

2019

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Recommended Citation

McDermid, Campbell and Pope, James (2019) "Online Project Based Learning: The efficacy for signed language interpreters," *International Journal of Interpreter Education*: Vol. 11 : Iss. 1 , Article 5.

Available at: <https://tigerprints.clemson.edu/ijie/vol11/iss1/5>

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Online Project Based Learning: The efficacy for signed language interpreters

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Abstract

Four online lessons were created to study the efficacy of teaching translation within a constructivist approach (Wilcox & Shaffer, 2005). The lessons were self-directed and project-based. Twenty participants supplied a baseline sight translation of an English story into American Sign Language (ASL). A model of “meaning” was used to assess the texts consisting of three levels: literal, enrichment and implicature (McDermid, 2012). A mixed method evaluation was conducted and results showed that participants enriched their baseline target texts, ranging from 2 to 17 instances. Eight completed a number of online lessons and submitted a second translation of the text, which evidenced more enrichment ($p^* < .05$). The participants described the lessons as beneficial and appreciated the design. However, the completion rate was low as was student-to-student interaction, perhaps due to the interface. Tentative conclusions of this small-scale pilot study were that for this cohort, self-directed, project-based learning led to enhanced use of enrichment and implicatures.

Keywords: on-line, pedagogy, project-based, interpreter, literal, signed language

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Online learning is becoming a popular medium for spoken language as well as signed language interpreters (Johnson & Witter-Merithew, 2004; Massey, 2005; Moreno, Otero-Sabogal, & Soto, 2011). Massey (2005), for example, reported on initiatives to promote online learning for translators that included the eContent Localization Resources for Translator Training, described as a “large-scale EU-sponsored international project” for online translator training (p. 630). For signed language interpreters in the United States, webinar courses have been routinely hosted by the National Consortium of Interpreter Education Centers, and online programs are offered by the National Technical Institute for the Deaf, Western Oregon University, and the University of North Florida. However, there has been little research into the efficacy of these programs.

This study addressed that gap by investigating the effectiveness of four online lessons for signed language interpreters using a mixed-method procedure. Specifically it looked at the characteristics of their target texts in American Sign Language (ASL) prior to participation in the lessons and then after having completed a minimum of one of the four online lessons. The goal was to look for evidence of changes to the target texts in terms of the frequency of enrichments or the addition of potentially implied meanings. Further this study also asked the participants to talk about their experience learning online, within a qualitative methodology, to gather their insight into what they deemed beneficial or problematic.

1. Review of the Literature

In order to investigate online learning, the literature was reviewed to determine an approach to constructing online lessons and to understand the nature of online learning environments. In addition, a model of the translation process was needed as a means of structuring the assessment of the translated texts and to organize the lessons. A Project-Based approach was identified in the literature and adopted for this study. McDermid’s (2012) model of the interpreting/translating process was chosen as the framework for teaching and assessment. These and the nature of online learning environments will be discussed next.

1.1. *Project-Based or Problem-Based Learning*

One approach to interpreter or translator training is the traditional teacher-centered didactic approach, but Senior (2010) suggests that there are “limitations of transmission approaches to teaching and learning” in second language classrooms (p. 137). A different approach to education is that of project-based or problem-based learning (Senior, 2010). In a project-based classroom, students are asked to work towards a goal, apply a variety of theories and practice discrete skill sets.

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The approach chosen in this study was project-based learning (PBL). Dole, Bloom, and Kowalske (2016) define it as presenting a problem to solve, and so it “begins with an end product or ‘artifact’ in mind” (p. 2). Such pedagogy is constructivist and has been used previously to teach students of translation (Ahluwalia, 2008; Kiraly, 2005; Li, Zhang, & He, 2015; Massey, 2005), and foreign languages (Levine, 2004). Such projects should be authentic in nature (Ahluwalia, 2008; Kiraly, 2005). The benefits of this approach include student control of the pace of learning as well as the area of focus (Ahluwalia, 2008). PBL supports different learning processes, such as acquisition, socio-cognitive reflection, and the co-emergence of different understandings and roles in the pedagogical process (Kiraly, 2005). It can also enhance critical thinking, research abilities, communication, time management (Tamim & Grant, 2013) and procedural knowledge concerning the translation process (Massey, 2005).

