Satellite Meeting - Reference and Information Services & Information Technology Sections:

*Innovation and the User Experience: Evaluating and Implementing Discovery Systems*

**Words in Vision: A Filipino Sign Language Thesaurus Management System Using Ren-py**

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Abstract

The development of technology has been continuously and constantly growing all over the world, most of which have focused on the improvement of communication. Communication is known to many as a way of expression either through words or actions. These words and actions vary in different places and cultures around the globe, but they usually have unique features to distinguish one from the other. However, communication, though it may seem a general feature in society, still has different types: verbal, nonverbal, written and visual. The most common communication type that the majority of the population of the world use in their everyday lives is through a combination of verbal communication, that is to be auditory and is oftentimes conveyed through the use of languages uttered by the voice, and nonverbal communication which is delivered through the use of gestures and body language. There are several more mixtures of these communication types that people may use, while on the other hand there are groups of people who are not able to use more than two of these types.

A popular communication channel built solely on gestures is known to many as sign language. It is the kind of language that is directly associated with people who are deaf and mute. Findings published in the world health statistics 2015 by the World Health Organization state that as of 2015 about 5%, approximately 70 million, of the world’s population being deaf and mute only a fraction from this number know how to communicate well using correct sign language. Sign language is a universal type of communication that grants mute and deaf people to state the exercitation of their intellect. This communication not only limits to people who are differently abled but also to people who can use verbal communication but choose also to learn sign language to understand and communicate with people who are deaf and mute.

The history of sign language traces back to the 17th century when Juan Pablo Bonnet created the first sign language dictionary that also contained the first sign language alphabet. This led to the creation of sign language schools and the development of different kinds of sign languages around the globe. The most popular form of sign language is the ASL, American Sign Language, which emerged from the creation of different schools for the deaf in Europe and opened the first of its kind in the United States of America in the early 19th century. At present, there are more than 200 types of sign language around the world. The development is as natural and continuous as spoken language, which progresses through interaction.

The technological advancement of communication at present does not give too much attention to this nonverbal form of communication. There are still some countries who are just placed in the position to choose from the current list of sign language types rather than creating their own type of sign language that should represent their own culture and language. The lack of resources in some countries hinder them from creating their own sign language and from being educated more about it. The lack of education affects the deficiency of its technological progressions. The Philippines is an example of a country that is still at the starting point of the FSL or Filipino Sign Language which originated from and mostly adapted the ASL. The development of the FSL paired with technology may significantly contribute to the knowledge, information and learning of this group in society.

The implication of this study is to develop a content management system that desires to shell out facilitation to mute and deaf people in the Philippines. This study will connect and project the importance of technological development of communication for those who are deaf
and mute. The use of Ren-py, a visual novel engine, will be the platform to create a Filipino Sign Language thesaurus that can be accessible to its users through different computer devices. Ren-py is a widely used platform that enables its users to easily alter script languages to create certain programs that are very user-friendly. This method is intended to gratify convenience to the congenital defects of the said group of people. Its design targets to recognize the cornerstone of having a more straightforward and more manageable application. The ease of access paired with learning may hopefully lead to a greater advancement for the education of the deaf and mute. The click of a button may introduce them to better communication with each other.

Keywords: Sign language, Ren-py, Filipino Sign Language, mute and deaf, visual novel engine, sign language thesaurus

Introduction

“The most important thing in communication is hearing what isn’t said.” (Peter Drucker)

Communication is an essential part of being human; we communicate to learn and to understand. It is most common to link communication with speaking, hearing and listening as it is the most known way. However, there are various forms of how an individual can communicate, either through verbal communication, written communication or nonverbal communication. Among the three stated forms of communication one that is used by the minority is non-verbal communication. This type of communication is often used by people who are differently abled, those who have either or both a disability in hearing and speaking. The creation of a channel for non-verbal communication is through the use of sign language, defined by the Cambridge Dictionary as “the system of hand and body movements representing words.”

