The Effects of Deliberate Practice on ASL Classifier Skills in Sign Language Interpreting

Michelle Cramer

An Action Research Project submitted to Western Oregon University

In partial fulfillment of the requirements for the degree of

March 2026

MASTER'S DEGREE FINAL EVALUATION REPORT

Completion Term: Spring 2026

Type of exit requirement: Action Research Project

The supervisory committee met with the candidate for a final evaluation in which all aspects of the candidate's program were reviewed. The committee's assessment and recommendations are:

Recommendations:

- ✓ Degree should be awarded

Recommendations:

- ✓ Exit Requirement has been approved

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ABSTRACT

Classifiers are a linguistic element common to many signed languages, including American Sign Language. They provide information on description, location, and action, functioning as adjectives, adverbs, prepositions, pronouns, and verbs. Learning to produce classifiers can be challenging for second-language learners of American Sign Language (ASL). Often, ASL second-language learners and ASL-English interpreters lack fluency in using classifiers, resulting in two-dimensional and unclear interpretations that lack cultural appropriateness. Research on acquiring classifier skills is limited, and this area could benefit from further investigation. This research study aims to provide insight into developing classifier skills through deliberate practice with visual aids, such as pictures and videos, as source materials for practice, examining the acquisition of classifier skills in American Sign Language (ASL) and the impact of intentional practice on developing these skills. It is a single-participant study of my

interpreting work, where I applied deliberate practice to classifier production. This research involves both quantitative and qualitative methods. The study was conducted over six months, during which I utilized deliberate practice supported by visual aids for classifier production. The data included recordings of my interpreting work and my reflections on that work, which were documented through journaling and Think Aloud Protocols. The results of this research project aim to inform educators on classifiers for American Sign Language (ASL) second-language learners and interpreters.

Keywords: American Sign Language, classifiers, Deliberate Practice Theory, expertise, visual aids

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CHAPTER 1 INTRODUCTION

Background

American Sign Language (ASL) is a natural language used by Deaf and hard-of-hearing (DHH) individuals in the United States (Damdoo & Kumar, 2025). Signers communicate through their upper body, through the space in front of them, and through non-manual markers (i.e., eye gaze, facial expressions, head, and body movements) (Beal-Alvarez, 2021, 2023). A common feature of ASL, found in many signed languages worldwide, is the use of classifiers (Zwitserlood, 2012). Classifiers are linguistic components of ASL (Krebs et al., 2021; Zwitserlood, 2021) that represent nouns and indicate location, movement, and description. Other terms used to define classifiers include "depiction," "depicting signs," "constructed action," and "spatial mapping." The term "depiction" is currently in use; however, this research study will focus on the term "classifier," which has a narrower definition that excludes role-shifting and characterizations.

Statement of the Problem

Classifiers make up one-third of the signs used by Deaf adults in spontaneous narrative tasks (Morford & MacFarlane, 2003). Despite their common usage, research by Jacobs (1996) shows that classifiers are one of the more challenging aspects of ASL to learn; furthermore, errors in classifier production are often more prevalent than in lexical sign production (Zwitserlood, 2021). Although the set of classifiers and specific rules governing their usage is finite, determining which classifiers to choose for an interpretation and how to apply them can be challenging (McKee & McKee, 1992). These factors underscore the importance of developing classifier skills, especially for ASL-English interpreters, who must be fluent in English and ASL to facilitate effective communication between DHH and hearing consumers.

Purpose of the Study

This research project was conducted at Western Oregon University. This study assesses how regular, intentional practice with classifiers for describing still images and videos can significantly enhance sign language interpreters' ability to accurately select and apply ASL classifiers. The goal is to provide insights into practical methods for improving skills in selecting and producing classifiers. The findings of this study can contribute to advancing classifier education and interpreting abilities. Can deliberate practice using visual aids substantially improve classifier production skills?

Theoretical Framework

This research is grounded in the theoretical framework of Deliberate Practice Theory (Ericsson, 1993), which supports intentional, goal-oriented practice with reflection as a method for developing skill and expertise. This theory was developed in the 20th century by Ericsson, a Swedish cognitive psychologist, and his colleagues. Deliberate practice is goal-oriented and focuses on improvement, distinguishing it from play and work (which often utilizes already developed skills). Deliberate practice has been successfully applied to multiple fields, including sports, music, dance, medicine, education, and interpreting.

The core components of Deliberate Practice Theory are: 1) establishing specific, measurable goals; 2) providing challenges that exceed the current skill level; 3) receiving immediate feedback; and 4) practicing repeatedly while applying that feedback. Additionally, reflecting on one's skills is essential for skill development, refining the process, and understanding where to focus on practice.

This theoretical framework was chosen for the research project because it aims to determine how deliberate practice can enhance classifier production skills. The study supports

the hypothesis that with repeated, intentional practice and feedback, classifier production skills will develop.

Organization

This paper is organized into chapters. Chapter Two begins with a thematic literature review. Classifiers and their functions in ASL are defined, while the challenges associated with learning to use them are discussed. It then focuses on the Deliberate Practice Theory for skills development and, finally, on how the use of visual aids supports learning. Chapter Three discusses the research methodology, including the design of this action research project, its purpose, data collection methods, the population, and analysis techniques. Chapter 4 examines the research results. In Chapter 5, the study results are discussed. In Chapter 6, findings are summarized, and conclusions are discussed. Following the conclusion is a references section.

CHAPTER 2 LITERATURE REVIEW

Introduction

American Sign Language-English interpreters, like all bilingual interpreters, must possess a high level of proficiency in both languages. Classifiers, a linguistic component of ASL, are a particularly challenging aspect of the language for second-language learners (Jacobs, 1996). Nonetheless, classifiers are an essential part of the language, occurring in 33% of spontaneous narratives of Deaf adults (Morford & MacFarlane, 2003), and an understanding of how to use them is crucial for developing ASL fluency. Lack of understanding of their application can result in two-dimensional, unclear interpretations. This literature review examines research on classifiers, their typology, functions, and acquisition. It also explores the difficulty in acquiring classifier production proficiency among interpreters, examining measurements of interpreter proficiency related to the use of classifiers. Additionally, it reviews research on Ericsson's Deliberate Practice Theory (1993) and visual media (images and videos) as tools for skill development in classifier production. The main scope of this review encompasses research conducted between 2015 and 2025; however, it also includes foundational research from the past 40 years and older, where current studies were lacking, looking at scholarly works, including articles and books. The review begins with an examination of literature on classifiers, focusing on their functions and roles in ASL. This literature review critically analyzes existing studies to illuminate how they inform and substantiate my research on the development of ASL classifier production skills, thereby contributing to the current knowledge on classifier skills acquisition.

Classifiers

Understanding classifiers—what they are and how they are used in ASL—is the first step in helping learners to develop fluency in classifier production. Classifiers are an integral part of

ASL, playing key roles in providing information about description, location, and movement. They add a visual dimension to the language, allowing signers to convey nuanced visual information. The goal of this literature review is to enhance the understanding of classifiers, their value, and their role in ASL, providing a foundation for improving classifier skill production.

