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Using ASL and print-based sign to build fluency and greater independence with written
English among deaf students

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Abstract

This study investigated the use of ASL and print-based sign in the development of English writing fluency and writing independence among deaf, middle school students. ASL was the primary language through which students engaged in higher-level thinking, problem solving and meaning making. Print-based sign was used for rereading the collaboratively constructed English text. Mixed method approaches were utilized. First, a pretest-posttest control group design investigated whether students receiving the instruction made significantly greater gains compared to non-receivers with length of text—one indicator of writing fluency. There were a total of 33 students, 16 in the treatment group and 17 in the comparison group. The intervention lasted a total of 8 weeks, during which the treatment teacher guided the collaborative construction of two English report papers. The comparison group continued with its usual writing instruction and had equal instructional time. The analysis of variance (ANOVA) for length was statistically significant with a large effect size ($d=1.53$). Additionally, qualitative data demonstrated ways in which three very different classes in the treatment group gained greater English competency and fluency. Further development of ASL as L1 was deemed a necessary component for students with language delays. All students exhibited progressively more independence with writing over time.

Using ASL and print-based sign to build fluency and greater independence with written
English among deaf students

This study considers the development of writing fluency and writing independence among deaf students—primarily those having severe to profound hearing losses, using or developing American Sign Language (ASL) as their primary language (L1), and having associations with the Deaf community and culture. When deaf persons with these unique life experiences become proficient readers and writers of English, there is value in studying and understanding their successes in order to replicate with others. Yet, to date, very little is known about how such persons develop English proficiency.

A Basis for Development of English Proficiency

Some claim English proficiency can be explained by the interdependence theory of bilingual education (Enns, 2006) which purports that there is a common underlying proficiency to language that allows skills whether cognitive or literacy-related to transfer across languages (Cummins, 1979). Few dispute that Cummins's model of interdependence has applicability to the deaf learner, for proficiency in ASL as a first language can lay a cognitive foundation that supports overall academic learning.

However, when it comes to the development of writing skills in English, the experience of the ASL user is unique from other bilinguals. First, there is no written language for the L1 (i.e., ASL). Unlike others who may be literate in their L1 and use this foundation of knowledge to support reading and writing in their L2, deaf students write for the first time using their L2. Second, among deaf persons with profound losses, a foundation for writing in English is often not developed through the use of spoken English. The interdependence theory rests upon the assumptions that students are

developing oral proficiency in their L2 and/or written language proficiency in L1. When ASL is the language of the community, this is not the case. And, without typical bilingual/ biliterate paths available, some would argue that ASL users are lacking a bridge to the development of written English (Mayer & Wells, 1996).

Proficiency in the L2 happens with adequate exposure to the language through genuine oral and written dialogue and with motivation among those learning it (Cummins, 1986). For deaf users of ASL as their primary language, gaining adequate and meaningful exposure to English can be a considerable challenge since it often cannot be accessed auditorily. With respect to bilingual education of the deaf, there are certainly unanswered and lingering questions. For example, can text alone provide the quantity and quality exposure to English necessary for development? Although some research on sign-text bilinguals exists, the focus has been on lexicon processing to determine conceptual models of production (Dufour, 1997) rather than how deaf persons have achieved sign-text bilingualism and to what extent they have become proficient users of English. There is skepticism that text alone can provide the necessary input for development of English.

Some have argued for communication via manually signed English which would make English visually accessible to deaf persons, and then serve as a substitute for oral English proficiency. The signer's communications might include any combination of English-based sign, mouthing, speech or fingerspelling for the purpose of expressing and receiving English (Mayer & Akamatsu, 2003). It is the position of this researcher that English-based sign approaches (excluding manually coded systems which have fallen out of favor for being cumbersome and a-conceptual) do not serve as adequate substitutes since the complexities of English grammar are not fully represented.

English-based signing is a socially and culturally produced method of communication. It is used by the deaf when, for instance, communicating with non-users of ASL or when specifically emphasizing the expression of something English-like through sign. English-based sign has also been called pidgin or contact sign, for it has developed spontaneously from two languages that have come in contact and is used as a method of communication between speakers of different tongues. By definition, a pidgin or contact language has a simplified grammar and restricted vocabulary (Pinker, 1995). And, as persons sign with more conceptually accurate expressions, there is a greater use of visual and spatial aspects of ASL grammar that are more distant from English. With the exception of those who receive additional access to English in a multi-component fashion through lipreading, fingerspelling, and by using one's residual hearing, deaf children have yet to acquire proficiency in English through English-based signing alone (Stewart, 2006).

Thus, the aforementioned population of deaf students is neither developing writing skill associated with their L1 nor an oral proficiency in English that would be supportive of writing fluency in L2. And, visual ways of expressing English that are believed to lead to English competency (such as English-based sign) fall short in representing the full complexities of English grammar, especially when used conceptually for meaning making purposes. It is then instructive to examine the use of teaching approaches that explicitly direct L2 learning.

Explicit Awareness Leads to Competency in the Second Language

Explicit awareness is consciousness of language—an ability to examine and reflect on language forms as well as analyze structure. It is also referred to as

metalinguistic knowledge because language in and of itself becomes a focus of one's thoughts and attention (Yaden & Templeton, 1986). Metalinguistic knowledge can relate to a raised awareness with various language elements (e.g., graphophonemes, pragmatics, semantics, syntax) or with language as a process (Rowe & Harste, 1986). Implicit competence, in contrast, is an unconscious set of grammar rules that guide one in the generation of expressions. Patterns of language are acquired and automatically abstracted during communicative and meaningful language acts (Jackendoff, 1994). When one utilizes implicit competence to judge grammaticality, he relies on a gut feeling or a rhythm of what sounds right rather than what he has consciously learned. Further, he may think something is correct but not be able to explain why (Ellis, 1994). With the exception of those in extreme and atypical language environments, all children unconsciously acquire the language of their community as their primary language (L1). For the majority of children in this study, ASL was acquired implicitly during infancy or childhood.