In a study conducted by the World Health Organization in 2015, about 5% or approximately 70 million of the world’s population are deaf and mute and thus these are the people who mainly use non-verbal communication. Also, according to the same study by the World Health Organization, only a fraction of the total number of the deaf and mute can communicate through proper sign language. Various types of sign languages were created from nation to nation, but it is the American Sign Language that goes an extra mile to continuously develop and become a basis for the other languages. The creation of sign language in every country is based on their own dictionary of words, considering their languages, culture and dialects. Michelle Jay explains in her article, “There are different sign languages used around the world. They have all come about because of the necessity for the language, communication, and education of deaf people. Sign language has been created due to a natural process and the fact that it is the natural language for the deaf.”. However, the common denominator always falls back to the translation of their national language to the American Sign Language as a universal point of understanding throughout the globe. The creation of each unique sign language is very tedious as there are a lot of considerations to be made; also the incorporation and education of it to the concerned community is another factor to consider. Hence, there are not that many official sign languages around the world.

The Philippines is an archipelago built on different languages arising from about 81 provinces around the country. Having just one national language, which is Filipino, alongside more than a
100 more languages and dialects across the country, makes this a broader platform in creating and strengthening Filipino Sign Language. For this study, the researchers have chosen to focus on the national language of the Filipinos which is used and understood by more than half of its total population. As of the year 2009, a total of about 517,000 people are part of the deaf and mute community in the Philippines. The same setting in the international scene, discussed in the previous paragraphs, also apply in the Philippines. The deaf and mute communities more often than not lack education in the proper use of sign language. Looking into this specific community in the Philippines, the researchers came to find that the absence of proper training and knowledge on sign language results to individuals creating their own signs to communicate with their family. They exclaimed that the creation of their own sign language results from these factors: (1) illiteracy of both individuals with disabilities and their families, (2) lack of education and support, (3) poverty and all the problems that fall under this factor. As for those individuals who are able to overcome the factors mentioned above, they are educated with the most popular type of sign language, which is again the American Sign Language.

The involvement of the government with Filipino Sign Language is engaged through House Bill 6428, which proposes to declare Filipino Sign Language as the National sign language of the deaf and mute community in the Philippines. It passed its second reading in the Congress last March 2016. Representative Antonio L. Tinio stated in a 2016 interview published on the Philippine Congress official website, “The FSL, a natural sign language indigenous to the Filipino deaf community, has its own grammar and linguistic structure. FSL is learned without effort from interactions of Filipino deaf children with other deaf children and the deaf community”.

The situation of deaf and mute people in the Philippines presented above became the motivation of the researchers to be pioneers in developing a Filipino Sign Language Thesaurus using an online application as a platform that could help these people learn and better understand the sign language. A thesaurus is defined as “A book of synonyms and near-synonyms in a written language, usually arranged conceptually, although dictionary arrangement is not uncommon.” (Reitz, 2004). Though it would be tremendous to be able to create a Filipino Sign Language, it is indeed very difficult and laborious. As a starting point, the creation of a Filipino Sign Language thesaurus may be a great start for further development of it in the future.

However, this does not solely focus on people who are deaf and mute. Researchers believe that for one to learn a certain thing, one must teach him or her. In this case, this study also aims to teach the people who are part of the environment of the deaf and mute community, highlighting their parents or people who are in their household. Education begins at home and the continuous support of the household can play a big role in the development of an individual. People who are also interested in learning sign language may also benefit greatly from this study.

**Motivation**

One of the skill of a librarian is to create thesauri and this study creates an avenue for librarians to share skill and knowledge with the community. We created a sign language thesaurus in this study and made it available in an application providing easy facility to mute and deaf people in the Philippines. Our study also connects and projects the importance of technological
development in communication for the society of the deaf and mute, who are sometimes marginalized in terms of technology provisioning. The platform that our study uses further focuses on the creation of the Filipino Sign Language thesaurus that can be accessible to its users through different computer devices reaching the Filipino community. We wish to alleviate the congenital defects of the deaf and mute people through the application that this study built. The ease of access paired with learning may hopefully lead to a greater advancement for the education of the students who are deaf and mute and the click of a button may introduce them to better communication with each other.