Classifiers in ASL are distinct from lexical signs. They function as adjectives, describing size, shape, and texture; as adverbs, indicating how actions are performed; as prepositions, detailing locations; as pronouns, representing nouns after they are introduced in the discourse; and as verbs, showing action (Baker-Shenk & Cokely, 1991). Supalla (1982, 1986 as cited by Zwitserlood, 2012, pp. 160-161) divides classifiers into five main groups:

1. *Semantic classifiers,* which represent nouns by some semantic characteristic of their referents (e.g., belonging to the class of humans, animals, or vehicles);
2. *Size and Shape Specifiers (SASSes),* which denote nouns according to the visual-geometric features of their referents. SASSes come in two subtypes: static SASSes, which consist of a handshape (or combination of two hands) that indicates the size/shape of an entity; tracing SASSes, which have a movement of the hand(s) that outlines an entity's size/shape, and in which the shape of the manual articulator denotes the dimensionality of that entity;
3. *Instrumental classifiers*, which also come in two types: instrumental hand **classifiers**, in which the hand represents a hand that holds and/or manipulates another entity; and tool classifiers, in which the hand represents a tool that is being manipulated;
4. *Bodypart classifiers*: parts of the body represent themselves (e.g., hands, eyes) or limbs (e.g., hands, feet); and
5. *Body classifiers*: the body of the signer represents an animate entity.

These categories were subsequently reduced to two: Handling and Whole Entity classifiers, which comprise Supalla's five categories (Zwitserlood, 2021, p. 161). Comparing classifiers to verb signs in ASL, Krebs (2021) emphasizes the greater linguistic flexibility of classifiers: "Classifier use and meaning is governed by linguistic rules, yet, in comparison with lexical verb signs, classifiers are highly variable in their morpho-phonology (variety of potential handshapes and motion direction within the sign)" (Krebs, 2021, p. 1).

The acquisition of ASL classifiers often poses the greatest challenge for many students whose first language is English (Jacobs, 1996). Jacobs (1996) explains that English lacks an equivalent to the classifier (AKA classifier predicate), which means learners need additional time to feel comfortable and fluent in their use. Additionally, she notes that classifiers do not adhere to English linguistic rules, as they involve multiple morphemes (a linguistic term meaning "units of meaning") produced simultaneously, whereas English expresses morphemes sequentially. These factors underscore the importance for ASL and interpreting students to focus on learning classifiers.

Proficiency in classifiers is crucial in all areas of interpreting, particularly in fields such as medical and legal interpreting, where miscommunications can result in serious consequences. Additionally, classifier proficiency is beneficial when working with Deaf consumers who have minimal language skills.

Another area of interpreting where classifier skill is essential is the educational system, particularly in K-12 settings. In the classroom, interpreters often significantly influence a Deaf student's language development, meaning that a lack of language skills in the interpreter can negatively impact the student's language skills. However, for educational interpreters who take the Education Interpreter Performance Assessment (EIPA), "The only standardized test that

measures interpreter skill in educational settings...created by Dr. Brenda Schick in cooperation with Boys Town National Research Hospital (BTNRH)" (Cates, 2021, p. 1), classifiers tend to be "areas of weakness for interpreters and areas of high impact on message clarity" (Cates, 2021, p. 1).

Aligning with Cates' research, Beal (2020) examined undergraduate students, primarily those majoring in interpreter training, who were nearing completion of an ASL IV class. This study focused on students' ability to produce classifiers. Beal found that most students "struggled with producing constructs that create visual representations of narrative action, such as classifiers/depicting constructs and constructed action" (Beal-Alvarez & Scheetz, 2015; Beal et al., 2018, as cited by Beal, 2020, p. 6).

In looking at what aspects ASL learners find most challenging, a study of 14 undergraduate students who were second language learners of the Sign Language of the Netherlands (NGT), Boers-Visker (2024) found that the most challenging aspects of classifier production to learn were, "... the rules governing the (default) orientation and handshape, as well as the coordination of both hands in relation to each other in space...sitting persons and animals posed challenges." One limitation of this study is its sample size. Additionally, Cates (2021) examined interpreters' scores on the Educational Interpreter Performance Assessment (EIPA). She found that showing "location/relationship using [the] ASL classifier system" was among the lowest scores for interpreters (Cates, 2021, p. 9).

This research suggests that examining methods of education related to ASL and interpreting courses may be worthwhile in uncovering underlying causes for these fluency deficits. Supporting this point, Girardin (2023) investigated fluency levels in ASL among graduate students in an interpreter training program, finding that the skill levels of 64% of

students fell below the program's goals. She determined four factors contributing to the results: "...the students' self-awareness of their own fluency, their amount of Deaf community involvement, the type and quantity of ASL assessments in courses, and faculty's level of expertise" (Girardin, 2023, p. ii).

Another salient factor may be the length of training in American Sign Language (ASL) that students receive before entering an interpreter training program (ITP). Jacobs (1996) argues that due to its distinct features, which distinguish it significantly from English, ASL should be categorized as a *truly foreign language,* a category from the Foreign Service Institute (FSI) and the Defense Language Institute (DLI), which designated four categories of languages based on difficulty to learn. She explains:

> Category 1 languages, which include Spanish, French, and German,' are the easiest for speakers of English to learn. Categories 2, 3, and 4 languages are, by degree, harder or take more time in which to become proficient for speakers of English; category 4, the hardest, includes Arabic, Chinese, Japanese, and Korean. (Walker, 1989; Walton 1992, as cited by Jacobs, 1996, p. 185).
>
> Difficulty is measured by the number of instructional contact hours required to reach prescribed levels of proficiency as determined by standardized proficiency tests. Proficiency is rated on a scale of 0 (no functional proficiency) to 5 (the proficiency of an educated native speaker) .... For a student with average language learning aptitude the FSI experience indicates that to reach a proficiency level of 2 requires 480 contact hours for a Category 1 language such as French, German or Spanish, but 1,320 contact hours for a Category 4 language such as Chinese or Japanese. (Jacobs, 1996, p. 185)

Jacobs (1996) calculates that learning ASL, as a Category 4 language, requires 2.75 times more time to learn than a Category 2 language, and ITP programs do not provide enough hours for students to reach a Category 4 language level of proficiency.

Other suggestions for the cause of interpreters' and interpreting students' generally low level of classifier production skills proficiency could include a lack of resources for skills development available to interpreters, and, as observed by Girardin (2023), a lack of opportunities, aside from work, to interact with the Deaf community and further develop ASL skills, as well as student and interpreter self-reflection skills and practices.

Overall, this research highlights the challenges of learning ASL classifiers and emphasizes the importance for ASL learners and interpreters to address this deficiency. Research on acquiring classifier skills is limited and represents an area that would benefit from further investigation. This study aims to contribute to research in this area with its findings.

