studies have also reported improvement in the skills of clients with chronic aphasia following computer-based treatment programs in spoken language (Laganaro & Venet, 2001; Weinrich, 1997), in reading comprehension (Crerar, Ellis, & Dean, 1996; Katz & Wertz, 1992, 1997), in naming ability (Bruce & Howard, 1987), and in auditory comprehension (Fitch & Thomas-Cross, 1983). Studies also suggest that individuals with aphasia who were exposed to some computer software such as the voice recognition software were able to improve their functional written language skills (Bruce, Edmundson,



&Coleman, 2003).As a result of the positive effects of technology on humans, many people including persons with language disorders are now comfortable with using computers in their homes, and this may increase the intensity of their practice. Using computers at home have enormous advantages which include: decrease in the need for travel, ability to receive prompt feedback, and provision of flexibility in access modes (Kinsey, 1986; Weinrich, 1997).Computer-based home therapy has the tendency to decrease the demands placed on caregivers in implementing home programs (Wallesch & Johannsen-Horbach, 2004). Indeed, there have been a considerable improvement in the interactive aspect of computer-based treatment as a result of technological awareness and its ever-increasing availability to consumers such as aphasic persons.

### **Limitation to computer usage**

Not all clients will be receptive to using computers or will benefit from using this technology in their rehabilitation. As with any technology, a learning curve is involved, and some rehabilitation professionals are not comfortable using computers. Ethical issues may arise with computer-based treatment if speech language pathologists provide software or Web sites without appropriate clinical evaluation and teaching. No uniform guidelines for the provision of online therapy services exist, and issues such as state licensure requirements when interstate services are provided are currently being addressed.

SLPs are the driving force behind computer-based therapy and must establish a diagnosis, create a treatment plan, and design and modify computer-based tasks for individuals with aphasia (Katz, 2001; Loverso et al., 1992; Mortley et al., 2003; Weinrich, 1997). Computers cannot perform many of the skilled roles of SLPs, nor can they replace elements of face-to-face

communication or provide individualized facilitation or moral support. In some cases, computer-based activities are not motivating for the person with aphasia (Wallesch & Johannsen-Horbach, 2004), and computers may not be available to individuals of lower socioeconomic status (Egan et al., 2004; Elman, 2001). The current Internet system and most Web sites are not accessible for many individuals with disabilities (Pinkett, 2001). Elman (2001, p. 896) stated that those individuals without Internet access will in the future be “isolated and disadvantaged.” Currently, there are no standardized educational requirements for SLPs, and evidence-based practice standards have not been established.

### **Summary of findings, conclusion and recommendations**

In conclusion, the role of computers in every facet of human life cannot be overemphasized. From a review of related works, it can be seen that the computer has been employed by many speech and language pathologists in resolving all forms of language impairment. Studies suggest that comprehensive therapy programs may be beneficial for many individuals with aphasia and other language impairments, and computer-based therapy may be one feasible avenue of providing this intervention.

Findings from the survey however, reveal that the extent to which computers were used directly for treatment was limited due to lack of accessibility and knowledge, even though research supports such use as effective in improving the communication skills of individuals with aphasia. SLPs need adequate computer skills in order to stay abreast of their clients’ knowledge and to aid them in school and work re-entry. However, SLPs seem to feel that computers are helpful but not necessarily essential in the treatment of every language disorder. This perception may exist

because SLPs are confident that other methods of service delivery are effective, or because of complacency, lack of knowledge of available technology, or inflexibility. It could be argued that being able to use a computer effectively is an essential skill in a technologically driven society.

Besides, there are intangible benefits of computer use in rehabilitation, such as increased autonomy, connectedness, self-worth, and recreation. For these reasons, SLPs can confidently target the habilitation or rehabilitation of computer skills as a functional endpoint of treatment for many individuals with speech disorder. Improving the quality of life for individuals with speech impairment is the ultimate goal when implementing technology in clinical interventions.

Findings indicated that computer-based treatment of language disorder is being implemented to varying degrees and more often for supplemental and administrative purposes than for direct therapy.

With computer-based therapy, a PowerPoint presentation could be created and sent via an e-mail attachment to the teachers so that they can visualize the progress their students made within the therapy setting while utilizing technology in the form of Sound Therapy Lite. Additionally, individual teacher/speech pathologist conferences will be conducted to allow the teachers an opportunity to ask any questions concerning the use of technology in speech-language therapy. Moreover, the conferences will provide the teachers an outlet to discuss in detail each student currently receiving speech-language therapy in their respective classrooms and how the use of technology may aid in the mastery of previously defined goals. Sound Therapy Lite is a helpful tool within the therapy realm and will be utilized with all students receiving speech-

language therapy to foster positive communication skills while diversifying instruction.

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