**Background of the Study**

*Cognitive Conditions of Deaf and Mute People*

People who are completely deaf are not capable and will never be adequate to fully comprehend spoken language (Hiskey, 2010). It is difficult for their brains to penetrate spoken language, that is why sign language is the most appropriate instrument that will cater to their needs. As it is explained, it is nearly not possible for the deaf to obtain an “inner voice” which allows the brain to acquire and comprehend information. This is in connection with the study that the researchers must know how people who overcame their disability and learned sign language, specifically those who built their own vocabulary in their younger years, cognitively processed by relating the sign languages with the things they just see. Which in turn in their older years, they learn how to speak out the words they formed through sign language. One example is the child of Mrs. de Guzman, a co-author, who can speak out words she learned using the help of the sign languages she acquired. Learning sign language is one thing, but learning how to speak the words you learned through sign language is another thing. Not everyone who knows how to use sign language can also speak the words they know.

The article written by Adams, C., & Malvern, C. (2003), depicted that deaf people recognize the perception of sign language regardless of the language spoken in the country. There are certainly different methods of communicating including through verbal or body language. On the other hand, signs and symbols can be gained by personal exertion without any difficulties which anyone can learn as a child, especially the deaf and the mute. With regard to the those who are capable of hearing, it is more difficult for them to perceive what deaf people do as their brains perceive divergently (Adams & Malvern, 2003). So, in another way, gestures are significant when processing information. It is also mentioned in the article that what deaf people widely used is the American Sign Language, also known as Ameslan or Sign.

*Sign language in the Philippines*

In a 2010 study by Maria Veronica Templo Perez, it is demonstrated how De La Salle-College of Saint Benilde offered services to deaf people. Deaf people are able to obtain equal education with high quality through the usage of Filipino Sign Language. As it has been mentioned above, access of deaf and mute people to learning sign language is often limited. Thus, most of them
cannot proceed with their studies because the services for people with disabilities are not widely available. This study specifically aims to help deaf and mute people, especially those who are part of the marginalized sector who have limited or no access at all to education in general, to provide them an application that they can freely and easily access.

Although FSL has been challenged to be declared as the national sign language of the Filipino Deaf and the official language to be used in all government transactions, positions and supporters are not stopping to push for the Filipino Sign Language Law. This bill includes a provision to use FSL as medium of instruction in Deaf Education. This is because Philippine Department of Education (DepED) is using American Sign Language and Sign Exact English in schools. The law aims for the shift from ASL to FSL and provisions the needed retraining and retooling of teachers as well as redeveloping the curriculum and instructional materials.

**Teaching and Learning sign language**

Mckee, D., & Woodward, J. (2014) wrote a book where it is explained that teachers should have more in depth programs and trainings in regard to their sign language teachings. Two programs are established to be able to reach the targets: the Asia-Pacific sign linguistics and the Certificate in Deaf Studies: Teaching New Zealand sign language. These programs aim to provide higher education for For the communities, or the people who teach them. This book explains that thorough and continuous learning and development is necessary in teaching sign language. Mrs. de Guzman, on of the co-authors, has undergone a lot of trainings and seminars to fully grasp how sign language works and how it should be taught to other people, specifically those who have disabilities.

**Scope and Limitations**

From the less than a million deaf and mute Filipinos, the researchers have chosen to focus on a group of deaf and mute students from Amang Rodriguez Elementary School of Malabon City. This was chosen directly by Mrs. Lederma de Guzman, a co-author and Special Education Teacher in the said School, Malabon III. Mrs. de Guzman has been devoted to learning about and teaching children with hearing impairments as too she is a mother to a child who is part of this community.

In 2007, Mrs. de Guzman was offered a scholarship for “2007 Summer Training Programs for Teachers of Children with Hearing Impairment, Mental Retardation and Learning Disability” by the Department of Education in the Philippines. This paved the way for the Amang Rodriguez Elementary School to offer education to children with special needs. Daily classes have been conducted by Mrs. de Guzman alongside one-on-one sessions for children with multiple disabilities. After a decade, the school has successfully had 5 elementary graduates and 5 more are now attending regular classes with supervision. And at present, the school has 21 pupils enrolled with different hearing impairments who are taught in one class.
For this study, a total of 11 students were taught and given the chance to use the Filipino Sign Language Thesaurus application made by the researchers. Each participant had signed consents from their parents and/or guardians to participate in this study. The confidentiality of their individual identities are stated in the waiver given on the Usability Testing (see Appendix A). These participants have different hearing disabilities, a mixture of either severe or profound hearing loss. They are ages between 6-20 years old but have different cognitive developments which are usually lower than their physical age. It is explained by Mrs. de Guzman, a co-author who has been a Special Education teacher since 2007, that hearing impairments have a great impact on the cognitive development of each child (Lange & Thompson 2006). The lack as well of education and literacy play a great role in the delay of learning.