According to Krashen's input hypothesis (1994), persons have two separate routes to developing ability in a second language (L2)—acquiring implicitly and learning explicitly. There are advantages to having both. First, it is inconceivable that one could learn an L2 through explicit teaching alone; there has to be some opportunity for acquisition. Language systems are too complex to be consciously learned in their entirety (one rule at a time). At the same time, studies of second language acquisition (see Ellis & Laporte, 1997) demonstrate that there is a need for explicit instruction (especially grammatical consciousness raising, negative evidence with recasts, and output practice) which is not necessarily needed for acquisition of L1. This need may be reflective of Eric

Lenneberg's critical period hypothesis, suggesting natural language acquisition declines with age and is restricted after puberty (Jackendoff, 1994; Pinker, 1995). However, with respect to L2, Lenneberg also acknowledges that natural languages tend to resemble one another in many fundamental ways and that learning a second language might be possible at any age once the L1 is established (Bialystok, 2001).

When metalinguistic knowledge is heightened through explicit instruction, one's ability to process and produce the L2 using this knowledge is slowed considerably. It takes more time, effort and cognitive capacity to express grammatically correct language (Ellis, 1994). While there is some disagreement on the interfacing that may or may not occur between explicit knowledge and implicit competence, most agree that the two can work together to produce more accurate expressions (Krashen, 1994; Paradis, n.d.). And, as with other cognitive skills, a person's ability to apply the correct language form can become more automatic or proceduralized with frequency of exposure and practice (Ellis, 1994).

These theoretical conceptions are exemplified in a study by White and Ranta (2002) which examined two groups of 6th grade students who spoke French as their L1 and were learning English as their L2. The teacher of the first group provided explicit instruction on the his/her possessive determiners to the students. The teacher of the second group continued instruction as normal; students were provided comprehensible input in the L2 but no explicit instruction. By the end of the intervention, there were some students in the second group who did reach high levels of oral production and metalinguistic knowledge. They had abstracted the structure of the language on their own simply by being exposed to the L2 in meaningful and communicative settings. Yet, more

students in the first group who received the explicit instruction exhibited high levels of metalinguistic knowledge for the his/her determiner. This was, in turn, associated with greater emergence of oral production. The explicit teaching, in this case, expedited the typical acquisition process. Paradis (n.d.) explains this as a shift from using metalinguistic knowledge to implicit competence, whereby the latter gradually replaces the former. The knowledge may not directly contribute to implicit competence; however, it may serve as a trigger to the development of competence. One important aspect of this interplay between explicit instruction and implicit competence is that explicit instruction of language is accompanied by or followed by application. Persons are exposed to and are encouraged to utilize the taught language as a part of real communications.

The Cognitive Academic Language Learning Approach (CALLA) is a model of instruction that incorporates explicit instruction of language learning strategies and content (Chamot & O'Malley, 1994). The approach emphasizes (a) higher order thinking, (b) teacher modeling and scaffolding, (c) interactive dialogue, (d) and use of students' prior linguistic competence and conceptual knowledge. Substantial gains on language achievement measures have been found among English Language Learners (ELLs) and Foreign Language (FL) students, especially among those reporting high use of the learning strategies. Overall it can be argued that explicit instruction in addition to implicit competence is necessary in L2 development.

The current study is based on the premise that the L1 plays a necessary role for deaf students in the development of writing. Through ASL, explicit instruction of the L2 or metalinguistic knowledge building can occur. Students use their L1 to engage in discussion, comparison and problem solving of L2 language features. At the same time,

there must be opportunity for implicit language learning. In the current instructional intervention, this was made possible through the use of print-based sign during guiding writing. Print-based sign is a more complex and non-communicative form of contact sign that was utilized when rereading and revising English text as a class. It was hopeful that students would develop a rhythm for written English –in all its complexity—through this process. This investigation was part of a larger study (Wolbers, 2009) that examined a number of quality writing variables.

Design

A mixed method design illustrates significant quantitative and qualitative outcomes. First, a pretest-posttest control group design investigates whether students receiving the instruction made significantly greater gains compared to non-receivers as those gains pertain to length of text, one indicator of writing fluency. Current research on writing fluency has utilized similar quantitative measures such as rate of text (Olinghouse, 2008) or number of T-units (Li, 2007); however, it should be recognized that these measures do not provide comprehensive understanding of fluency but serve as first indicators. Future directions in L2 writing fluency may consider measuring additional process-based indicators such as the mean length of writers' translating episodes (Abdel Latif, 2009). Additionally associated with the current study, qualitative data was collected to demonstrate ways in which three very different classes in the experimental group gained greater English accuracy and fluency over time.

Research Questions

Quantitative

Do deaf students who receive the intervention techniques (i.e., 1 - explicit L2 language instruction via ASL that is recontextualized into purposeful communication acts and 2 - print-based sign when rereading English text) make significantly greater gains in written English fluency compared to deaf students not receiving the intervention techniques in tandem with their writing curriculum?

Qualitative

In what ways are students in the treatment group evidencing over time greater accuracy, fluency, and independence with writing English?

