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Utilization of Filipino Sign Language-Sight Words Intervention (FSL-SWI) to Increase the Literacy Skills of Deaf and Hard-of-Hearing (DHH) Pupils

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Abstract

Having a vast repertoire of sight words that they are familiar with from previous literature will assist young readers in recognizing words by sight or memory. Due to their unique learning characteristics, Deaf and hard-of-hearing (DHH) students may find reading challenging. Given their inclination for visual learning, sign language serves as their primary means of communication. The majority of Filipino DHH students struggle to comprehend Filipino-written terminology. Results from the Phil-IRI screening tests conducted on pupils in grades 4, 5, and 6 show that they fall under the frustration level. The main goal of this study is to use an intervention known as Filipino Sign Language-Sight Words Intervention (FSL-SWI) to alleviate the difficulties DHH learners face in learning Filipino-written words. The intervention involved using multimedia teaching materials that are accessible on all Android and iOS devices. A mixed-methods technique was employed in the study to gather both quantitative and qualitative data. Pre- and post-tests were administered to 89 students in grades 4, 5, and 6 who participated as student participants to collect quantitative data. The significant increase in mean percentage scores seen in the pre-and post-test findings suggests that the use of FSL-SWI is a potent and successful multimedia learning intervention that can assist DHH learners in expanding their vocabulary in Filipino. The post-test results indicated that following the intervention, the learners reached an independent reading level, showing proficiency in using sign language to function independently and comprehend information effectively. On the other hand, survey forms and focus group interviews with selected stakeholders were utilized to gather qualitative data. The focus group interview generated three themes for this study: Filipino sign language variation, sign language training for parents/guardians, and easy access to multimedia. All stakeholders rated the FSL-SWI positively overall. Based on feedback and evaluation, FSL-SWI is strongly recommended as an intervention to help students in grades 4, 5, and 6 expand their Filipino vocabulary.

Keywords: sight words, deaf and hard-of-hearing education, Filipino Sign Language, multimedia

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1. Introduction

Reading is undeniably one of the most essential life skills acquired by young children. Primary school students are typically anticipated to read fundamental texts by the commencement of second grade. Sight words, or high-frequency words, are commonly found in texts and can enhance learning. The capacity to acquire an extensive vocabulary of sight words will enable young readers to recognize terms they are familiar with or have previously encountered through memory or visual recognition [1]. Children acquiring reading

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skills are taught to enhance their phonics proficiency, phonemic awareness, and capacity to comprehend written language and sight words to become competent readers. [2]. Sight word recognition facilitates effortless reading [3], allowing readers to avoid pausing to decipher unknown words, thereby maintaining focus and enhancing comprehension of the material [1].

Deaf and hard-of-hearing (DHH) learners have distinct learning traits that may exacerbate their challenges with reading. Sign language serves as their principal means of communication owing to their preference for visual learning. The literacy development of these youngsters is markedly inferior to that of their hearing counterparts of the same age. [4]. There are two broad components to the reading challenges faced by DHH students - the challenge of accessing phonology, and the challenge of recognizing the differences between the structure of a written language and the structure of a signed language [5]. It is observed that children who use spoken language and who have hearing loss lag their peers with normal hearing in terms of the development of phonological awareness, which is related to the development of literacy [6]. In addition, children with hearing loss are more likely to experience a delay in vocabulary development than those with normal hearing. This is due to the fact that their receptive and expressive lexicons are smaller, and their word learning abilities are altered [7]. Based on the findings of two studies, there is some preliminary evidence that individuals with hearing loss may have a relative advantage in the acquisition of print knowledge [8]. However, these studies primarily focused on alphabet knowledge, as opposed to a more comprehensive understanding of print. It was argued by Werfel [6], and Lund [7] that this conclusion was contrary to reality. Concerning alphabet knowledge, preschoolers with hearing loss demonstrated comparable or occasionally superior performance to their peers with normal hearing. In comparison to their peers, children with hearing impairments exhibited substantially lower conceptual print knowledge scores. Therefore, it can be contended that conceptual print knowledge is one of the domains in which children with hearing loss exhibit a sizeable deficit [6].