The Challenge

Learning sign language is not an easy process. It takes a lot of time and effort to fully understand how sign language works in communicating with other people. This effort should start within the members of the household of the individual who is deaf or mute. This exhibited a challenge for the researchers in reaching out and explaining this importance to the concerned family members. Researchers found out through Mrs. de Guzman, that this is indeed a big challenge because of the level of illiteracy within the household itself.

This is in connection with another challenge - poverty. In this case, some of the participants of the study are part of the marginalized sector of the community who do not have much means to fully give attention to both health and education. Thus they tend to depend on the services provided within their specific municipality which usually does not fully cover the necessities of a person who has hearing impairments. The delay in medical attention makes it more difficult for the individual to cope with learning that may or may not be provided to him/her.

Another challenge for the researchers is the introduction of the Filipino Sign Language as the medium used in the application developed. This became a challenge because most of the students who participated in the study are exposed in the American Sign Language and it is rare for them to use the Filipino Sign Language inside their classrooms. Thus, it will take some time for the participants to cope and adapt to the new language medium that is introduced in the application.

Below is the framework that exhibits the initial status of language learning for the deaf and mute community in the Philippines. It demonstrates the difficulties of the students who are deaf and mute encounter considering the factors that prevent them from attaining the end product of learning correct sign language.
At an early age, students who are deaf and mute are forced to develop their own vocabulary to be able to communicate. Aggravating the circumstances when immediate family has not recognized the disability early and leads to untoward incidents causing behavioral problems (Lange & Thompson, 2006) to the students who are deaf and mute. Nonetheless, their own sign language is what these students who are deaf and mute students have to express themselves and be understood. Upon recognition of the impairment, which in most families happens very late (Davis & Carr, 2014), family household start to study the individual sign language created by the deaf. In a few fortunate cases, an interpreter may bridge the sign language to ASL translation. The predicament faced by the deaf who are taught ASL is when they try to practice it and apply in their household. Some are illiterate so reading is not even a platform to exchanges of learned words. Learning a foreign word is seldom another block in the communication.

Figure 1 is the conceptual framework of this study. It shows the direct translation and understanding of words from individual sign language to the Filipino Sign Language. In this process, the individual sign language words are translated and understood by the deaf in Filipino which the household understands. In this way, the continuity of the learning is observed without having to teach the individual the ASL.

Figure 2. Process of learning the sign language in the Philippines using the FSL Thesaurus.
Methodology

Thesaurus Construction

Thesaurus is define as the vocabulary of a controlled indexing language, formally organized so that the a-priori relationships between concepts are made explicit (Aitchison & Clarke, 2004). For diverse vocabulary of language interpreting from one to another, collation of various meanings of words, and to build contextual relationship among words, a thesaurus is a necessity. In addition, Filipino is multilingual and multi-dialectical whereas English is predominantly utilized in speaking and written communication. Subsequently, ASL is the only sign language used in the Philippines. It is an existing reference for the deaf and mute community that can be interpreted and connected through the Filipino Sign Language. The translation of ASL to FSL is the capability and the power of the thesaurus.

This study considers Jessica Milstead’s top-down method - guidelines specifically for use on the American Society for Indexing website. This will serve as the theoretical framework of the study for the thesaurus construction. Below are the machinations of the said framework:

• Convene a group of subject experts to decide on the scope and broad categories of terms to be included.

• Use existing dictionaries and thesauri to decide on the terms and their relationships.

• Review and organize the preliminary term set; decide on preferred terms and make use of references from the variants and synonyms; build hierarchical and associative relationships among the preferred terms.