In understanding the development of classifier skills, this review next examines expertise and deliberate practice.

Novice to Expert and Deliberate Practice Theory

Like most professions, expertise in a field is not achieved merely by completing a program of study; it requires years of experience and often involves ongoing learning throughout a person's lifetime. Interpreters typically begin their education not as native users of ASL but as learners of ASL as a second language in college. Acquiring a language requires many hours of instruction and practice to develop fluency, with additional hours needed when the language differs significantly from the learner's native language, as is the case with ASL and English (Jacobs, 1996). The acquisition of expertise in a skill has been a controversial topic. The theoretical framework of this research paper is Deliberate Practice Theory, developed by

Ericsson (Ericsson et al., 1993), a Swedish cognitive psychologist, and his colleagues. This section explores this theoretical framework, the evolution of expertise research, and its relevance to enhancing ASL classifier production skills.

Perceptions of expertise have evolved over the centuries. The prevailing attitude through the 1800s was that expertise was rooted in heredity or innate talent. This idea was questioned in the mid-20th century by the research of de Groot and others, whose work examined the cognitive processes involved in the development of expertise and skills (Palazonni, 2024). De Groot's seminal research inspired further investigation into the subject, spawning a series of studies throughout the 1900s (Palazonni, 2024). The result was a general shift in attitude toward effort in skills development, with less emphasis on aptitude.

In the 1900s, Ericsson and his colleagues initiated their research into expertise, drawing on the current research of the time. This led to the development of Deliberate Practice Theory, a "highly structured activity, the explicit goal of which is to improve performance" (Ericsson et al., 1993, p. 368, as cited by Hambrick et al., 2020, p. 3). Their research suggests that attaining expertise in a skill is not solely attributable to innate talent, but rather the result of focused, goal-directed practice. They distinguish deliberate practice from work and play. Unlike work, which is routine and efficient, and play, which is inherently enjoyable, deliberate practice focuses on specific goals for improvement (Ericsson et al., 1993, as cited by Sazda, 2021). Ericsson (2009) points out that although deliberate practice can be applied on the job, one factor that hinders its use is the lack of immediate feedback available; workers are often unable to reflect on their work performance and frequently have no one to provide feedback for them. Additionally, workers are often focused on applying the skills they have developed so far. I suggest further research into

this topic, examining why some interpreters believe they are developing expertise without deliberate practice.

According to Ericsson et al. (1993), several factors influence the effectiveness of deliberate practice in skills development: motivation, focus, feedback, and time. Other factors include ensuring that goals are specific, attainable, measurable, and progressive (Herring, 2015).

Although Ericsson's Deliberate Practice Theory (1993) has been widely researched and accepted, it has also faced opposition. Hambrick et al. (2020) and Macnamara et al. (2014) criticize Ericsson for repeatedly redefining the theory, altering its parameters, and hindering researchers from testing its accuracy. Additionally, Hambrick et al.'s (2020) study, which includes a meta-analysis of available research on Deliberate Practice Theory, revealed significantly lower correlations between deliberate practice and expertise development than those of Ericsson et al. However, Miller et al. (2020) examined the meta-analytic research of Macnamara et al. (2014) and identified several flaws, including the categorization of some data as deliberate practice, which did not satisfy its definition. They concluded that deliberate practice theory is a valuable method for skills development.

Additionally, Ericsson refuted arguments against Deliberate Practice Theory, clarifying its definition by including "the subjects' motivation to attend to the task...The subjects should receive immediate informative feedback and knowledge of the results of their performance. The subjects should repeatedly perform the same or similar tasks," and where the "teacher designs practice activities that the individual can engage between meetings with the teacher" (Ericsson et al., 1993, p. 367, as cited by Ericsson, 2016). Therefore, he contrasted deliberate practice with other forms of practice. He stated that research by Macnamara et al. (2014) included data inconsistent with the definition of deliberate practice, such as play and competition, and

excluded data that conformed to its definition, thereby skewing the accuracy of their results (Ericsson, 2016).

Despite its detractors, deliberate practice has been proposed and utilized for decades to acquire and improve skills, with applications in interpreter training and skills development (Herring, 2015; Motta, 2011; Palazonni, 2024).

Kanoksin et al. (2025) examined the effectiveness of deliberate practice versus conventional lectures in trauma training for 48 medical students. Students were randomly assigned to either a deliberate practice group or a standard lecture group. The deliberate practice group demonstrated improved grades and higher scores on the Objective Structured Clinical Examination (OSCE), a standardized, performance-based assessment of clinical and communication skills.

Marcus et al. (2020) studied 35 residents, two years post-graduation, who engaged in deliberate practice to improve their teaching skills under the guidance of faculty coaches. Surveys assessed residents' confidence and comfort in teaching, supervision, and providing feedback. Participation in deliberate practice was associated with significant improvements in both confidence and comfort across these teaching-related abilities.

Additional research across various fields, including healthcare and education, supports the concept that expertise develops through deliberate practice—goal-oriented, feedback-supported practice—rather than through experience or repetition alone (Coughlan et al., 2014; Gonzalez &Kardong-Edgren, 2017; Lehtinen et al., 2017). In these studies, learners improved most when practice focused on specific weaknesses, provided immediate feedback, and became increasingly more challenging over time, demonstrating that the quality of practice matters more than quantity.

These studies indicate that deliberate practice is a relevant tool for skills development as well as confidence.

Some limitations to the use of deliberate practice for self-study include the user's skill in self-reflective work, evaluation of one's skills, objectivity, and the methods in place for measuring improvement. Additionally, if engaging a mentor or teacher, their lack of objectivity and availability can hinder the process.

In applying deliberate practice to develop classifier skills, several options are available. One tool is the use of visual aids.

Visual Aids for Skills Development

This section explores research on the use of visual aids (images and videos) in classifier skills enhancement. Visual aids have been employed as tools for skills acquisition in the classroom and in independent study to facilitate skill development.

In this literature review, I found a wide range of studies on the use of visual aids to enhance learning among medical students, online learners, blended learning students, cooking instruction students, architecture students, and second language learners. Research on the effects of using videos on medical students' coursework found that videos improved students' learning, with self-study immediately following a video being the most effective (Ott et al., 2024). Coyne et al. (2018) conducted a meta-analysis of research involving blended learning—a form of instruction that included in-person, online, and video instruction—on health students. Results indicate that students preferred blended learning over in-person instruction, demonstrated greater engagement in learning, and gained enhanced knowledge and skills. In a study of 141 women who utilized visual aids (videos) for cooking skills instruction, participants reported benefits

such as improved visualization and replicability of the cooking process, greater confidence, increased flexibility in independent learning, and better access to learning materials, particularly for acquiring new skills and reinforcing higher-level skills (Surgenor et al., 2017). Architecture undergraduate students who used video instruction experienced better retention of information, heightened engagement in class, and improved learning in design and drawing courses. However, students who were stressed about their coursework did not experience the same benefits (Obagah & Brisibe, 2017).