Madronio's [9] research demonstrates the critical role of accessibility, layout, and content in the development of educational interventions that target the enhancement of the written vocabulary of DHH learners in Filipino. To determine whether children at certain grade levels can read texts at an age-appropriate level, the Philippine Informal Reading Inventory (Phil-IRI) is used as a tool by the Philippine Department of Education to assess their reading abilities [10] and to aid in identifying the interventions needed by learners. Nevertheless, it is crucial to recognize that the Phil-IRI manual [11] is tailored to the needs of regular and hearing learners. The school year 2022-2023 is the pilot year of the Philippine School for the Deaf (PSD) to utilize Phil-IRI in Filipino Language.

The Phil-IRI screening test results for students in grades 4, 5, and 6 indicate that they are at the Frustration Level. As a result, the majority of the students scored below 14 and required reading intervention in Filipino.

Figure 1 shows the grade 4 performance level in the Phil-IRI screening test results for the 2022–2023 academic year. Section Narra, Mahogany, and Yakal got mean percentage scores of 32.2%, 28.15%, and 15%, respectively, with a total average performance of 25.1% that falls under the frustration category of reading.

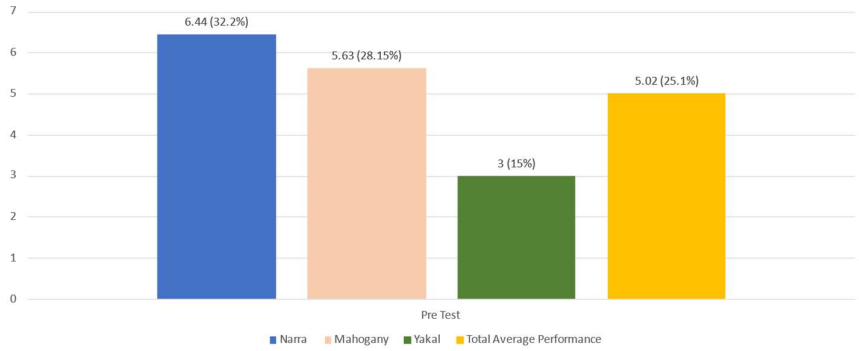

Figure 1. Grade 4 Phil-IRI Screening Test Results (School Year 2022-2023)

Figure 2 presents the results of the screening tests for learners in grade 5. They also consist of three (3) sections, Jupiter, Earth, and Venus, with mean percentage scores of 28.35%, 16.1 %, and 24.45%, respectively.

The total average performance of this grade level is 22.95%, which also falls under the frustration level of reading.

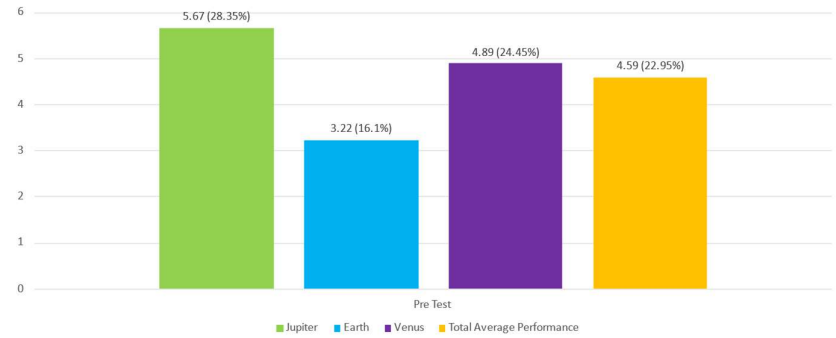

Figure 2. Grade 5 Phil-IRI Screening Test Results (School Year 2022-2023)

The grade 6 performance level on the Phil-IRI screening test for that same academic year is summarized in Figure 3. Like the previous grade levels, it's also composed of 3 sections, Star, Meteor, and Asteroid. MPS of these sections were 20.2%, 18.2%, and 17.25%, respectively with a total average performance of 18.55% which also falls under the frustration category of reading.