• Produce a draft thesauri, conduct recording of videos and usability testing, and revise to obtain final version of thesauri
This study applied the application development lifecycle through the utilization of the FSLT Application Development Framework shown in Figure 3. Presented below are the stages of the framework and the steps that this research executed.

Stage 1: Planning

A. Identify problem and objectives

Inspired by Mackinnon’s (2015) study which created digital Jamaican Sign Language Dictionary using a R2D2 approach, the authors longed to create a Filipino Sign Language thesaurus. Further investigation was done to see if there is an existing FSL. However, the exploration revealed that at present there is no existing FSL thesaurus. Therefore, authors faced the following challenges:

- ASL has no Filipino translation for sign language
- The difficulty in learning sign language by the Filipino deaf and mute community
- The prolonged cycle of learning sign language
- Thesaurus from ASL to FSL is constructed which gradually built the foundation of FSL vocabulary. Researchers aimed to develop an interactive application in learning the FSL.
B. Inventory of resources

The interest to create an interactive application was done through the use of a visual novel engine. The ease of development and access paired with the convenience it supplies to the users make it the best platform for the chosen participants. Key people involved were identified.

C. Formulate and evaluate alternatives

Video recordings were provided and the need for auditory platform was contemplated in order to cater the full potential of the application. Wordings and instructions are supplemented as basic features. Modes of assessment were added to highlight the outcome of learning.

D. Draft of the plan

A series of meetings was conducted to formulate action items, timelines and scope of the development of the application. Frameworks were designed, alternatives were presented, and application development processes were identified.

Stage 2: Research Design

A. Action Research Design

The study used action research design where researchers discovered ways to improve how Filipino communities address issues of being deaf and mute in their communication.

B. Thesaurus Construction Framework

• Convene a group of subject experts to decide on the scope and broad categories of terms to be included.

Filipino Sign Language professionals in the Philippines were tapped, namely: Ms. Julia Luz Miralles a sign language interpreter of Church of God International; Ma. Joy Enverga of Philippine Registry of Interpreters and Ms. Lederman de Guzman a co-author and Special Education (SPED) teacher focusing on deaf and mute students in Amang Rodriguez Elementary School Malabon City. Thorough discussion was carried out to define the scope of the thesaurus construction and application development. Consultation also took place amongst the educators from School of Deaf Education and Applied Studies of De La Salle-College of Saint Benilde to facilitate further comprehension of the issue.

• Use existing dictionaries and thesauri to decide on the terms and their relationships.

The experts were using ASL in their educational instruction. Therefore, vocabularies of ASL are the existing dictionary used to build words and word relationship in FSLT.

• Review and organize the preliminary term set: decide on preferred terms and make use references from the variants and synonyms; and build hierarchical and associative relationships among the preferred terms.
The use of Filipino Sign Language (FSL) has been a challenge as per Ma’am Lederma. Aside from the fact that it is not yet being used, her training is in ASL. She had a lot of attempts in trying to create and develop FSL instructional modules and materials that will aid her in her instruction and teaching however she had only taken an initial preparation and some manual video recordings. She was hoping that in institutionalizing FSL, training and retooling will be provided by the Philippine Government as well as funds in developing curriculum and instructional materials.

This study developed the thesaurus for FSL which started the classification and taxonomies of Filipino words. It considered the cognitive age of the students which is of kinder level even though their physical age ranges from 6-20 years old. The question of understanding the words in FSL which is taught in ASL is considered in the use of the FSL thesaurus. FSLT formulated the equivalent, associative, and hierarchical relationships of terms and translations in Filipino from ASL that the interpreters knew.

The following below are the guide questions this thesaurus construction followed:

1. What are the words that can be translated in FSL?
2. What existing standards and controlled vocabularies can be used for the translation?
3. What are the relationships of the words ( equivalent, associative, and hierarchical relationships )?
4. Which of the words are going to be included in the terminologies of the FSLT application?

FSLT application will serve as an interactive tool for reference purposes. It will help in vocabulary search for sign language and vice versa - sign language to fingerspell words. For greater purpose it supports the House Bill 2049 declaring FSL as the national sign language of the Filipino Deaf and the official language to be used in all government transactions. By this, it aspires to strengthen the use of FSL.