Participants and School Contexts

In order to gather enough student participants for this quasi-experimental study to obtain the necessary power, two various deaf education programs were utilized. Participants were two middle school teachers of the deaf, one from each program, and their respective students. There were 33 total students, 16 in the treatment group and 17 in the comparison group. Great care was taken to match the two school programs, the two teachers, and the two groups of students on a number of pertinent variables. The programs were selected because they adhered to the same communication philosophies, had approximately the same number of deaf students attending, and served as epicenters of the deaf community and deaf events, even though one is a residential school and the other is a center-based program. The teachers had approximately the same number of years experience, both were hearing, both had graduate degrees in deaf education, and both had national interpreting certificates through RID and were effective users of ASL. The comparison group teacher came with high recommendation from administration.

Regarding student comparability, there were no significant differences found for age ($M=12$), hearing loss ($M=93\text{dB}$), or pretest reading levels ($M=2.77$).

Both the treatment and comparison groups were comprised of three instructional classes: high, mid, and low. Students in each of these two programs were placed according to their language and literacy levels. The students in the high-achieving classes at each site were reading at or slightly behind the level of their hearing peers. The students in the mid-achieving classes at each site were at a literacy level approximately 3-5 years behind their hearing peers. The students in the low-achieving classes at each site exhibited severe language delays in L1 development and were achieving at beginning literacy levels.

Procedure

During an 8-week period, the students in the treatment group were exposed to intervention techniques while students in the comparison group continued with their classroom writing instruction. The treatment teacher guided the collaborative construction of two report papers during the intervention period. Students in the treatment group and comparison group had equal amounts of instructional time. Within the treatment group, there was great variability among students and, therefore, the instruction was implemented differently in the high, mid, and low-achieving classes. The intervention was responsive to students' prior knowledge, both conceptual and linguistic. Likewise, the instruction in the comparison classrooms varied according to ability levels.

Instruction in the treatment classroom. The instruction utilized in the treatment group, called Strategic and Interactive Writing Instruction (SIWI)¹, involved students and teacher working collaboratively to generate, revise, and publish pieces of text. The

¹ For a more detailed description of SIWI, see Wolbers (2009).

particular students in this study, as identified by their teacher, needed to learn how to write report papers or expository pieces of text. During the SIWI intervention, students co-constructed two expository texts for preselected and authentic audiences. At the beginning of the intervention, the instruction was substantially guided with the teacher utilizing modeling, explanation and thinking aloud strategies. Over time, students appropriated the higher-level (e.g., organization, structure) and lower-level (e.g., English syntax, spelling) writing skills that were needed and assumed greater independence over their writing and thinking. Of particular interest to this paper are SIWI methods meant to increase explicit knowledge and implicit competence of English.

SIWI is comprised of two main components that were present on all days of the intervention; these components include (1) strategic instruction rooted in cognitive theories of composing and (2) interactive instruction which is based on sociocultural theories of teaching and learning. The instruction was strategic in the sense that students were explicitly taught to follow the processes of expert writers. The mnemonic POSTER (plan, organize, scribe, translate, edit, revise) was used to prompt students to engage in writing behaviors of those more knowledgeable. Students each had their own individual POSTER cue cards that had questions, prompts and visual scaffolds for those writing actions to be accomplished during each sub-process. For instance, “plan” encouraged students to think of audience, purpose and what they already know on the topic. Students came to appropriate these strategies over time and no longer needed the prompts or cue cards. For the purpose of editing and revising, students repeatedly read through the constructed text as a group. When students read the text, they used *print-based sign*.

Print-based sign is a nuanced and complex way of signing because it calls for students to pay attention to the exact written English and express the corresponding meaning through a manual/ visual mode. While reading, the teacher uses one hand to point to the printed text and one hand to sign, or she points to the word/s first and then signs. Many students also prefer to voice or move their mouths to replicate the words they are reading. Every attempt is made to represent visually all the English while avoiding conceptual inaccuracies. This entails fingerspelling words that do not have meaningful equivalents. Also, because of the lack of one to one correspondence between languages, it involves, at times, signing one word that equates to more than one written word or signing multiple words that equate to one word in text. The teacher references and points to the text; therefore, the signing is always supported with the English printed word. While such a method is deemed too cumbersome for the purpose of communication, it is a way of practicing English visually and manually while retaining the full complexity. Additionally, since the text during writing was generated by the students based on their own ideas, the English as input was comprehensible and meaningful.

The SIWI instruction was interactive in the sense that students shared ideas, brainstormed by building on each other's ideas, and cooperatively discussed and determined all writing actions. The teacher would "step-in" (Englert & Dunsmore, 2002) to provide guidance, model, scaffold, or think aloud if students struggled with how to proceed. The teacher would "step-out" when students demonstrated independence and control over the decision-making. Oftentimes, students were engaged in higher-level thinking skills such as problem solving, explaining, evaluating, justifying, and reasoning.

When students interacted with each other and discussed how to accomplish something in their writing, they chose to use ASL.

There were four additional and minor SIWI components. These included the use of (1) examples/models and non-examples, (2) visual scaffolds, (3) explicit grammar lessons that were later recontextualized back into authentic writing, and (4) metalinguistic knowledge building (e.g., distinguishing and comparing ASL and English constructions). Whereas the first two of these components were applied mainly in support of students' higher-order composing abilities (e.g., use of text structure, organization, coherence) and unrelated to this particular study, the latter two are relevant for they involve explicit instruction of the L2 through the primary language of ASL.