The aforementioned data demonstrates that the written Filipino language is unfamiliar to the majority of Filipino DHH learners. The primary objective of this study is to provide an effective intervention that will enhance the literacy levels of DHH students in Filipino vocabulary. Specifically, the study aims to utilize the Filipino Sign Language Sight Words Intervention (FSL-SWI) through multimedia presentations to increase their vocabulary in Filipino words. Table 1, the Table of Abbreviations was developed to guarantee clarity and facilitate understanding of this work. It will serve as a quick reference tool for readers.

Figure 3. Grade 6 Phil-IRI Screening Test Results (School Year 2022-2023)

Table 1. *Table of Abbreviation*

FSL-SWI	Filipino Sign Language Sight Words Intervention
Phil-IRI	Philippine Informal Reading Inventory
DHH	Deaf and Hard-of-Hearing
DepEd	Department of Education
MPS	Mean Percentage Score

1.1 Conceptual Framework

Given that the Phil-IRI was intended for regular and hearing learners, and the screening tests of grades 4, 5, and 6 were classified as "frustrated," the special education teachers at the Philippine School for the Deaf (PSD) who instruct the Filipino subject must identify an appropriate intervention to resolve these literacy obstacles. Through the use of the Filipino Sign Language Sight Word Intervention (FSL-SWI), students engage in an active learning process that helps them to mimic the sign language they observe in multimedia presentations and comprehend the meaning of the word. Figure 4 shows the conceptual framework of the study. The execution of sign language, words, and images are the intervention's primary characteristics. The word's definition is illustrated in the image. The learner's vocabulary in Filipino is anticipated to be enhanced by the written text.

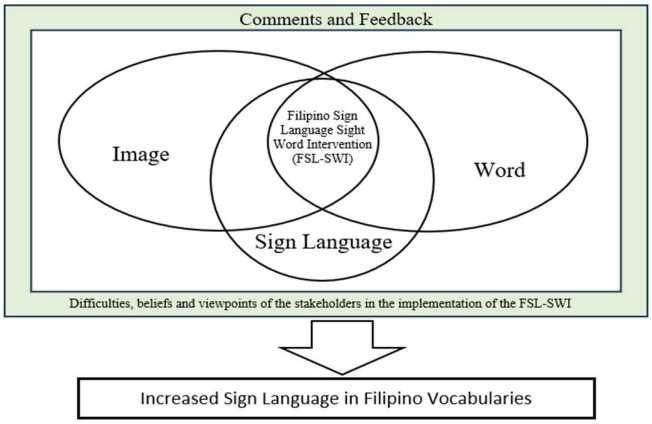

Figure 4. The Conceptual Framework of the Study

The text is manually read through the use of sign language. Enclosed within a box, the FSL-SWI displays the comments, suggestions, and input from the chosen stakeholders. The goal of the study is to assist DHH students in expanding their Filipino language vocabulary.

2. Research Questions

2.1 What was the DHH learners' level of Filipino vocabulary in grades 4, 5, and 6 prior to using FSL-SWI?

2.2 What is the Filipino vocabulary level of DHH learners in grades 4, 5, and 6 after utilizing the FSL-SWI?

2.3 What are the difficulties, beliefs, and viewpoints of the stakeholders in the implementation of FSL-SWI?

HYPOTHESIS (H_0)

Filipino Sign Language Sight Words Intervention (FSL-SWI) does not increase the DHH learners' Filipino vocabulary.

3. Methodology

Figure 5 displays the visual diagram of the methodology process utilized in this study. A quantitative and qualitative data collection process was used in the design [12]. Participants' pre-and post-test results were analysed using quantitative research methods. Surveys and semi-structured interviews were utilized in the qualitative section to gather perspectives, ideas, and opinions from some selected stakeholders.