Advantages of learning with visual aids are also evident in second language acquisition. Halwani (2017) found that among high school students learning English as a second language (ESL), 90% preferred using visual aids (computers, pictures, and videos) to enhance classroom instruction. Students who utilized visual aids experienced increased focus in class, a better understanding of the materials, and greater confidence. In another study of English as a Second Language (ESL) high school students, McNulty and Lazarevic (2012) investigated students in a one-week project where the instructor recorded them in role-plays using English. This study revealed that visual aids boosted student motivation and helped students improve their pronunciation skills. Research by Pisarenko (2017) suggests that high school students learning a foreign language benefit from visual aids, such as videos, demonstrating enhanced language acquisition, increased motivation to learn, and personal development.

This research offers substantial evidence that visual aids offer numerous advantages in language acquisition, as well as in other areas of study. Salient themes included improved learning, increased engagement in learning, greater motivation to learn, and increased learner confidence. The research is lacking on visual aids explicitly related to the acquisition of ASL and

classifiers. However, ASL is a visual language, so using visual aids aligns with this mode of learning, and research supports the use of visual aids for second language learning.

Conclusion

In summary, this literature review demonstrates that classifiers are a critical linguistic feature of ASL used in one-third of casual discourse among Deaf adults. Classifiers serve as adjectives, adverbs, prepositions, pronouns, and verbs, providing information on action, description, and location. When compared with English, it becomes clear that these two languages are significantly different from each other. In particular, English lacks an equivalent to the ASL classifier and differs in its morpheme sequencing (Jacobs, 1996). These differences suggest that ASL may require more time for students to learn than languages that are more closely related to English, such as Spanish. Additionally, studies show that second language learners and interpreters often struggle with fluency in the use of classifiers. Interpreter EIPA scores and ASL fluency evaluations from interpreter training programs reflect this (Cates, 2021; Girardin, 2023).

Given this data, this review also examined research on Deliberate Practice Theory (Coughlan et al., 2014; Ericsson, 1993, 2001, 2009, 2016; Gonzalez & Kardong-Edgren, 2017; Hambrick et al., 2020; Herring, 2015; Kanoksin et al., 2025; Lehtinen et al., 2017; Marcus et al., 2020; Mcnamara et al., 2014; Miller et al., 2020; Motta, 2011; Palazonni, 2024; and Sazda, 2021) as a framework for enhancing classifier skills, which is based on intentional practice with immediate feedback. Research includes multiple studies that support this theory, along with a few that challenge it. However, subsequent studies countered those challenges, providing evidence that reinforced Deliberate Practice Theory. This theory is now utilized in interpreter training programs as a method for practice and self-reflection for students.

Another area of research examined was visual aids—pictures and videos—tools that enhance learning. This literature review revealed numerous studies across various fields, including architecture, medicine, cooking, and second language acquisition. These studies consistently support the use of visual aids for educational purposes, yielding positive results such as enhanced learning, increased confidence, greater engagement with class materials, and heightened motivation to learn.

A gap in research is the area of classifier skills development. Few studies (Beal, 2020; Cates, 2021; Girardin, 2023; McKee & McKee, 1992; Zwitserlood, 2012, 2021) have examined methods for improving classifier fluency, particularly among adult second language learners. This represents an area where additional research could be beneficial, and it is a focus of this research paper. The findings of this literature review have implications for ASL and interpreting education. It suggests that examining the duration of ASL instruction, along with concentrating on classifier instruction, would be beneficial (Jacobs, 1996). Additionally, research indicates that using deliberate practice and visual aids can be effective tools for developing classifier skills. A limitation of this research is the scarce resources on classifier skills development (Beal, 2020; Cates, 2021; Girardin, 2023; Jacobs, 1996; McKee & McKee, 1992; Zwitserlood, 2012, 2021). Additionally, among available studies, some had a limited number of participants.

CHAPTER 3 METHODOLOGY

Introduction

This research project examines the effects of applying deliberate practice and visual media to ASL classifier production skills. In this chapter, I will discuss the methodology of my research project, including the timeline, population, data collection, intervention, and data analysis methods.

My interest in researching the development of classifier production grew from reviewing my interpreting work and identifying a gap in my knowledge and skills regarding classifier production. This gap was particularly evident when I interpreted information with considerable detail and description. The greatest challenge I encountered was producing descriptive classifiers and conveying varying perspectives and viewpoints. These factors prompted me to explore ways to enhance the flexibility and fluency of my interpreting with classifiers.

Design

This study is an action research project (that involves studying a problem or situation and identifying issues, testing solutions, and reflecting on the results) that fits into the research categories of Interpreting Practice, Ontological (the study of what exists and the nature of reality), and Pure Empirical (reliance on observable and measurable phenomena). The theoretical framework supporting my research is based on Deliberate Practice Theory (Ericsson et al., 1993), which advocates for skill mastery through intentional practice. This research focuses on ASL classifier production and examines whether intentional practice methods have a measurable impact on this skill. My research question is: Can deliberate practice using visual aids significantly improve classifier production skills?

Data was collected monthly for over six months from three sources. First, I videotaped my spoken English to ASL interpretation of stories, along with other online videos and audio resources that included details and necessary classifiers. Second, I kept a journal of my feelings and observations regarding my interpreting samples. Third, I made audio recordings of Think Aloud Protocols (TAPs) (Smith, 2014), a method of articulating your thoughts as you mentally process your work, while reviewing my interpreting samples. This data collection procedure incorporated the four key elements of deliberate practice: goal establishment, immediate feedback, reflection, and refinement. After recording my interpretation sample, I reviewed it and completed a TAP, noticing areas that needed improvement and brainstorming ways to improve. I then completed a journal entry where I reflected on my work and considered challenges and ways to improve.

Population

I, the author, am the only participant in this study. In 2024, I earned a Bachelor of Science in Interpreting Studies: Theory from Western Oregon University. I am currently enrolled in the Master of Arts in Interpreting Studies: Theory and Practice (MAIS) program at Western Oregon University. Demographics include that I am hearing, my native language is English, and I am an adult second language learner of ASL. This research focused on my interpreting work and the development of my classifier production skills. All data collection was based on my interpreting work.

Data Analysis Procedures

Data consisted of six videos, one recorded each month over six months; five (initially, there were six recordings; however, one was lost due to computer failure) audio recordings of Think Aloud Protocols (TAPs), one recorded each month; and six journal entries, recording my

thoughts and feelings with each video recording. I analyzed data using both quantitative and qualitative methods, using the research analysis software Atlas and Dovetail.