Instructional components suspected to play a large role in students' development of accuracy and fluency in English are: (a) the use of ASL during problem solving discussions of language, meaning making, and metalinguistic knowledge building conversations, and (b) the use of repeated readings of co-constructed text using print-based sign.

Instructional variations by level. At the start of the intervention, students in the high-achieving treatment group demonstrated an understanding that written English and ASL have distinct and distinguishable characteristics. Students--when discussing, problem solving, or meaning-making--would opt to use their primary language, ASL. For example, while students were co-constructing text about the Lincoln Memorial, one student explained to the others (using ASL) what "2nd inaugural address" means. On another occasion, one student questioned the organization of a paragraph, saying that it just does not flow. He recommended switching a couple sentences so ideas fit better

together. The student used ASL to convey his reasoning to the other students. At the same time, students of this high-achieving class could recognize situations that called for using English. When students offered ideas to be added to the collaborative text, they used English-based sign to relay the expression with as much English accuracy as possible. This was not a prompted action; rather, students automatically made the switch to contact sign when writing. Although students' expressions in contact sign were lacking in English grammatical complexity and precision, they were close enough approximations of English that they could be written and subsequently revised, reworked, or further complicated. One of the objectives for these students was that they develop an internalized repertoire of English that is more complex than their current version. The approach taken with this group was to provide explicit instruction of English constructions and to practice English in its fully complex form within the context of purposeful composing. The teacher determined which grammatical aspects needed in-depth focus, based on students' readiness at the moment. If the grammatical problems that surfaced were beyond explanation or too far beyond students' current levels of understanding, the teacher would model the correction to the text and briefly explain or think aloud. Students would repeatedly read through the constructed text with the teacher using print-based sign.

The instructional approach taken with this first group can be illustrated with an example. On one day, a student wanted to add his idea to the group's text about Washington, D.C. He switched to English-base sign, utilizing his English competence. He fingerspelled some words and also used some artificial signs for functional words (e.g., the, is) that are not typically necessary in ASL. He said, "Lincoln memorial is the

place to honor Lincoln for freeing the slave and make America united.” He spelled the words “freeing” and “united”. Although he could utilize ASL signs that relay the appropriate concepts and meanings of these words, he wanted these exact English words with the exact spelling. There is a sign in ASL that carries the concept of “free/freedom/frees”, but the morphemic ending of “ing” is a construction that is specific to English. Now this contribution was a close enough approximation of English that it was added to the text but then underwent a round of revisions. The students collaboratively worked through the revisions with the teacher’s guidance, adding “the” to the beginning of the sentence, changing “make” to “making” and making “slave” plural by adding “s”. They noticed the latter two mistakes on their own, discussed the applicable English grammatical rules, and agreed it was necessary to revise those areas.

In the case of adding “the” before “Lincoln Memorial,” the students needed to be prompted by the teacher that there was a problem. She took the opportunity to teach a brief and explicit mini-lesson on the use of articles. She created a visual scaffold (see Table 1) for students to determine which article, if any, was necessary before the noun in question. After the short lesson, the chart was placed on the wall in the collaborative writing area. Students used this tool to support their application of the rule to the sentence they recently constructed. (Charts like these stayed on the wall until students had appropriated the knowledge and could independently select determiners.) To complete this portion of the lesson, the class, using print-based sign, reread the grammatically accurate sentence together.

The mid-achieving group of students used ASL as their L1 just as the first group but did not have a natural inclination to switch to English-based sign when writing. Two

students of the group did exhibit more metalinguistic knowledge than the others and were more likely to code-switch or attempt to code-switch to English, adding function words and morphemes, although sometimes in the wrong way. In the mid-achieving group, students' writing commonly consisted of ASL-like productions, which would indicate that students either did not recognize English as a separate language or they had not yet developed even a simplified internal representation of English. For example, one student wrote, "Sometime that problem solve it" which resembles ASL's topic-comment structure. Another student wrote, "Night yesterday buy movie DVD" which is exactly how the expression is signed. "Night yesterday" meaning "last night" serves as a time marker of the past in ASL. As such, there is no need to change the verb tense since the time marker is in place. As Durgunoglu (1997) observes, persons may attempt to apply their L1 grammar when engaged in L2 language or literacy activities; this may continue until new and distinct parameters are in place for the L2.

The mid-achieving class was exposed to a metalinguistic knowledge building strategy in addition to employing the techniques used with the high-achieving class. When students offered ideas to add to the written text, the teacher frequently asked, "Is that expression more like ASL or more like English and why?" This question prompted students, with guidance, to think about and discuss the structural differences, and it also encouraged them to attempt some translation as time went on. Much instructional time with this group was spent discussing ways of transforming a visually and spatially expressed idea into a linear English statement. Therefore, another recurrent question posed by the teacher was, "How can we change that ASL expression into something that is more like English?" When the teacher asked this question, she used an ASL thinkpad.

The thinkpad is a separate writing space that allowed the teacher to capture ASL expressions through glossing, drawing, or listing of key signs. Capturing ASL expressions helped students to remember the original expression while discussing translation approaches. Translation conversations were carried out primarily in ASL.

The low-achieving treatment group of students consisted mostly of students with minimal language development in an L1. Two students had more of an ability to express themselves through ASL than the others. However, even though the language of these students was slightly more advanced, behavior problems were a consistent challenge for the teacher. These students were not achieving or demonstrating learning. Three other students were recent transfers from other school programs and exhibited severe language delays. These students had little to no sign ability when first arriving at the school and little to no intelligible speech. A final student had more residual hearing and intelligible speech than the others but still exhibited many gaps in her oral competency that likely served as barriers to reading and writing. Since joining the signing program, she had been increasingly developing and using sign to express herself; however, she utilized it mainly to support her speech. At pre-test, the writing samples of students in the low-achieving group consisted of a few sentences that mainly did not make sense to the reader. For example, one student wrote, “I want be need do know”, and a second student wrote, “My is my dad how ball.”