Figure 4, shows the storyboard that plotted the concept into terms, variants and synonyms. It also formulated initial words of FSLT. They were analyzed using natural and controlled language, two indexing language devices. Terms are then grouped into broad categories. Categories were deduced by identifying sub categories per area and created a 4-level node of hierarchical terms and associative terms. Below are the categories of the terms based from the areas of basic and foundational human interaction.

- Ang Alphabetong Filipino (The Philippine Alphabet)
- Bilang 0-20 (Numbers 0-20)
- Mga Hugis (Shapes)
- Mga Kulay (Colors)
- Mga Panahon (Weather)
- Mga Hayop (Animals)
- Mga Salita (Words)
  - Ang Aking Pamilya (My Family)
  - Ang Aking Paaralan (My School)
    - Mga Tao sa Aking Paaralan (People in the School)
    - Mga Lugar sa Aking Paaralan (Places in School)
    - Mga Gamit Ko sa Paaralan (My Things Used in School)
- Bahagi ng Aking Katawan (Parts of the Body)
  - Mga Pagkain (Foods)
    - Mga Prutas (Fruits)
    - Mga Pagkain sa Kusina (Food in the Kitchen)
  - Mga Magagalang na Pananalita / Pagbati (Respectful Words / Greetings)
  - Maliligo Ako (Taking a Bath)

**Figure 4.** Filipino Sign Language Thesaurus Storyboard

- Produce a draft thesauri, conduct recording of videos and usability testing, and revise to obtain final version of thesauri

FSLT produced 56 characters for the Philippine Alphabet, 152 words, 10 clusters or areas, 5 sub areas and 3 sub sub clusters or areas. It also produced 226 recordings of FSL paired with character, words and sounds.

One FSL signer who is deaf and mute recorded the sign language of the words formulated for FSLT. Subsequently, videos were uploaded along with audio recordings of the words in Filipino. This molded the thesaurus that is manifested in the application. A distribution package was extracted for the purpose of usability testing. Feedback was collated and analyzed. Revision was done to the application to account for suggestions, comments and recommendations.

**Stage 3: FSLT Application Prototyping**

There were two methods executed 1) implementation of the thesaurus construction top-down method and 2) prototyping process below:

- Ren-py training

Ren-py, a visual novel engine is used to create FSLT. It is a widely used platform that enables its users to easily alter script languages to create user friendly programs that can be accessible through different computer devices. The researchers attended a training for Ren-py in the University of the Philippines-Diliman. They were taught techniques that they were able to apply in the creation of the FSLT.
- Storyboarding was performed to outline the navigational interfaces of the FSLT application.
- Audio and Video recording capture the representation for the FSLT.
- Coding and Prototype developed the FSLT application.

**Stage 4: Evaluation**

To validate and verify the FSLT application usability testing was conducted. See Appendix A for the Usability Testing - test procedure and test case. Feedback analysis was performed. Results were presented in graphs and level of satisfaction was measured.

**Stage 5: FSLT Application Development**

The creation of the Filipino Sign Language Thesaurus is through the desktop application, Ren-py. See Figure 5 for the screenshot of the Filipino Sign Language Thesaurus Application. Ren-py is a visual novel engine that can be easily accessed by users through different computer devices. It is the importance of the single click of a button that leads to unlimited learning that makes this application very useful. The researchers attended a training for Ren-py in the University of the Philippines-Diliman. They were taught techniques that they were able to apply in the creation of the FSL thesaurus.

![Figure 5. Filipino Sign Language Thesaurus Application Opening Page](image)
The researchers recorded different sign language videos of vocabulary words grouped into different modules as shown in Figure 6: The Filipino Alphabet, Filipino numbers from 1-10, Colors in Filipino, Shapes in Filipino, Simple Filipino Greetings, The Filipino Family, Filipino body parts, The Filipino school and additional Filipino food and drinks.