Videos

Each month, for six months, I recorded myself interpreting one video or audiobook, for a total of six video recordings of my interpretations. The source materials I interpreted for my data collection were five audiobooks of the writings of Laura Ingalls Wilder, including *Little House in the Big Woods* (Wilder, 2017)*, Little House on the Prairie* (Wilder, 2017), *Little Town on the Prairie* (Wilder, 2017)*, and The Long Winter* (Wilder, 2017), and a YouTube video describing the digestive system entitled *The Human Digestive System: How it Works!* by T. Schwenke (2022). I chose these source materials because they all included detailed descriptions, which increased the probability of my producing a large number of classifiers in my data sample interpretations. In my analysis of these video interpretations, I viewed the first ten minutes of each video sample and documented in Excel spreadsheets each classifier I produced and how it was produced. I documented several classifier types, including Body, Body Part, Descriptive, Element, Instrument, Locative, Plural, Semantic, and Size and Shape Specifier (SASS) (Baker-Shenk & Cokely, 1991; Handspeak, n.d.; Supalla, 1982, 1986 as cited by Zwitserlood, 2012, pp. 160-161); however, the focus of this study was on two classifier types: Instrument and SASS. I chose these two because they were the most challenging for me, and I had consistent numbers that I had produced whereas other classifier types had lower totals and would not have enough represented data. I then compared my production of these classifiers to their standard ASL linguistic production parameters of handshape, location, movement, orientation, and non-manual markers (facial grammar and head and body movements) and use to determine if the classifier

was linguistically appropriate for the description and if produced according to ASL linguistic parameters. Classifier production was examined for changes over time.

Think Aloud Protocols (TAPs)

I recorded an audio or video recording of a Think Aloud Protocol (TAP) for each video interpretation I produced. Each TAP was recorded shortly after the interpretation, while the interpretation was fresh in my mind. I collected a total of five TAPs. One TAP is missing from my data, which is a limitation of my research. I later transcribed the audio and video recordings into Word documents, using Microsoft Word transcription software. I then analyzed transcriptions qualitatively, using Atlas text-analysis research software. I used the analysis software to identify themes and changes over time.

Journal Entries

I created one journal entry after each TAP. These were typed into a Word document. I recorded a total of six journal entries. Using Atlas text-analysis software, I focused on qualitative analysis and scanned journal entries for themes and for changes over time.

CHAPTER 4 RESULTS

Introduction

This chapter presents the results of the action research study examining the effects of regular deliberate practice with visual aids on the development of ASL classifier production skills. The results are organized to align with the research study question, "Can deliberate practice using visual aids significantly improve classifier production skills?" Findings are presented across six months of implementation, corresponding to monthly video recordings, TAPs, and journaling. This study employs mixed-method analyses, and data sources include quantitative data of classifier error rates and qualitative data drawn from TAPs and reflective journal entries. The results are presented in three sections. First, a quantitative analysis of video recordings, focusing on two categories of classifiers – instrument, and size and shape specifiers (SASSs). Second, qualitative analyses of TAP texts. Third, qualitative analyses, looking at journal entry texts. Interpretation of these findings is reserved for Chapter 5 (Discussion).

Interpretations/Video Recordings

These results are the data of two classifier groups, Instrument and SASS, documented from six interpretations collected over six months. In each classifier group, I documented the total classifiers, the number of classifiers that were not linguistically accurate in terms of choice and/or execution, and the calculated percentages of errors obtained by dividing total classifiers into total errors. **Table 1** shows totals and percentages of Instrument and SASS classifiers produced in each video recording.

Table 1

Totals and Percentages for Instrument and SASS Classifiers

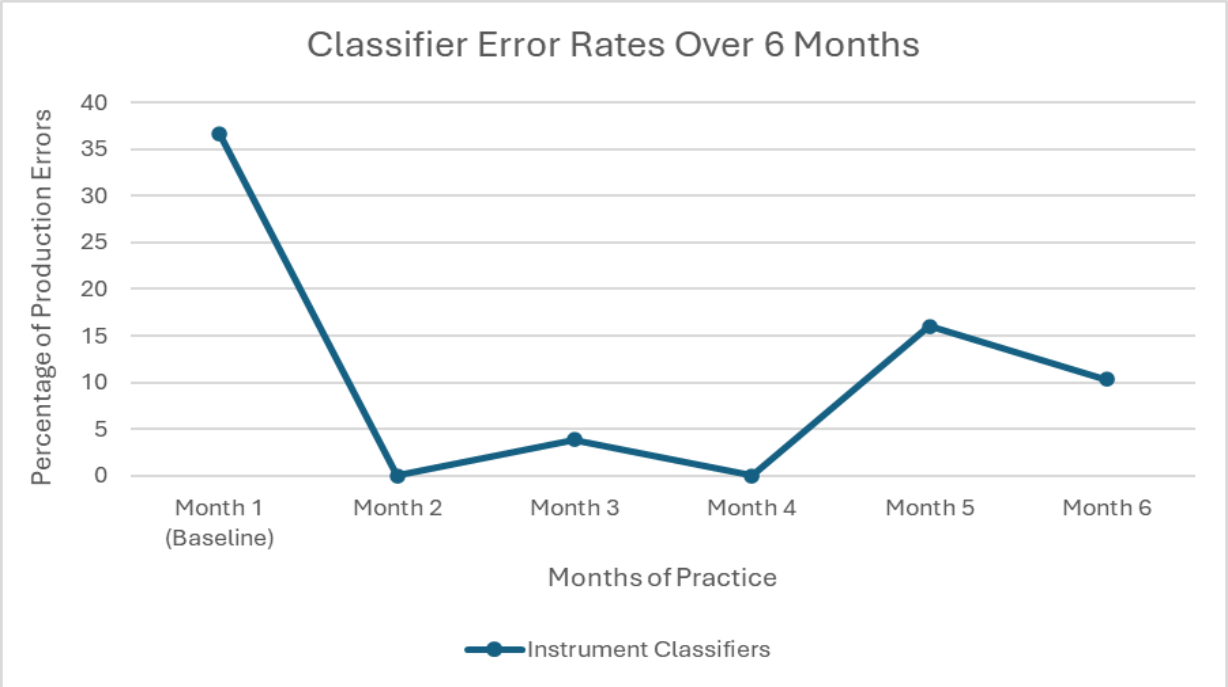
Classifier Type	Month	Total Classifiers	Total Classifier Production Errors	% Errors of Total

Instrument	Dec-24	26	9	34.62
	Feb-25	9	0	0
	Mar-25	26	1	3.85
	May-25	9	0	0
	Jun-25	25	4	16
	Jul-25	29	3	10.34
SASS	Dec-24	30	8	26.67
	Feb-25	21	2	9.52
	Mar-25	21	5	23.81
	May-25	44	4	9.09
	Jun-25	21	1	4.76
	Jul-25	27	2	7.41

Both classifier groups show the highest error rates in Month 1, with a substantial reduction in Month 2, and lower, more stable rates in later months.