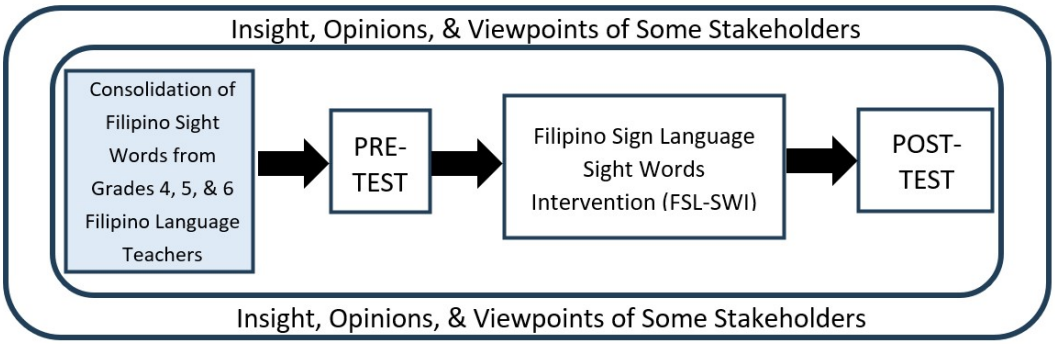

Figure 5. Visual Diagram of the Methodology Process

3.1 Population and samples. The participants of the study were pupils from grades 4, 5, and 6 enrolled in the pioneer government-owned sign language institution that offers basic education in the Philippines, for the school year 2022-2023. The gender breakdown of participants is displayed in Table 2. 51 or 57% were males and 38 or 43% were females.

Table 2. *Distribution Participants According to Gender*

Gender	Grade 4	Grade 5	Grade 6	Frequency	Percentage
Male	12	18	21	51	57%
Female	14	13	11	38	43%
Total	26	31	32	89	100%

The predominance of male participants is evident in this research study. For the academic year 2022–2023, the participation percentage is 100%, which reflects the whole PSD upper-grade population.

Purposive sampling method was utilized in selecting stakeholders to evaluate the FSL-SWI. They are in line with the Department of Education's (DepEd) efforts to increase the literacy of DHH learners. Further, their willingness to participate was strongly demonstrated during the voluntary selection procedure. They represent the various stakeholders which include

learners, parents, teachers, the hard-of-hearing, and the Deaf community.

Table 3 summarizes the profile of the stakeholder participants who participated in the interview and focus group discussion. It presents their age, profession, and hearing ability/loss.

Table 3. *Profile of the Participants in the Evaluation of the FSL-SWI Intervention*

Participants	Age	Gender	Profession	Hearing Ability/Loss
A	13	Male	Pupil	Profound
B	15	Female	Pupil	Severe
C	36	Female	Parent	Regular Hearing
D	41	Male	Parent	Profound
E	33	Female	Deaf teacher	Profound
F	58	Female	Teacher	Regular Hearing
G	36	Female	Teacher	Hard-of-Hearing

3.2 Research Instrument

The FSL-SWI Vocabulary Form, a 50-item list including columns for Filipino vocabulary, a pre-test, a post-test, and a remarks column, was the validated evaluation tool used in the study to gather quantitative data. The instrument used in this study was validated by master teachers, and a Deaf teacher using a five-point Instrument Rating Scale. The validators gave a rating of 4, an Agree Interpretation, which suggests that the research instrument is valid and recommended to gather relevant data for the study. Most of the items were taken from the stories in the Phil-IRI manual. Some vocabularies were carefully selected by the Filipino teachers themselves.

Sign language is executed twice. The Filipino vocabulary is presented first, then fingerspelling, another manual sign language, images, and another manual sign language. Figure 6 shows the sample multimedia of the Filipino Sign Language Sight Words Intervention.