With the low-achieving group, there was a continual attempt to engage students in interactions using ASL to further develop the L1; students needed a fully accessible language through which they could express, understand, and mediate learning. Oftentimes, students relied on showing, drawing, gesturing, or acting out meaning instead

of describing with language. The first objective was always to ensure students shared meaning of the associated language. The teacher would often ask students if they understood what was expressed and whether they were able to repeat the message in their own words. Asking students about their understanding was a quick comprehension check to ensure students were monitoring their receptive skills and applying appropriate conversation strategies when they were not understanding. Through this process, meaning was obtained, and the teacher or other students would restate, summarize, or reconceptualize the expressions. This process allowed ASL learning to be contextualized and meaningful.

The low-achieving group of students faced substantial challenges in participating in the writing activity. The interactive format required students to express their ideas or questions, give attention to others, and build meaning with others through interweaving talk. This was no small task for students with minimal language skills and very little history with two-sided conversations. Students needed much guidance with conversation principles (i.e., expressing themselves clearly, looking at the speaker when she is talking, attempting to understand what she is saying, providing related responses, turn taking, asking questions when meaning is not clear). Students were not accustomed to watching and trying to understand others' contributions. They would talk directly to the teacher and disregard other students' comments. The teacher would remind them to handle one suggestion at a time and would redirect their attention to the original speaker for the missed comment to be repeated. Language commonly used by the teacher was, "That is a great suggestion, but she is not finished with her idea yet. Let's help her finish. Look what she is saying."

Students helped each other build ideas through language. For example, one student offered an idea to add to the text, saying, “continue 40 years.” The teacher repeated this idea and asked the group to help him create a more full idea. Students had to address the questions, “Who are we talking about? 40 years of what?” The students worked together to construct a more complete idea. They collectively produced, “3 stooges continue 40 years, start performing 1930s”. This idea was indeed more complete and was placed on the ASL thinkpad for translation.

During class, ASL and English were clearly identified as having distinct uses and characteristics. Because understanding was first achieved using ASL and gesture, almost all of the students’ contributions to the text were first housed on the ASL thinkpad. The class then went through a process similar to that used with the mid-achieving class whereby they talked through the translation of the ideas from ASL to English. Just as students in the mid-achieving class needed to figure out the English words that matched the signs they knew (e.g., “shift the controller”), so did the students in the low-achieving class. When the class would finish translating an idea, the idea was checked off on the ASL thinkpad. For this class, there was much emphasis on simple sentence construction—sentences had to contain subject (who or what) and a verb (do-what).

Instruction in the comparison classrooms. The high-achieving class of students in the comparison group was reading literature and novels at grade level. On a daily basis, students would read from leveled books and respond in writing to questions about the reading. They also received explicit English grammar instruction, did work from a grammar textbook, wrote journals, and spent time on vocabulary-building activities. In comparison to the other classes, they completed more out-of-class reading and writing

assignments. And, they completed assignments at a level of greater sophistication than those assignments completed by the other classes. They also received instruction regarding idioms and multiple meaning words.

The second class of students, considered a mid-achieving group, spent more time on writing-related activities than on reading activities. Just as students in the first class read from leveled readers and responded in writing to questions, so did the students from the second class. Students in the second class were also matched with penpals at a different school; students in the second class wrote approximately 4 to 5 emails to their penpals with the understanding that they would eventually meet. The nature of this activity motivated students to write substantially longer text (i.e., $\frac{1}{2}$ page to $\frac{3}{4}$ more with later emails as compared to beginning emails). After drafting their letters, students worked one on one with the teacher to discuss an agenda for revisions and edits. For this step, students utilized Microsoft Word “track changes” feature. Then, students prepared their final drafts. Students in this second class also received explicit English grammar instruction. Instruction began with a focus on parts of speech (i.e., nouns, verbs, adjectives, adverbs) and transitioned over time to the construction of sentences and paragraphs. Multimedia and hands-on activities were incorporated in grammar teaching (e.g. use of a smartboard to incorporate physical touch). On a regular basis, students also wrote in journals to open-ended prompts or to topics of their choice.

The third group of students, categorized as having low language and literacy skills, also engaged in penpal exchanges. Students read from leveled readers (fiction and non-fiction) and then responded to questions, oftentimes using writing to give short and extended responses or to complete comprehension worksheets. There was also much

attention given to vocabulary building. Students highlighted unfamiliar words while reading. Then, they participated in activities where they would learn and practice these new words (e.g., vocabulary bingo). Lastly, students practiced retelling and sharing text in ASL, thereby building literacy connections with the dual languages present in the classroom.

Sources of Data

Writing samples were collected from all students prior to and after the intervention period to evaluate the differences in length of text as determined by the number of words. The writing prompts were created to mirror some state standardized assessments. These can be viewed in Appendix A. The two prompts were counterbalanced to reduce any impact based on the prompt itself. All students were provided the prompt on paper but were also provided interpretation (via ASL) of the prompt as many times as they wanted. Students completed their writing during a period of approximately 30 minutes.