Table 2

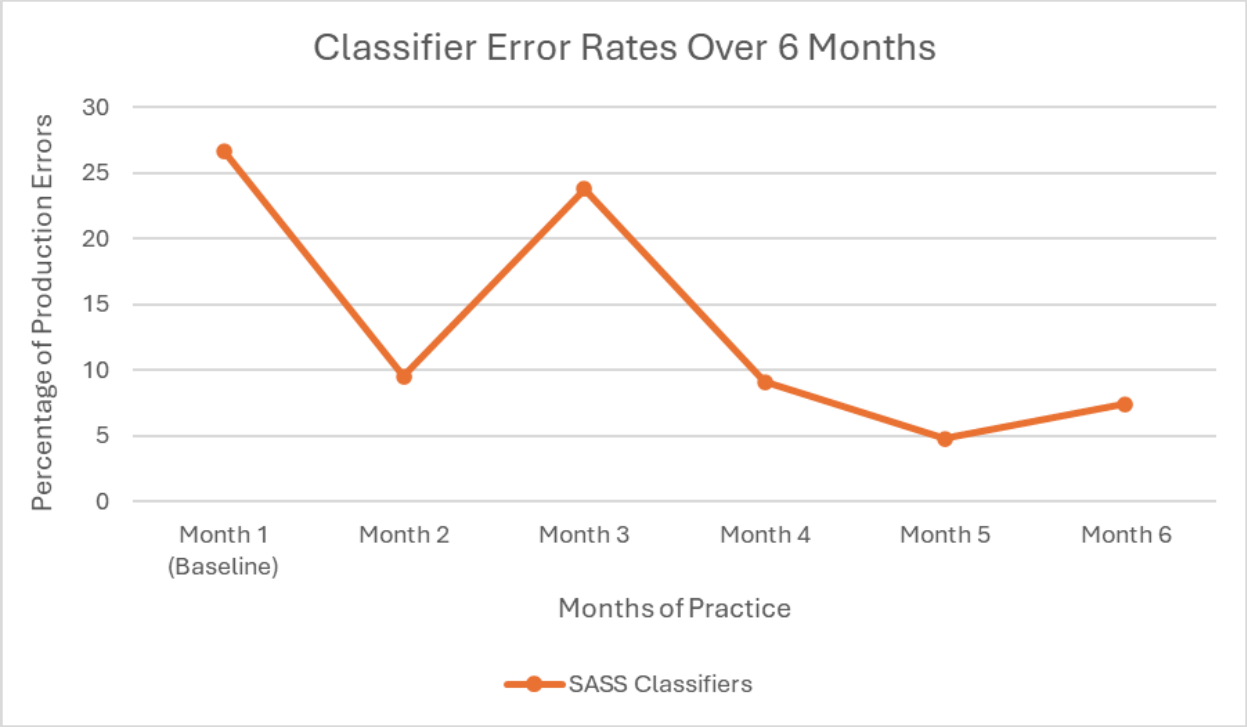
Instrument Classifier Error Rates



Instrument classifier results (see **Table** 2) show that the highest percentage of classifier production errors was 34.62, which occurred in the baseline sample in Month 1. Error rates declined significantly in the next three data samples taken in Months 2, 3, and 4, with results of 0.00, 3.85, and 0.00, respectively. They then rose again to 16.00 and 10.34, in Months 5 and 6, respectively. The data reveals a 53.78 percent decrease in classifier production errors when comparing Months 1 and 6.

Table 3

SASS Classifier Error Rates



SASS classifier results (see **Table 3**) show that the highest classifier production error rate of 26.67 occurred in Month 1, with a significant decrease to 9.52 in Month 2. Rising again in Month 3 to 23.81, it then declined in Month 4 to 9.09, and continued to decline to 4.76 in Month 5, with a slight increase to 7.41 in Month 6. Between Months 1 and 6, classifier production errors decreased by 72.21percent.

Think Aloud Protocol Audio Recordings

This data consisted of six TAPs recorded in four audio recordings and two video recordings. One TAP was recorded for each video interpretation sample. These TAPs were analyses and reflections of my interpretation samples. I transcribed the recordings to Word documents and analyzed them using two analysis software brands, Atlas, and Dovetail. I used Dovetail for summaries and thematic analyses and Atlas for determining changes over time in my classifier production skills.

Results of thematic analyses of the first TAP reflect challenges with making appropriate classifier choices for various actions, such as children in a group sliding down a hill on a sled, storing a sled behind a house, children playing hide and seek with their father and hiding behind a box or stove, and the process of grating a carrot. Limited conceptual/background knowledge of certain objects, such as a butter churn, affected ability to effectively select appropriate classifiers for description. Time limits also affected classifier choices, sometimes leading to choosing classifiers that were not optimal. Additionally challenging was finding satisfactory classifiers to accurately describe the physical properties of objects, such as “stiff” paper or “grainy” butter.

In the second TAP, areas of difficulty appeared with object representation and interaction, such as choosing linguistically appropriate classifiers to describe a paper doll, dressing the paper doll, and children looking at the doll. As well, spatial and relational representation posed challenges, as in the case of depicting animals approaching a human sitting on a rock.

The third TAP revealed challenges with describing animal action and behavior and human/animal interaction, such as rabbits twitching their noses and eating grass, horses

"breaking ground," leading and tying cows in a field, and showing a cow's flank against a human's face. However, confidence was expressed in using classifiers to describe a calf learning to drink milk. Other challenges included showing humans manipulating objects, such as the depictions of making a bed, twisting hay, and undoing hair braids. However, at this point, confidence began to increase in the ability to make linguistically appropriate classifier choices, in general, and in speed in making those choices.

The fourth interpretation used a different genre of source material, a video explaining how the digestive system works, in contrast to my other interpretations which were audio recording narratives of family life. As a result of interpreting in the specialty genre of medical interpreting, different challenges arose and the fourth TAP reflected this. A large portion of this interpretation was diagrammatic, showing body parts and systems in the signing space in front of the body and on the body (as an anchor), and the main classifier production challenges occurred with Body Part classifiers and how to apply them. Challenges included describing complex anatomical concepts and using spatial relationships, such as depicting connections between organs.

The fifth TAP relayed difficulties with using classifiers in describing objects that are hanging or that you hang. For example, the narrative explained that Laura's hat was dangling at her feet. Other challenges were describing interactions between people, as in two people holding hands and a father carrying his daughter. Describing properties, such as filtered sunlight and eyes twinkling, posed some challenges, as well as shoe prints, placing beads into a handkerchief, mosquito bites, and powdered medicine. Additionally, some spatial and perspective challenges included depicting a person looking over the edge of a bed and a dog walking alongside a

crawling person. Despite these issues, confidence and speed in classifier manipulation increased. Additionally, classifier choices were largely linguistically appropriate for the message context.

The sixth TAP indicated key challenges focused on depicting actions, such as scraping an object, showing a pig's tail movements, as well as uncertainty about accurately representing specific objects and their placement, particularly regarding describing placing a violin in its case. These skills require referencing and positioning elements in signing space. Additionally, showing spatial relationships with a cat getting its tail caught in a door presented a challenge. This interpretation involved setting up and referencing the elements of a story about cats and doors, specifically involving spatial organization, and maintaining these as the story progressed.