Figure 6. Sample Multimedia of FSL-SWI

Each slide presentation contains Filipino-written words, an image, and manual sign language. The study adopted the "Reading Level Proficiency Rubric" of the Philippine Informal Reading Inventory (Phil-IRI) to measure and describe the level of the vocabulary of the pupils [11]. Scores of the participants were recorded in the Level of

Vocabulary Competency Form to ascertain the extent of their Filipino vocabulary proficiency. It has a scale rated as follows: 0-15, Frustration Reading Level, which means that the learner finds the FSL-SWI so difficult that they cannot successfully respond to them [13]; 16-35, Instructional Reading Level, which means that the learner profits the most from teacher-directed instruction in Filipino vocabularies; and 36-50, at the Independent Reading Level, students can read and comprehend nearly flawlessly on their own using manual sign language.

To evaluate the intervention's overall impression and applicability in terms of content, layout, and accessibility features, qualitative data were gathered for this study using the FSL-SWI Feedback Form. It is a five-point Likert scale, and the answers are indicated by ticking the box next to the number that represents the assessors' answers. The following ratings were given to the criteria on the aforementioned scale: 5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree, and 1-Strongly Disagree. The weighted means were interpreted using the same arbitrary scale. Additionally, it has a comments section where stakeholders can provide specific feedback and suggestions. In order to ascertain the obstacles, viewpoints, and opinions of the stakeholders about the FSL-SWI, focus group interviews were also held.

3.3 Data Analysis

The collected data was examined using the subsequent statistical instruments:

3.3.1 Mean. When the data were divided into groups before and after the FSL-SWI, the mean was used to determine the scores of the DHH students in grades 4, 5, and 6.

3.3.2 Paired Sample T-Test. The outcomes or mean scores from the pre-and post-test were compared using the Paired Sample T-Test.

3.3.3 Thematic Analysis. The focus group interviews yielded specific themes that were identified through the application of thematic analysis.

4. Results and Discussion

The following findings from a study on increasing the vocabulary of DHH learners in grades 4, 5, and 6 with FSL-SWI intervention are reported in accordance with the previously stated research goals:

4.1 To ascertain the difference between the learners' levels of Filipino vocabulary in grades 4, 5, and 6 before and after completing the intervention program, data were painstakingly recorded, tabulated, and assessed using a paired sample t-test. To make it simple to identify variations, the data is provided in tabular form. The pre-and post-test findings of the 89 participants in the researcher's 50-item test, administered both before and after the use of the FSL-SWI, are displayed in Table 4.

The grade 4 pupils acquired an MPS of 10 in their pre-test and 83.23 for their post-test result. Learners of grade 5 scored 8 MPS on their pre-test and 80 MPS on the post-test. The grade 6 pupils got 14 and 82 MPS in their pre and post-test, respectively.

Table 4. *Mean Percentage Scores (MPS) of Pre-Test and Post-Test*

Grade Level	No. of Items	No. of Pupils	PRE-TEST MPS	POST-TEST MPS	Difference
4	50	26	10	83.23	73.23
5	50	31	8	80	72
6	50	32	14	82	68

Table 4 makes it abundantly evident that, following the use of the FSL-SWI, participants' MPS of the pre-test increased significantly, with differences of 73.23 (grade 4), 72 (grade 5), and 68 (grade 6). This is a noteworthy indication that using FSL-SWI is a powerful and successful learning material intervention to help DHH learners expand their vocabulary in Filipino. The total level of Filipino vocabulary attained by the students in the upper grades is displayed in Table 5.

