The Development of English Phonetics through the use of ADEPT for visually impaired students

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Abstract

Through the development of Adaptive English Phonetic Tools (ADEPT), this paper aims to enhance the inclusiveness of language learning and teaching courses by giving blind and low vision students and teachers of India as a second or foreign language better access to the International Phonetic Alphabet (IPA) symbols and the sounds they stand for. Based on the efficacy of multimodal training protocols, this strategy entailed the integration of auditory and tactual information to aid the development of phonological literacy.

Keywords: Pronunciation, phonetics, braille, visually impared

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Introduction

Braille usage is also an indication to the visually impaired community that sighted society cares about their rights and needs. Presenting information and working on the widespread use of Braille helps the community feel that her values as a human are respected. Braille is personal like all language is. Having information in Braille ensures more protection for private lives. It's personal when reading an email on a refreshable Braille display. It's personal when one grabs the right credit card because it's labeled, or when fishing around in the refrigerator reading labels. It's personal when a letter arrives typed in Braille. It is personal in the simple act of reading a book. Even for children, reading on their own is a special pleasure that shouldn't be denied to them. Literacy helps stimulate children's learning abilities, their imaginations and creative skills, and helps them communicate in the language they'd use in their everyday lives.

In order to learn Braille, a variety of techniques, technologies, and learning aids are becoming increasingly popular. They can be as straightforward as LEGO's Braille Bricks, which attempt to teach children with visual impairments how to read Braille by forming a letter, number, or math symbol in Braille with tactual symbols. As a result, children who are visually impaired can benefit from self-learning, multimodal, interactive, and gamified learning materials. Technology has the capability to empower the individual learner. This amounts to a paradigm shift in Braille learning because educational tools may both support independent study and benefit from group instruction. As a result of such technology's relative portability, more resources can be employed in the classroom with less equipment, minimizing the need for cumbersome numbers of Braille texts by integrating all aspects of Braille learning, such as reading, writing, and typing, onto a single platform. It is a multifaceted learning method that aids in avoiding the drawbacks of the current teaching and learning paradigms.

However, working together with instructors will be necessary to fulfill these programs' full potential. The teacher's job can evolve; they no longer have to control the student but can instead support them as they travel the path of learning instead. These interactive learning paths of learning dynamically enable the student to steer their own learning thanks to multimodal technologies that integrate audibility and tactility. These teachers don't need to get further training on the new technology since they are intuitive enough to concentrate on creating effective pedagogies and managing the classroom as a whole.

For the purpose of both the broad study of language and, more particularly, the advancement of phonological literacy among language learners and teachers, it is essential to have a working knowledge of phonetics (how speech sounds are formed, transmitted, and perceived) (Hardison, 2014). Phonetics should be taught in classes that emphasize English as a foreign language with the same emphasis as other linguistic components (EFL). The researcher is aware of the limited selection of pedagogical resources available to teach phonetics to EFL learners .As a result, it became crucial for me to think about the design of potential strategies or tools for pedagogical purposes, emphasizing in particular the need to create didactic materials based on the Universal Design for Learning (UDL) guidelines from the Center for Applied Special Technologies (CAST, 2018) for all learners, including those who have visual impairments and may not have easy access to a dictionary or multimodal

resource for phonetic symbols. Adaptive English Phonetic Tools (ADEPT), which may be utilized in a variety of inclusive educational environments, were developed to fill this demand.

This is a crucial component in the researcher's personal and professional lives. The researcher believes he has the experience and knowledge to provide the visually impaired community, in particular, and all English language learners, in general, with the necessary access to this linguistic component through new tools to facilitate the production and perception of American English sounds. The researcher is blind and a research student in English literature. Given that the bulk of currently available mainstream tools for learning English frequently rely on visual content that is not genuinely accessible to them, this application will enhance the English learning experience for the community of people who are visually impaired. ADEPT can fill many gaps in the EFL classroom in Tamilnadu, India, as well as in a variety of visually impaired communities, based on his experiences as both an English teacher and student. This will enable these students to develop more easily in their oral skills and become more aware of their own language.

Literature Review

Wells-Jensen (2005) provided a summary of numerous potential methods, such as the usage of IPA Braille, to help the blind read and write IPA symbols (Englebretson, 2009)

One existing set of tactual phonetics-related artifacts was found through a web search for inspiration. A tactual IPA magnet-board system was created by Lillehaugen, Echavarra Moats, Gillen, Peters, and Schwartz (2014) to help visually challenged pupils learn phonetics and phonology. They took the initiative to create comparable materials for phonetics after noting that tactual magnetic classroom tools had been created some time earlier for the study of chemistry (Supalo, Mallouk, Rankel, Amorosi, & Graybill, 2008). This was created to enable users to reposition the puzzle pieces on a magnetic board. The authors proposed the creation of comparable technologies for use in many industries, such as language training.

In order to create a welcoming environment that will increase the motivation of impaired students to learn foreign languages, collaboration between academic and library personnel, as well as other students, is crucial (Orsini-Jones, Courtney, & Dickinson, 2005).

Both the blind participant in the study and the other students in the class had generally positive experiences, according to Orsini-Jones et al. However, there were some accessibility

problems with other websites and databases that were found. The authors stressed the importance of include feedback from a user who is blind or visually impaired in academic programs in order to comprehend some of the limitations and difficulties of website access and general assessment procedures. Information from the class was recorded for your convenience. Orsini-Jones (2009) suggested encouraging blind students to improve their Braille reading in both their mother tongue and the foreign language they are learning.

When combined with auditory data in either a noisy or clear environment, manual tactual information from placing a hand on a speaker's face permits precise syllable identification (Sato, Cavé, Ménard, & Brasseur, 2010).