Additionally, videotaped observations were made in the treatment classes every fourth lesson over an eight-week period. The videotapes were reviewed and analyzed for evidence of growing independence in students' ability to: distinguish and describe differences between ASL and English; code-switch from ASL to English-based sign; and discuss and utilize complex English grammar during the co-construction of text. Data from observations were supplemented with teacher reflections.

Analysis and Results

Quantitative Findings

An analysis of variance (ANOVA) was performed with length of text as the dependent variable. The univariate statistic indicated that length of composition was influenced by instruction, $F(1,31) = 20.55, p < .000, \text{partial-eta squared} = .40, d = 1.53$. In the comparison group, the average number of words at pretest was 49. At posttest, the total word count was approximately the same at 42. The treatment group's word production, however, grew from an average of 35 total words on the pretest to an average of 81 words on the posttest. The low- and mid-achieving groups made the most drastic improvements from pretest to posttest; yet, all three classes in the treatment group wrote considerably longer papers at posttest. Results by class can be viewed in Table 2, and samples of student writing at pretest and posttest can be viewed in Appendix B.

Qualitative Findings

Qualitative data illustrate students' growing accuracy and fluency with English. Even though the high-achieving class in the treatment group was already utilizing their English knowledge and/or competence to construct text with relative ease near the beginning of the intervention, their writing exhibited slightly increased length by the end of the intervention. More important for the students in this group, however, was their growing independence with grammatical accuracy. Over time, the teacher recognized she had more of an ability to "step back" and allow students to collectively revise and edit previously taught constructions and grammar. Parallel improvements were noted in their independent writing as well. For example, the teacher had explicitly taught students in this group how and when to construct compound and complex sentences in their writing. They subsequently practiced embedding these more advanced sentences into the collaborative text during guided writing. On posttest, students, on average, had doubled

their correct use of compound sentences as compared to pretests. Even more striking, students quadrupled their correct use of complex sentences.

The technique of building metalinguistic awareness was useful in helping students from the mid-achieving class distinguish ASL from English. They evidenced a growing ability to recognize language elements as ASL or English. By the end of the 8 week intervention period, students needed less prompting and guidance on how to talk about either of the languages. When ideas were up on the ASL thinkpad, students, as a group, became more able to apply translation techniques, moving the ASL to a close approximation of English. The two students that were already evidencing some code-switching at the beginning of the study became more consistent and more accurate. Other students increased their use of English-based expressions during the co-construction of text, although with irregularity.

One additional observation of the ASL thinkpad is that students were more inclined to participate in the construction of text. The ASL thinkpad provided an “entry point” into writing that was not available to them before. It allowed students to be involved in generating ideas for the text even if they did not yet have English for the expression. Students learned that writing is a process of problem solving and revision, and that writing is not typically expressed on paper the first time perfectly. Rather, writers give attention to language and translation to determine appropriate and equivalent expressions that represent their ideas. Value is given to the process and thinking more than the product. The following classroom exchange demonstrates new ways of student involvement in the process of writing.

One day while the students were writing together about an indoor water park, one student sat idle. The teacher looked directly at her and said, “OK, I would like to hear your ideas now. What do you think we should add to the text next?” The student appeared hesitant and unsure how to start. The teacher reminded her that she was most interested in the student’s ideas and thinking and that the student could participate in English or ASL. After the student clarified that she could indeed use ASL, the student provided an idea for the paper. She described a gigantic hanging tank that gradually filled and tipped, dumping water on the people below. Her idea was expressed in rich ASL, complete with appropriate facial grammar, structure, and classifier (CL) use². Using ASL gloss and classifier descriptors, I have attempted to capture some of her ASL expression on paper.

HAVE-LARGE-CL (c-shaped hands become the water tank that begins to tip)-
WATER – CL (five fingered-hands become the water leaving the tank and
moving downward) – PEOPLE – STAND CL (four fingered-hands downward
become the people below) – CL (hands become water and cover person from head
to toe)

Once the idea was captured on the ASL thinkpad, students worked together to determine equivalent English words and phrases that could help them express this idea in their paper. Through discussion, students were able to agree on “well of water,” “dump,” and “splash.” The teacher prompted them to start their sentence with “there is,” and students provided the rest (after some problem solving) in near English. The teacher then guided them through some final revisions, and they read through the text together using print-based sign. The ASL thinkpad provided students with a space for contributing to the

² ASL classifiers are used to represent action as well as placement of persons or things (Schein & Stewart, 1999).

collaborative writing and working with language translation, which may have encouraged an increase in ideas expressed by students during independent writing.

Students in the low-achieving treatment group showed development in their use of both ASL and English skills. By the end of the 8-week intervention, students were independently asking others to repeat missed or misunderstood communications. Without the teacher's prompting, they were actively trying to understand what others were saying. They attempted to work collaboratively, share ideas, build and interweave comments, and serve in positions of both expert and novice. Student involvement was very high from beginning to end, for student opinions and ideas were valued from the start. The students with additional disabilities and behavior challenges also were engaged and actively participated throughout.

Most importantly, the teacher gave students the time they needed to express themselves. Throughout the course of the intervention, students visibly became more able to express themselves using ASL and needed less language scaffolding and support from the teacher. In essence, students were growing in their ASL abilities while learning about writing and English. Near the end of the intervention, students were adept at offering ideas to the group in ASL, albeit using typically simple expressions. Others would ask questions and make sure they understood the expressed meaning. Students then reworked the ideas, adding to and complicating the ASL.