This was then embedded in the codes of the Ren-py application. In every specific page, there is a video with a Filipino voice over of the specific word along with the written word itself. The incorporation of the Filipino language comes hand in hand with using a Filipino native speaker in the voice recording. The value of the culture of the Filipino language is projected through these specifications.

The researchers conducted an assisted usability testing, where each participant was given 10-20 minutes to experience the application. The specific module of four different shapes in the Filipino language was presented to them. During the learning process, the researchers observed and recorded the behaviour of each participant. After this learning process, a short quiz were given to them to answer. There were two parts of the short quiz, the first part was the practical part wherein the shape and name of the shape were displayed then the participant was asked to present the shape in sign language and to fingerspell it as well in the Filipino language. “Finger spelling, also known as dactylology is manual representation of written letters according to manual alphabets which in turn are based on the standard alphabets. Representation of the letters with hand movements is a part of sign language of the deaf communities worldwide.” (Sign Community, 2013).
The second part was where the participants were presented the video with choices displayed on the screen, and each was asked to choose the correct Filipino word for the specific shape. Both the practical and multiple-choice quizzes were used to evaluate the level of memory and understanding. A feedback form was provided to them to gather their insights about the usability, display and level of satisfaction. Comments and suggestions from both the participants and their parents were also taken note of after the experiment.

Presentation of Data

The researchers conducted a test run of their assisted usability testing during the first Sunday of May 2017. This was done in the SPED classroom of the Amang Rodriguez Elementary School in Malabon City. There were 11 students out of the 21 pupils of Mrs. de Guzman who participated in the study with full consent from them and their parent/s.

The charts below present the basic information of the 11 students that participated in the study.

Figure 7. Filipino Sign Language Thesaurus Application - Quiz

Figure 8. Distribution of the sex of participants

Figure 9. Age of the participants
Among the 11 participants, 2 (18.18%) are male and 9 (81.82%) are female. The percentage of each sex does not affect the results of the study because the study is focused on the level of understanding and satisfaction of each. The availability of participants during the testing was beyond control of the researchers.

Figure 8 presents the different ages of the 11 participants. 27.3% of which or three students are 10 years of age. The diversity of ages presents how the issues of education for the deaf and mute community at present. Not all were given education at once at the right age. The results in Table 2 do not affect the results of the study but are seen as a basis for recommendation for the future development of the Filipino Sign Language thesaurus.

After the testing, the students were asked for their feedback about the interface and their satisfaction. Below are the data gathered from the 11 participants.

**Figure 10.** Satisfaction rating of the participants

**Figure 11.** Interface and usability rating of the participants

Out of the 11 participants, Figure 10 presents a 100% satisfactory rating. This positive feedback has resulted in further development of the FSLT using the Ren-py application.

Figure 11 exhibits again a 100% positive feedback with regards to the application itself. The usability, ease of access and display were very satisfactory for the 11 participants.

**Conclusion**

Basic words such as The Filipino Alphabet, Filipino Numbers from 1-10, Colors in Filipino, Shapes in Filipino, Simple Filipino Greetings, The Filipino Family, Filipino Body Parts, The Filipino School and Filipino Food and Drinks were formulated as the initial part of the FSLT. They were learned and experienced by the deaf and mute students who were the recipient of the FSLT game prototype.

The participants were well pleased when they got to experience the game application. They were enthusiastic in every step of playing the game. The learning process was manifested when they were able to participate in the quiz after navigating through the sign language module where shapes were demonstrated through sign language and a spell out words were shown. Impressive may not be the result of the quiz when taken initially after the module. However, the capability
of the application to be taken again and again eventually established proficiency of the participants. The results and feedbacks gathered from both the 11 participants and their parent/s were overwhelming which garnered 100% ratings.

The participants and their parent/s were all very excited to be individually provided with copies of the game that the researchers will be fully developing. They expressed their appreciation for the study to help the education of different deaf and mute communities around the Philippines.

Recommendations

After conducting the study, researchers recommend for future researchers who want to deepen the study or have the same nature of study the following:

- **Development of the Application**
  1. Include broader scope of vocabularies in the application.
  2. Expand on the dialects and other languages used in the Philippines.
  3. Develop application that could be used also in mobile devices or tablets.