These TAPs show changes in multiple areas. In the area of skill development, I became more aware of my strengths and weaknesses with classifiers as well as the progression of my ability to recognize areas to improve, such as classifier usage and spatial organization. Additionally, results show a significant growth in attitude. Although I felt an initial uncertainty in classifier choice and production, an increased flexibility and confidence developed. Initially, I experienced a hesitancy in working with classifiers; however, I became more proactive, engaged in more reflection, and discovered ways of adjusting my techniques over time.

Journal Entry Texts

Data consists of six journal entries, one written after each interpretation sample that was created. These entries are reflections on my interpretations and my thoughts and feelings related to classifier production.

Notable changes occurred over several classifier production skill areas: confidence and speed, understanding core issues, perspective and dimensionality, and specific technical improvements. In February, my understanding of the core issues increased, affecting my

classifier skills and why specific classifiers posed difficulties for me. By the end of February, I became more skilled with still objects and developed a new layer of understanding about action-based interpretation. In March, my confidence and speed in choosing classifiers began to increase, as well as my comfort level in classifier production. I became aware that my application of classifiers often lacked variety in perspective and dimensions, and I began to focus on adding these aspects to my interpreting. Additionally, I saw improvements in the production of specific classifiers, such as depicting the hanging of a coat on a coat rack or hanging a chunk of meat on a nail.

By June, I began noticing the need to use classifiers to show multiple perspectives. Previously, I tended to describe distant people and objects from a single perspective. However, by July, I began incorporating multiple perspectives.

Summary

In reviewing the classifier error rates collected across the six-month data collection period, results followed a non-linear trajectory. Instrument classifier error rates were highest in month one, with baseline data samples. Month two showed a zero error rate, a slight increase in month three, declining to zero again in month four, increasing slightly in month five, and decreasing further in month six (see **Table 3**). SASS classifier error rates were highest in month one, decreased substantially in month two, then increased significantly in month three while remaining below initial levels and declining further in months four through six (see **Table 3**).

Qualitative data from Think Aloud Protocols (TAPs) and reflective journal entries align with the quantitative results of interpretation sample analyses. Data from TAPs indicated an increase in speed and confidence in classifier identification and production, and journal entries reflected positive changes in confidence and skill.

Journal entry analysis shows changes in multiple areas of classifier production, such as confidence and speed, understanding of production challenges, the need for and use of perspective and dimensionality, and overall ease with using classifiers. Journal data also showed an increased understanding of the underlying reasons for difficulty with specific classifiers. Additionally, entries revealed increased attention to using various perspectives and dimensionality, as well as showing improvements in producing specific classifiers, such as hanging a coat on a coat rack or hanging a chunk of meat on a nail.

CHAPTER 5 DISCUSSION

Introduction

This action research study examined the effects of deliberate practice with visual aids on the acquisition of ASL classifier skills. Whereas Chapter Four presented this study's results, this chapter interprets those findings with consideration of the research question, "Can deliberate practice using visual aids significantly improve classifier production skills?" I begin with discussing the findings and analysis of the video interpretation samples collected over six months, highlighting trends, patterns, and their significance. Then I review the TAP and journal entry data and consider correlations to my video interpretation findings and significant indicators. The chapter concludes with a discussion of these findings in relation to my research question and the theoretical framework that supports this study.

Video Interpretation Samples

The data from both the SASS and Instrument classifiers indicate that the highest error rates were recorded in Month 1. This trend is consistent across both classifier systems. After the initial baseline period, the error rates for both classifier groups demonstrated a non-linear progression. However, the general trends show a notable decrease in production errors, with error rates consistently below 50 percent and continuing for all subsequent data collection periods, except for Month 3 SASS classifier data collection, where the error rate, although reduced, remained only slightly lower than the initial baseline measurement. These results are summarized in **Tables 2 and 3**, which provide a detailed comparison of error trends across the different months. This data suggests a significant learning curve in the first month of deliberate practice. After my last ASL class, although I used classifiers in my interpreting, I had not formally studied or reviewed linguistic information on ASL classifiers. The initial month of

review and practice was the foundation for that learning curve. Data indicates that after the first month of deliberate practice (with visual aids and review/reflection), I gained enough knowledge and skill with classifiers - their types, handshapes, and applications. I was able to significantly improve my ability to make effective selections for message context and to enhance my production skills in subsequent interpretation samples, reducing classifier linguistic inaccuracies. Data in subsequent months were consistent with this supposition.

TAPs and Journal Entry Samples

TAPs and journal entries support my quantitative data, showing a progression in skills development and confidence. Although I faced challenges with my skills and abilities with each interpretation, as expressed through my TAPs, I also saw that my knowledge and skills slowly developed, as well as a new sense of confidence. Data shows that my speed with classifier production also increased. These TAPs revealed a journey of proactive growth in that, throughout each TAP, as I reviewed my interpretation sample, I brainstormed ideas for alternate classifier selections, formations, and executions. In March, two months into deliberate practice, data show a turning point in the advancement of my classifier abilities. At that point, I expressed an increase in confidence and proficiency in general, and specifically with describing still objects, instrument classifiers, and action. At this time, I also recognized the need to include multiple perspectives and dimensions in my depictions.

Results in Relation to Existing Research

The findings of this action research project support existing literature demonstrating that skills acquisition can be enhanced with deliberate practice and visual media. Ericsson et al. (1993) determined that skills could be improved through deliberate practice, which combines goal setting, regular and repeated practice, immediate feedback, and reflection. The reduction in

ASL classifier error rates in this study reflects the application of deliberate practice following Ericsson et al.'s parameters. This project's results further support Miller et al. (2020), who, in their meta-analysis of Macnamara et al.'s (2014) deliberate practice research, assert that deliberate practice is a valid and effective tool for skills enhancement and expertise development. This project's research results additionally support Kanoksin et al. (2025), who found that learning enhanced by deliberate practice was more effective than traditional lecture-based classroom learning for medical students. These studies all support learning and skills development through deliberate practice, which aligns with my action research findings.

In addition to deliberate practice, this study's findings support the use of visual aids in skills enhancement. Qualitative patterns observed during the study suggest that visual aids contributed to the classifier learning process. Still images and video materials were incorporated into practice activities. Given the visual-spatial nature of ASL and the visual elements of classifier constructions, using visual aids supports skill development, particularly in action-based classifier descriptions. While the effects of visual aids were not directly isolated as a variable, both quantitative trends and qualitative observations are compatible with this interpretation. In addition to the quantitative data of declining error rates, qualitative data indicated increased confidence in classifier use over time, and that confidence evolved from still images to videos in practice, which aided in the development of skill in using classifiers in action and interactive scenarios. These findings suggest that deliberate practice and visual aids, such as still images and videos, benefit the acquisition and proficiency of classifier skills. This supports existing research showing the effectiveness of visual aids in skills acquisition. Research by Ott et al. (2024), Coyne et al. (2018), and Obagah and Brisibe, (2017) showed the benefits of increased knowledge and skill with video-supported learning. Halwani (2017) and Surgenor (2017) found that students

showed greater confidence and learning flexibility when videos were used as supplemental learning aids. Obagah and Brisibe, (2017) demonstrated an increase in students' retention of information with video instruction. Pisarenko (2017) found that students showed improved language acquisition when using visual aids in learning foreign languages. These studies align with my research results, indicating improved learning and language acquisition, as well as confidence in my skills.