There are some caveats with PBL approaches. Authors have cautioned teachers to be prepared to keep students on task (Blumenfeld et al., 1991; Dole et al., 2016). There should be clearly defined parameters for the project and buy-in from the students (Savery, 2006). Savery (2006) also suggests the need for strategies such as instructor tutoring, participant collaboration and opportunities for self- and peer-assessment.

1.2. Online Learning

In addition to a project-based pedagogy, the current study also examined the nature of an online learning environment. Several benefits of this approach have been noted in the literature; for example, Ahluwalia (2008) and Levine (2004) found that internet-based projects could foster cooperation as well as the “authentic integration of skills” (Ahluwalia, 2008, section 3, paragraph 3). Web-based delivery can stimulate “confidence, self-esteem, and autonomy” in students (Ahluwalia, 2008, section 3, paragraph 3). Moreno et al. (2011) found online delivery to be effective for participants with varying work schedules. It allows for non-linear, student-directed research and constructivist learning (Massey, 2005). This mirrors the cognitive demands of fields such as translation (Massey, 2005), where translators must instantly grapple with different problems in a variety of contexts.

While these benefits have been highlighted, so too have challenges of online learning approaches. In a traditional classroom, the discourse can follow a pattern of initiation by the teacher, followed by an immediate student response and then an evaluative comment (Tercedor-Sánchez, López-Rodríguez, & Robinson, 2005). In an asynchronous, online environment, this immediate response and feedback is absent (Alexander, Vale, & McKee, 2017). To overcome this, instructors must learn how to frame their lessons and scaffold the learning (Tercedor-Sánchez et al., 2005). For example, an educator must try to predict student questions or responses and create activities to address them.

Several studies have noted lower retention and completion rates in online classes as compared to face-to-face traditional classrooms (Carr, 2000; Salcedo, 2010). It has been estimated that “course-completion rates are often 10 to 20 percentage points higher in traditional courses” (Carr, 2000, A39). In Sachtleben and Crezee’s (2015) study of interpreting students in blended and fully online learning environments, students reported several challenges including “interacting socially with others” and “finding one or more partners to pair up with” as well as “ensuring constant engagement” between the students and teacher (Sachtleben & Crezee, 2015, p. 32).

The literature highlights a number of ways to improve student retention and participation, including establishing a sense of community, trust-building exercises, consistent interaction, group activities, and reasonable class sizes (Rovai, 2002). Sachtleben and Crezee (2015) and Massey (2005) advocate for access to language peers, perhaps because peer feedback is thought to be a supplement to the lack of immediate interaction with an educator (Massey, 2005). Protocols have also been suggested to include different types of prompts in online discussions leading to different constructivist and process-based activities (Ehrlich, Ergulec, Zydney, & Angelone, 2013). Wang (2015) advocates a blended model in interpreter education with both online and face-to-face aspects. An initial in-person orientation to the program or specific training on the technology has also been recommended (Blumenfeld, et al., 1991; Dole et al., 2016; Sachtleben & Crezee, 2015).

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1.3. Signed Language Interpreters and ASL

There is a small body of literature on online learning and signed language interpreters. In one US-based qualitative study, the authors surveyed two cohorts of alumni from an online graduate level program with a focus on ASL-English interpreting. The participants shared that to succeed in that online environment required “strong interpersonal relationships,” opportunities for face-to-face interactions, and a “social constructive approach” (Darden, Ott, Trine, & Hewlett, 2015, p. 276), meaning the ability to discuss ideas with peers to build a better understanding of the course content. The students also wanted instructors who were flexible and “modeled collegiality” (Darden et al., 2015, p. 276). While students appreciated multiple forms of technology, the authors also cautioned, “The price of technology fatigue appeared to overwhelm the benefits perceived from the use of technology to collaborate.” (Darden et al., 2015, p. 278).

In another US-based study, the investigators looked at 50 students in a blended program designed for educational signed language interpreters and spanning nine semesters (three years) (Johnson & Witter-Merithew, 2004). The participants were working interpreters, many of whom had no formal education in ASL or interpreting. They began with a range of scores from 1.5 to 3.4 (average 2.6) on a modified version of the Educational Interpreter Performance Assessment (EIPA), a widely-used test for educational interpreters. This was below the 3.5 recommended standard. Upon completion of the program, all of the participants improved their ability to interpret and their scores on the full EIPA ranged from 2.4 to 4.6 with a median of 3.5 (Johnson & Witter-Merithew, 2004).