Table 5. *Level of Filipino Vocabulary*

Grade Level	AVERAGE PRETEST RESULTS	*Proficiency Scale	AVERAGE POST-TEST RESULTS	*Proficiency Scale
4	5.31	Frustration Reading Level	44.88	Independent Reading Level
5	4.90	Frustration Reading Level	42.64	Independent Reading Level
6	4.66	Frustration Reading Level	41.71	Independent Reading Level

** The Reading Level Proficiency Rubric of Phil-IRI served as the basis for the Proficiency Scale.*

The literacy levels of all students in the upper grades who participated in the pre-test were below the frustration threshold. This suggests that the learners were unable to adequately respond to the Filipino vocabulary prior to the implementation of the FSL-SWI, as they found it to be exceedingly difficult. The average post-test scores, which are in the independent reading level, showed that the FSL-SWI had a good influence. Grade 4 obtained the highest post-test result, 44.88, followed by Grade 5 at 42.64 and Grade 6 at 41.71. This implies that after the intervention, upper-grade learners can function independently and have strong comprehension when using sign language. It was also noted that the learners sign along with the multimedia intervention's content, which is similar to reading the words aloud. The intervention program called Filipino Sign Language- Sight Word Intervention (FSL-SWI) is a very effective intervention in improving the Filipino vocabulary of DHH learners.

4.2 The t-test's outcome for identifying a significant difference between the pre-and post-test findings is displayed in Table 6.

Table 6. *T-Test Result on Finding the Significant Difference in the Means of the Grades 4, 5, and 6 Pupils Before and After the Utilization of the FSL-SWI*

Variables Compared	DF	MPS	Computed t-value	Critical t - value	Decision	Impression @ 0.05 Level
Grade 4						
Pre-Test (X_1)	25	10.61	33.93	1.70	Reject H_o	Significant
Post-Test (X_2)		89.77				
Grade 5						
Pre-Test (X_1)	30	9.81	30.56	1.69	Reject H_o	Significant
Post-Test(X_2)		85.29				
Grade 6						
Pre-Test (X_1)	31	9.31	24.64	1.69	Reject H_o	Significant
Post-Test(X_2)		83.43				

The researchers rejected the null hypothesis, which is significant at the 0.05 level, based on the data collected from the grade 4 students, which yielded a computed t-value of 33.93 and a critical level of 1.70. The researchers rejected the null hypothesis, which is significant at the 0.05 level, based on the grade 5 participants' computed t-value of 30.56 and critical t-value of 1.69. With the learners' grade 6 data, the researchers rejected the null hypothesis, which is significant at the 0.05 level, with a computed t-value of 24.64 and a critical t-value of 1.69. The impressive increase in the mean following the use of FSL-SWI suggests that there was a very notable improvement in the Filipino vocabulary of students in grades 4, 5, and 6.

4.3 The difficulties, beliefs, and viewpoints of the FSL-SWI stakeholders are listed in Table 7. It received a score of 4.59 and was interpreted as strongly

agreeable. This clearly indicates that FSL-SWI should be utilized as an intervention to assist students in grades 4, 5, and 6 in expanding their Filipino vocabulary.

Table 7. *FSL-SWI Feedback and Evaluation Form*

Criteria	**Stakeholders**				**WM**	**INT**
	1	**2**	**3**	**4**		
The contents of FSL-SWI are …						
1. accurate and are based on the Most Essential Learning Competency (MELC) Self Learning Modules of DepEd	4	4	4	5	4.25	Agree
2. current and are based on the Most Essential Learning Competency (MELC) Self Learning Modules of DepEd	4	4	4	5	4.25	Agree
3. suited for the deaf and hard-of-hearing (DHH) learners	5	5	5	5	5	Strongly Agree
4. level appropriate to the grades 4, 5, and 6 DHH learners	4	5	5	4	4.5	Strongly Agree
The layout …						
5. makes it easy for the DHH learners to process graphics, text and sign language	3	5	4	5	4.25	Agree
6. of the FSL-SWI intervention is consistent	4	4	5	5	4.5	Strongly Agree
7. is clear and logical	4	5	4	5	4.5	Strongly Agree
8. words and subtitles are clearly visible	5	5	5	5	5	Strongly Agree
Accessibility…						
9. The FSL-SWI intervention accommodates the unique learning style of DHH pupils	4	5	4	5	4.5	Strongly Agree
10. The FSL-SWI intervention can be utilized by the DHH learners without much help from the teacher.	4	5	5	5	4.75	Strongly Agree
11. The FSL-SWI intervention can be accessed in any type of computer	5	5	5	5	5	Strongly Agree
Total:					**4.59**	**Strongly Agree**