Together, these studies of deliberate practice and visual aids in skills acquisition suggest that ASL classifier production skills benefit from incorporating deliberate practice and visual aids, such as still images and videos, resulting in improved comprehension, information retention, and confidence. The alignment between this project's findings and research across expertise development strengthens the argument that interpreter education programs may improve classifier proficiency by incorporating regular deliberate practice supported by visual media.

The results of this research align with Deliberate Practice Theory, which is the theoretical framework that supports this study. The idea of Deliberate Practice Theory is that, with regular practice that includes the four elements of goal setting, immediate feedback, repetition, and reflection, measurable skill development will occur. I incorporated these four elements into my practice; however, daily and weekly goals were not highly specific, which could be a limitation of this study. I did create general goals, such as becoming more comfortable with and skilled at using classifiers in still images and with action videos; they were just not very specific. Despite this limitation, this study answered my research question, showing that deliberate practice with visual aids did increase my skills, as indicated by a reduction in linguistic errors.

Summary

The results of this action research study indicate a steep learning curve in ASL classifier use after the first month, possibly due to reviewing classifier linguistic parameters and use in various contexts. However, this improvement in skill continued to be evident throughout the study, despite a non-linear decline in classifier error rates. This study supports existing literature on deliberate practice for skill acquisition as well as research showing that visual aids enhance the learning process in skills acquisition. The next chapter will discuss this study's biases, limitations, applications, and suggestions for future research.

CHAPTER 6 CONCLUSION

Introduction

In this action research project, I examined the use of deliberate practice and visual aids in the acquisition of ASL classifier skills. This study is within the framework of my research question, "Can deliberate practice using visual aids significantly improve classifier production skills?" as well as the theoretical framework of Deliberate Practice Theory (Ericsson et al, 1993). In this chapter, I will discuss the study's limitations, my biases, the significant applications of this research, and recommendations for future research. I conclude with a summary of the chapter.

Study Limitations

This study presents limitations that deserve careful consideration, as each affects how the findings should be interpreted. First, the research was conducted as an action research project, focusing solely on my own interpreting work; thus, only one participant was included. The limited sample size does not allow for the generalization of classifier skill development over a broader population. As a result, the findings are context-specific and cannot be generalized. Future studies should include a larger, more representative sample that includes ASL students, interpreting students, and professional interpreters.

Additionally, the research was limited to six months for practice and data collection due to the requirements of this graduate research exit project. This relatively short timeframe may not represent long-term trends or continued progress in classifier skill development. Extending the duration of future studies may provide better insight into the acquisition of classifier skills over time.

Despite these limitations, this study offers valuable insights into the process of deliberate practice in ASL classifier skills enhancement, highlighting areas for future research.

Biases

In conducting this action research project, I was aware of the possibility for personal biases to influence both the research process and the interpretation of results, particularly regarding Deliberate Practice Theory and the use of visual aids in classifier skill development. As a proponent of deliberate practice and someone who has personally benefited from applying it to my academic work in college, I recognized that my expectations may influence my research data analysis and conclusions. Bias could have affected my qualitative (subjective) data, which included narratives of my progress in TAPs and journal entries. For example, my belief in the effectiveness of deliberate practice may have influenced my perception of improvement, leading me to document increased confidence that might not be entirely attributable to deliberate practice and visual aids. An example of this is my description of feeling more proficient at selecting and executing classifiers, which could partially reflect my expectations rather than measurable change.

In contrast, the quantitative (objective) data, such as the total accuracy rates measured through observation and comparison with ASL linguistic standards, were less susceptible to subjective interpretation. This data relied on measurable parameters within ASL linguistics, reducing the influence of personal bias. For example, I noted the choice and articulation of classifiers and whether these fit within appropriate linguistic and semantic parameters, then documented this data in an Excel spreadsheet.

Regarding visual aids and personal bias, two types of visual aids were employed: still images and videos, resources allowing me to practice producing classifiers in a variety of

contexts. Video practice provided the opportunity to work with classifiers, showing the movement and interaction of agents in a scenario. Without visual aids, practice would have been limited to my own imagination. As a result, my perception of the benefits of visual aids in supporting classifier skill development may have been influenced by a bias of their value to my practice.

One unexpected outcome of this process was a notable increase in my confidence. Initially, I anticipated some improvement in skill, but I did not foresee such a marked rise in confidence in my abilities. This surprising data suggests my confidence grew not only from a belief in improvement, but also from tangible evidence of increased knowledge, more rapid decision-making, and greater fluidity in production. This indicates that the deliberate practice process, especially when combined with a variety of visual aids, not only enhances technical ability but also enhances a deeper sense of competence and self-efficacy, a result that supports the value of structured and reflective skill development.

Study Significance and Applications

Understanding how deliberate practice influences classifier skills is essential for developing effective strategies to support ASL and interpreting students, as well as ASL-English interpreters, throughout their learning. These findings could inform curriculum design by incorporating deliberate practice classifier exercises in ASL courses or developing workshops for interpreters focused on classifier proficiency. By examining the impact of deliberate practice, educators and professionals can better address learners' specific needs and enhance their proficiency in this complex skill.

Classifiers represent a particularly challenging aspect of American Sign Language for most students and interpreters. They require nuanced handshapes and spatial awareness, making

them particularly difficult for learners to master without informed practice. Research has highlighted these difficulties, emphasizing the need for additional support and instruction to overcome them (Jacobs, 1996; Cates, 2021).

Recommendations for Future Research

To build on the findings of this study, future research should use larger sample sizes that include participants from broader populations such as ASL students, interpreting students, and professional interpreters. Extending the research timeframe beyond six months is also recommended to gather more comprehensive data. Additionally, it would be beneficial to include all classifier subgroups in subsequent studies to explore which groups respond most rapidly and effectively to specific types of deliberate practice. Further research should also examine various aspects of classifier production, with particular attention to the five parameters: palm orientation, location, movement, handshape, and non-manual markers (non-manual markers encompass facial expressions, head movements, eye gaze, mouth movements, and body postures, all of which are part of the linguistic and semantic components of ASL). This deeper exploration could significantly inform and advance ASL and interpreting pedagogy.

Summary

This research project has helped me develop my interpreting skills in a previously challenging area. Through developing my interpreting work through reflective practice, I have increased confidence and self-efficacy with classifier work. I believe this research can be encouraging to interpreting students and interpreters who find classifiers challenging. I hope that this work will inspire further research in the area of classifier production skills in this and other areas.

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