- **Study**
  1. Increase the number of participants to have greater result.
  2. To test whether the application is still as effective with a greater number of participants.
  3. To include parents as part of the tester of the application.

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“Kindness is the language which the deaf can hear and the blind can see...”

REFERENCES


**ONLINE RESOURCES:**

1. [https://www.asindexing.org/about-indexing/thesauri/](https://www.asindexing.org/about-indexing/thesauri/)
4. [https://www.signcommunity.org.uk/finger-spelling.html](https://www.signcommunity.org.uk/finger-spelling.html)
Test Procedure

Objective:
To check the functionality of the Filipino Sign Language Thesaurus Application.

Before we start:

- Application is installed in the computer that the tester will use
- Assistive Testing approach
- One programmer per one tester per one computer
- Application is already opened before the testing
- Questions can be raised anytime during the testing
- In the Guide, tester will find the steps in performing the test
- Testers will answer a feedback form to document the result of the assessment

Programmer: Lutchie, Rima, Sonia, Tricia
Facilitator: Mrs. Lerma
Testers: [Name], [Age], [Gender]
Guide:

Step 1  Programmer will orient the tester on how to navigate the application
Step 2  Together the application is explored by navigating through the module/game
Step 3  Once the tester has the comfort level to use the application, he/she may start to play and take the quiz
Step 4  Once the tester is done playing, facilitator will ask the tester to answer a feedback form.

Exit: Testing is done once the feedback form is completed by the tester.
WORDS IN VISION: A FILIPINO SIGN LANGUAGE THESAURUS
MANAGEMENT SYSTEM USING REN-PY

TESTER:

Application should be open before testing starts:

Hi, [Tester]. My name is [Programmer], and I’m going to be walking you through this session today. Before we begin, I have some information for you, and I’m going to read it to make sure that I cover everything. You probably already have a good idea of why we asked you here, but let me go over it again briefly. We’re asking people to try using our application that we’re working on so we can see whether it works as intended. The session should take about an hour.

[Name]

The first thing I want to make clear right away is that we’re testing an Application - Filipino Sign Language Thesauruses and not you. You can’t do anything wrong here. In fact, this is probably the one place today where you don’t have to worry about making mistakes. As you use the application, I’m going to ask you as much as possible to try to think out loud: to say what you’re looking at, what you’re trying to do, and what you’re thinking. This will be a big help to us. Also, please don’t worry that you’re going to hurt our feelings. We’re doing this to improve the application, so we need to hear your honest reactions.

[Age]

If you have any questions as we go along, just ask them. I may not be able to answer them right away, since we’re interested in how people do when they don’t have someone sitting next to them to help. But if you still have any questions when we’re done I’ll try to answer them then. And if you need to take a break at any point, just let me know.

[Gender]

You may have noticed the recording. With your permission, we’re going to record what happens on the screen and our conversation. The recording will only be used to help us figure out how to improve the application, and it won’t be seen by anyone except the people working on this project. And it helps me, because I don’t have to take as many notes.

If you would, I’m going to ask you to sign a simple permission form for us. It just says that we have your permission to record you, and that the recording will only be seen by the people working on the project.

- Let the tester sign below:

[Tester Name]

- While they sign it, START the SCREEN RECORDER
NON-DISCLOSURE AGREEMENT:
We also have a non-disclosure agreement that says that we won't disclose confidential and personal information of the testers for their protection.

Accept the NDA and make sure that Papers and Testers sign below.

Do you have any questions so far?

Now we can start.

First, I’m going to ask you to look at how I navigate and use the application/game.

Allow the tester to try until you feel they are comfortable to use the game on his/her own.

Now you can play

Allow this to continue for a time. Then ask if they are good to take the quiz.

Thanks. Now I’m going to ask you to try taking the quiz.

Once the quiz is done. Ask the tester how they feel.

Allow the user to proceed until you feel that they are ready to answer the feedback form.

But you need to close the application and let them see no more running game.

Feedback Form

Q1: Do you want to play the game again?

- Yes
- No

Q2: Which of the following have you experienced? Check all that

- Fun to use
- Easy to use
- Good colour
- Good Images

Thank you for your participation.