Legend: WM – Weighted Mean; INT – Interpretation

The focus group interview produced three themes that were found in this study. These are:

4.3.1 Filipino Sign Language Variation. The selected stakeholders emphasized the need to be familiar with the various varieties of Filipino Sign Language. It is worth noting that the Deaf community does not have a universal sign language to bind its members [14]. Madronio [15] explained that sign variation is unavoidable in the Philippines due to its geographical peculiarities. As a result, variety occurs naturally in both spoken and sign languages, which is an important aspect of any linguistic study. Sign languages, like spoken languages, vary significantly according to sociolinguistic context. This variability can be influenced by factors such as region, age, gender, education, family history, social status, ethnicity, registration, and language [16]. Some vocabularies (*anak*, *baboy*, *lagi*, *wala*) included in the FSL-SWI need to include sign variations in FSL for early awareness of the individual who utilizes the intervention.

4.3.2 Sign Language Training to Parents/Guardians. Most of the selected stakeholders believe that learning sign language is not only applicable to the enrolled learners in school but also to the parents and guardians. They unanimously agree that intensive sign language training is essential to attain efficient and effective communication with their deaf children. Hence, literature shows that most researchers in the field of sign language education, believe that the Deaf community's expertise and experience are infused into every facet of a successful sign language instruction because they are crucial language and cultural role models [18] [19] [20]. Parents must initially learn sign language, sometimes concurrently with their child, before the child may begin using it. The child's linguistic access will improve in tandem with the parents' fluency. Immediate and positive information on learning sign language and developing social networks is particularly crucial for families and

caregivers, as it greatly impacts the attitudes that these individuals have toward deafness and, in turn, the linguistic strategies that they undertake [21].

4.3.3 Easy Access to Multimedia. FSL-SWI multimedia is straightforward to use for many stakeholder participants. Watching it multiple times helps students remember the manual sign language for a specific Filipino vocabulary. Furthermore, they believe that this type of innovation is critical and can be replicated in other learning domains. This multimedia helps the DHH learners to focus better and to improve their understanding of written vocabulary [22].

5. Summary and Conclusions

Based on the results and discussions drawn from this study, the following are the conclusions and recommendations made by the teacher-researchers:

5.1 Based on the findings of the pre-and post-tests, it was clear that the FSL-SWI was successfully implemented with DHH learners in grades 4, 5, and 6. After using FSL-SWI, the mean significantly increased, indicating that the Filipino vocabulary of students in grades 4, 5, and 6 significantly improved.

5.2 It was also noted that the students signed along with the multimedia intervention's content, which is similar to reading the words aloud. The intervention program called Filipino Sign Language- Sight Word Intervention (FSL-SWI) is a very effective intervention in improving the Filipino vocabulary of DHH learners.

5.3 The FSL-SWI evaluation and feedback from the chosen stakeholders reveals a Strongly Agree rating of 4.59, indicating that FSL-SWI should be utilized as an intervention to help students in grades 4, 5, and 6 expand their Filipino vocabulary.

5.4 The result of the focus group interview reveals the importance of Filipino sign language (FSL) variations, FSL training to parents and/or guardians, and easy access to multimedia as contributing factors in the enhancement of the learners sign language and written vocabularies.

5.5 To help DHH learners expand their vocabulary in the Filipino learning area, it is advised that they utilize the established FSL-SWI intervention as instructional resources.

5.6 The FSL-SWI intervention can potentially be extended to other learning domains to support the development of deaf and hard-of-hearing learners' written vocabulary.

5.7 To overcome the observed shortcomings of this study, more comparable research might be conducted.

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