Similarly, students increased their knowledge of English. Notes were made on the ASL thinkpad to retain the ideas as they were expressed. Then, students discussed methods of translating their expression into a form of English. By the end of the intervention, students could create simple but complete sentences in English (i.e., having

a subject and a predicate), without the teacher stepping in much. The collaborative dialogue below represents students' growing awareness of how to construct an English sentence.

Here students are co-constructing an expository paper about The Three Stooges. One student raises his hand and offers an idea to be added to the text.

S1 (student1): Know made-up/create very very silly slap, slap, slap each other.

T (teacher; asking the class): Now is that more like ASL or more like English?

S2: English.

T: Why do you say it is English?

S2: He said who for his subject.

T: He said who? When did he do that?

S1: Oh.. hey.. I forgot. (attempts the expression again) Made-up silly silly three stooges

T: So now he says who.

S1: Hey three stooges silly silly slap slap slap each other.

T: OK, now do we have English?

S2: Verb verb he needs a verb.

T: Oh a verb.

S1: Is.

T: Is... that's a verb, three stooges is.

S2: And he can say comedy...slapstick comedy (looking at his resources in front of him).

T: Comedy, OK.

S1: Slapstick three stooges comedy.

T: Wait you forgot your verb.

S1: Is slapstick comedy?

T: OK, now what do you think? English? He says three stooges is silly comedy slapstick.

S3: Yes English, he says who and verb.

T: Good; he said who for his subject and is for his verb/ do-what.

At this point, the teacher adds the constructed sentence to the English text because it is a close approximation even though it is not grammatically accurate yet. The group then engages in some editing/ revising and rereading of the text using print-based sign. This example is substantially different from the dialogue at the beginning of the study which involved more direct instruction, modeling and teacher think-aloud.

Discussion

Previous studies have indicated that deaf children have the necessary discourse rules to appropriately structure and conceive their written expressions; however, their syntactic disfluency has masked their abilities, causing writing to appear to be unorganized and lacking of text structure (Marschark, Mouradian, & Halas, 1994). Similarly, novice L2 writers have been known to spend more time translating their ideas and stop more because of translation issues (Sasaki, 2002). This study examined whether the SIWI instructional approach could lead to greater writing fluency. Relevant components of the instructional approach, in particular, draw on theories of language learning (e.g., how bilinguals make use of implicit competence and explicit knowledge). Instructional strategies included (1) using ASL for metalinguistic knowledge building and problem solving and (2) using print-based sign during the rereading of English text.

Analysis of the length of essay showed that students in the SIWI group more than doubled their total number of words (i.e., the pretest mean of ~35 to the posttest mean of

~81 words). Conversely, the pretests and posttests of students in the comparison group did not exhibit that there had been positive change in students' writing. Students in the treatment group demonstrated improvement in two areas: first, the amount of ideas they provided in English or translated to English grew; second, their abilities to construct grammatically correct writing expanded. Quantitative data reported elsewhere show that, over the intervention time period, students in the SIWI group made significantly greater gains than students in the comparison group with regard to contextual language and grammar accuracy (see Wolbers, 2009). Qualitative data showed how students were invited to participate in the collaborative writing and how they increasingly took more and more control over translation processes as well as editing and revising of English. The instruction was enacted differently in each of the three treatment classes in ways that responded to students' linguistic and conceptual needs, and all students' work exhibited greater English accuracy and fluency from pre to posttest. Additionally, students who previously were not utilizing English-based sign to support the construction of text began to code-switch more often as their awareness grew.

Theoretical Implications and Limitations

As students obtain greater fluency in writing and develop their abilities to correctly use English grammar, there is reason to speculate that they have a more accurate and complicated internal representation of English, in some form of implicit competence or explicit knowledge. With this study's population of students, it is suspected that the employment of both ASL and English-based sign played an instrumental role in developing students' use of written English. ASL was used to explicitly teach language aspects or build metalinguistic knowledge. Students defaulted

to ASL (their primary language) for communication and for meaning-making purposes. When struggling with difficulties in the process of writing, students preferred discussing, questioning, sharing, defending, or rationalizing in ASL, likely because it is a fully complete and accessible language to them.

Students utilized a version of English-based sign in conjunction with print (called print-based sign) during repeated readings of the text. According to Krashen's input hypothesis, reading can stimulate language acquisition when the input is comprehensible. In the treatment group, students were reading their own ideas constructed in fully complex and grammatical written English. The text was meaningful and comprehensible. The use of print-based sign in this literacy context proves to be a promising approach, which could give rise to development of deaf students' implicit competence.

When designing SIWI, little thought was given to how rereading the text using print-based sign could aid students in developing inner language. Rather, the instructional element was intended to assist students in the process of reviewing, revising, and editing one's work. However, during the intervention, it became clear that students were not only seeing and using English in its fully complex and written form, but they were also becoming more comfortable with the flow, the manner of expression, and the "sound" of the language through the repeated readings. Future research should examine the potential of print-based sign along with self-generated and revised English text in serving as appropriate input for deaf individuals to develop some implicit English competence.

The results of the current study provide theoretical implications that, in the case of the deaf user of ASL as L1, written English (L2) proficiency comes as a result of developing an internal representation of English through explicit knowledge and implicit

competence. For the students in this study, such a process was supported by first having a fully developed L1 through which a cognitive foundation and a common underlying proficiency for language was established, and, as a result, linguistic and cognitive-related skills could transfer to learning English. Through the use of their primary language, students developed metalinguistic awareness and came to view ASL and English as two separate languages having distinct characteristics and forms. They utilized this explicit knowledge when constructing and revising text. Students code-switched to English-based sign for the purpose of constructing, reviewing and rereading text. The initial written expressions (stemming from English-based sign) were revised into more accurate and complicated expressions of English. Students reviewed the constructed text by engaging in repeated readings using print-based signing. Students were not only seeing and using English in its fully complex and written form, but they were also becoming more comfortable with the flow and rhythm of the language through the repeated readings. Lastly, writing events were meaningful and had social or communicative purpose. Thus, the process of developing a deeper representation of inner English, for this group, was more than simply using spoken English, English-based sign, or ASL.