In addition to including multisensory input in speech learning, it's crucial to keep in mind that L2 speaking skills development takes place in a communicative context, particularly when L2 learners are involved and communication is interactively co-constructed during conversational interaction. When communication breaks down, there is a negotiation for meaning that leads to changes in speech so that the other person may understand what is being said. This is how interaction-based learning happens (Gass & Mackey, 2015).

Qaisar, Saeed (2019) Comments on the recent technological advancements are focusing on developing smart systems to improve the quality of life. Machine learning algorithms and artificial intelligence are becoming elementary tools, which are used in the establishment of modern smart systems across the globe. In this context, an effective approach is suggested for automated text detection and recognition for the natural scenes.

Spungin (1996) examined the problems with and potential causes of braille illiteracy. She asserted that the decreasing use of braille could be attributed to the stigma associated with blindness and as a replacement for braille, there is a growing emphasis on using residual vision and technological advancements, particularly speech output (see also Miller, 1999; Spungin, 1989; Troughton, 1992). According to Sullivan (1996), assistive technology may help people with visual impairments (for instance, a computer's audio output is typically faster than its braille output), but using audio output instead of braille may cause a significant delay in the development of literacy skills and even lead to an increase in illiteracy.

Beers (2003) asserts that better word recognition results from better spelling, which aids pupils' decoding skills and, ultimately, comprehension. As a result, spelling is one of the literacy elements that is crucial to students' learning and comprehension.

Methodology

A small group of visually impaired students was chosen through a quasi-experimental design to study the relationship between the use of the Braille system and the English language reading for specific information subskill, where the text is manipulated with greater precision because it aims to obtain specific information like phone numbers, names, and addresses and learners don't need to read the entire text.

Discussion

The Tactual IPA Magnet-board System (Lillehaugen et al., 2014) is suggested in this paper to help visually challenged pupils with their pronunciation skills. The following changes are made to the design of the tactual materials: Each object would be larger to make it easier to manipulate, each would have vital information included with the symbol to aid in learning and memory recall, and each would have some kind of reference directing visitors to a companion website for further details on the sounds and audio recordings. Based on these adjustments, many alternatives for object size and information kind can be tried before a choice on the features is made. Tactual method will support the suggestions made by Orsini-Jones (2009) and maintain Braille notation as part of its input to learners in the design of the symbol cards in order to accommodate a range of learner backgrounds, ages, learning styles, and educational contexts (The National Federation of the Blind, 2009). For example, a card was prepared for each voiceless aspirated stop (e.g., the first sound in pet, top, and catch), the flap (e.g., the medial consonant sound in city), r-colored (rhotacized) vowels (e.g., bird, teacher), and each diphthong (a si). Additional cards could be created based on the difficulties that some frequently occurring sounds present for many L2 English learners, including native Tamil speakers (e.g., buy, loud, toy). In accordance with Ladefoged and Disner (2012), the front and back mid vowels (i.e., [e] and [o]) were likewise regarded as diphthongs).

The students must listen to Consonants and Vowels to audio recordings of each sound. Typographical description, sequence number (which corresponds to the number on the symbol card), phonetic symbol, examples of words (in standard orthography) in which the sound occurs, and the IPA articulatory description of the sound are all displayed on the screen for each sound file. A more pedagogically focused discussion of how the majority of the vowels is produced is also included in the files for those vowels. Each recording starts off with the symbol's name. Each consonant is created in two brief vowel-vowel sequences, followed by a

number of words that contain the consonant. Each vowel is created independently, and the words in which it appears are all followed by that vowel.

Additionally, click the link "IPA in Braille" to learn the Braille sign that corresponds to each sound. The International Phonetic Alphabet (IPA) symbols for its English acronym must be covered in detail .

The tactual method is developed as a technology tool to support the development of a didactic tool composed of 45 tactual cards that enables blind learners to detect the shapes of the IPA symbols related to American English. Each tactual card includes the spelling of each symbol and its Braille equivalent, a description of the typeface in print and Braille, and a serial number that lists the cards in the order in which the data on this page appears for each card.

The following three situations that can be experienced through tactual methods can be training are good examples of those that suggested a positive effect of using the adaptive IPA symbols.

a.Representation: The students had little trouble recognizing the materials. The layout was entirely usable. Some of them could read the Braille notation, and they could feel the symbol cards and identify the figure's shape. (Network for Recognition)

b. Expression: Using a very flexible and controllable material, the students could design their own phonetic symbols (i.e., the pipe cleaners). They might use their hands to mimic the figure's shape and touch the symbols of their peers. They were able to include ideas from the tactual cards as well as their own creations in this way. (Network strategically)

c. Participant interest: Right from the start, the participants showed a strong desire to study the shapes of the symbols and model those shapes using different materials. They weren't all equally skilled with their hands to model the shape with pipe cleaners, but they were all eager to participate. (Emotional network)

Conclusion

All students receive a comparable approach to language instruction. When using effective materials and teaching strategies in an inclusive ESL or EFL classroom, disabilities are not a barrier to language learning. As well as cooperative learning environments and the process of empowering learners by providing them a genuine sense of the purpose of learning another language, multisensory input—whether a combination of auditory, visual, and/or tactual—enriches language acquisition. It's significant to note that the training allowed the study's

participants to take part in an empowering process. Their lists of recommendations, remarks, and thoughts led me to believe that they had discovered in this study not only the chance to learn about phonetics but also the understanding that, with some curricular modifications, they may discover other sorts of knowledge. They demonstrated a genuine desire to learn throughout the study by actively participating and showing a lot of excitement. With the aid of quality resources and training, the learning process in this instance was clearly successful. Every language instructor can promote in their classes the value of phonetic study to enhance oral proficiency in any language and the significance of cooperative learning to incorporate a genuine inclusive learning environment.

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