At the same time, there do exist other plausible explanations for the increased length of student writing in the treatment group. One reason that warrants credit is that, by the conclusion of the intervention, students evidenced greater metacognitive knowledge for the process of writing. Students' writing on the pretests largely consisted of unorganized listings of details. During interviews with students prior to the intervention, they discussed writing in terms of homework assignments and responses to the teacher's questions. There was no indication that students experienced authentic

audiences and authentic purposes for writing. At the post interviews, however, they mentioned giving attention to the audience before writing, during writing, and after writing. Students' awareness had an impact on how students planned and organized their writing, and, in terms of length, it may have affected how they wrote. As one student put it, he "write(s) so that people can understand." This awareness of audience, I believe, led to greater explanation and clarity in student writing. It additionally made students more cognizant of producing a text structure that is comprehensible to the reader. Yet, the control group was also writing for authentic audiences during the pre and posttests, and did not evidence greater fluency.

Conclusion

Students with varying language abilities took part in the SIWI intervention, and all showed significant growth in their fluency and knowledge of written English structure and principles. According to language learning theory, students were developing an increasingly complex and accurate internal representation of English. The instructional approaches varied for each class of the treatment group in order to be more responsive to language abilities during instruction. While specific theoretical conjectures have been made, I will restate the broad implications. Proficiency in ASL alone was not sufficient in producing proficiency in written English; however, all classes in the current study used ASL as their primary mode of communication, for it provided a means of carrying out the most elaborate discussions. Likewise, the value of accepting into the classroom a language that not only represents personal identity but also has cultural and community ties cannot be underestimated. Second, those students with near average or average literacy levels automatically switched to English-based sign when writing. This was a

skill that was developed to some extent over the course of the intervention. Whereas English-based sign provided students with a starting point for writing English, it was not accurate or complicated enough. SIWI approaches have been detailed in this paper and are believed to have aided students in developing explicit knowledge or implicit competence for English.

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Table 1

A/ The/ ---

	Specific	General
Single	The	A
Plural	The	---

Table 2

Average Word Counts by Class

	Total words on pretest (<i>M</i>)	Total words on posttest (<i>M</i>)
High-achieving treatment class	71	89
Mid-achieving treatment class	22	79
Low achieving treatment class	13	55

APPENDIX A

STUDENT WRITING PROMPT EXAMPLE

Write about the theme:

Giving to Others

Often, giving to others who are in need is very satisfying. At the same time, those of us who have received gifts of kindness may feel appreciation and thankfulness. Write about giving or receiving.

Do ONLY ONE of the following:

Tell about a time when you have helped someone in need

OR

Describe someone who has given support to others

OR

Explain a time when you were on the receiving end of kindness

OR

Describe how you volunteer or give to your community

OR

Write about the theme in your own way

APPENDIX B

STUDENT WRITING SAMPLES

Student 14 pretest

[reading level – 2.9; 15 total words]

“it about to get the goal”

i try the best a A+ 100% a goal.

Student 14 posttest

[reading level – 3.2; 140 total words]

If someone need helped then I talk tell them. to helped, and tell how you feel or need money to given to poor people, and food, and need house, and chothes. to keep them warm when during winter. for an support. that for poor people need something. it for them. some people need home, and money, and food. giving to other that mean charity. We giving an prestant parent and kids. Kids and parent need US for helping them and giving to them. They need us giving to to them, and food, an home, clothes, money. When you be nice to them then they will like you, and we will like them too. I like to giving them an clothes, and shoe, and toys, and money, and food. thanks you for supports to helping poor people and kids and adult.

Student 3 pretest

[reading level - 5.1; 108 total words]

One day, Scott was walking the school. He saw many kids were picking on a boy named Brain. They called Brain in many bad ways. He oftenly went into bathroom and cried. One time, he threated them that he'll bring guns and bombs to kill and blow the school buildings. Scott saw him threatening the school. He went up to Brain and talked with him.

Scott took Brain to counseling center. The counselor helped Brain. Brain calmed down. Few weeks later, Brain went to school and had a talk with those who picked on him. They had a long talk and became friends. All thanks to Scott.

Student 3 posttest

[reading level – 6.0; 230 total words]

My parents was divorced in 2003. They told me and my sister while we was having fun in KFC. My sister and I cried a lot when they told us. I'll tell you why my parents were divorced and how I felt about it.

My mom, Nancy, and my dad, Alan, was fighting (not physically) about money. My dad tend to be on the computer right after he arrived from work. But my dad always do chores. My mom tend to cook, take us shopping, etc. My mom thought that my dad pay NOTHING at all. So my parents was fighting, but they still love each other.

My sister and I felt really desperate when they told us. I thought that my life would be over. But in a year, I feel okay, probably better. We had to go to my mom's then to dad's every week, which was tough to do, and have time together. At first, you will feel really desperate when your parents are divorced but you will feel fine in a year or two.

I just told you why my parents are divorced and how I felt about it. When I hear the word, "divorced", I think of my parents. It's just that it's tough. If your parents are divorced, don't feel bad about it, and your life will not be over.