There has also been some research into teaching signed languages via distance learning. Buisson (2007) looked at the efficacy of seven online lessons designed to teach ASL glossing, a literal transposition of ASL signs into written English. It was found that the participants improved their knowledge of ASL grammar as compared to the control group. In a study of an online course in New Zealand Sign Language (NZSL), students described the benefits of flexible design and a schedule of convenience over a face-to-face classroom (Alexander et al., 2017). However, the authors note that while the students demonstrated content knowledge, it was “to a lesser degree of proficiency than we have observed in classroom learners in a beginner’s course covering equivalent content” (p. 75). In a study of a blended ASL classroom, where some students were present while others were offsite, Ehrlich-Martin (2006) highlighted several disadvantages. These included a lack of visual presence by the students who conferenced in, problems with turn-taking, a lack of peer interaction, the perception that off-site students were interrupting the class, and concern when the videoconferencing software broke down. Many of these challenges were due to the limitations of the technology, and by the end of the course, seven of the eleven respondents to a post-class survey preferred traditional face-to-face classes for ASL instruction (Ehrlich-Martin, 2006).

1.4. Theoretical Translation Model

Having chosen an online, project-based environment for the study described in this paper, a multidimensional theoretical model for translation was adopted as the framework for the lessons and assessment. The model recognizes the multidimensionality of language, and that a sentence carries what Abbott (2006) refers to as a “bundle of propositions” (p. 7), both the stated meaning and implied meanings. The model was originally proposed by McDermid (2012) and takes into consideration at least three levels of meaning, the literal or verbatim level, an enriched level, and that of implicature.

The model used in this study also drew upon Halliday and Hasan’s (1976) model of cohesion, the second level of meaning in McDermid’s (2012) model. Halliday and Hasan argue that “ties” enhance cohesion across sentences. These ties include the clarification of reference, the addition of conjunctive devices, the inclusion of words that are synonyms or related (lexical cohesion), the replacement of substitute words such as “so” and “did” with a portion of the earlier discourse and the filling in of elided expressions (ellipsis). Sections 1.4.1 through 1.4.3 next detail the characteristics of a target text at the literal, enriched or implicature levels.

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1.4.1 Literal meaning

Following in Grice's (1975) footsteps, literal meaning was defined in this study as "closely related to the conventional meaning of the words" (p. 44). At a literal level, an interpreter should not add to or subtract from a target text and should follow the grammar of the target language audience (McDermid, 2012). Some aspects of the target text can be clarified without going beyond the literal meaning, such as words or signs with multiple meanings (polysemy), references indicated by anaphoric pronouns, and deictic or indexical expressions that refer to the time of the utterance.

At a literal level, an interpreter would also deal with anisomorphic or dissimilar structures between the source and target texts. So, for example, ASL and English differ in the use of pronouns (Kegl, 1987; Wulf, Dudis, Bayley, & Lucas, 2002), where ASL sentences may have fewer than those in an English sentence. Therefore working from ASL into English, an interpreter may have to include more. ASL and English can also exhibit different grammatical structures at the surface level (Liddell, 1980; Matsuoka, 1997; Wilbur, 1979), such as Topic-Comment (Janzen, 2007). An interpreter has to be prepared, therefore, to restructure the surface order of the target sentences.

1.4.2 Pragmatic enrichment

Linguists (Ariel, 2008) as well as signed language interpreter educators (Wilcox & Shaffer, 2005) have argued that a literal interpretation of an utterance leaves meaning under-determined. Instead Relevance Theorists describe enriching literal meaning in context by creating explicatures to arrive at a clearer understanding of what was said (Carston, 1996; Sperber & Wilson, 1995). Blum-Kulka (2000) refers to the "Explicitation Hypothesis," that target texts must include enrichments to enhance their comprehensibility to the target audience. Nida (1964), a renowned translator of the Bible used the term "expansion" to describe how target texts could be clarified. Later signed language interpreter educators also supported their use (Humphrey & Alcorn, 2001; Lawrence, 1994).

In the literature, there are many examples of enrichment strategies (Klaudy, 1998; Sequeiros, 2002). As described by Halliday and Hasan (1976), language users may elide or leave out information and still produce a coherent utterance. One aspect of speech that can be elided in English without altering the grammaticality of a sentence is an adjunct (Carter, McCarthy, Mark, & O'Keeffe, 2018). Adjuncts may serve as an adverb or a prepositional phrase and can provide additional information about where events took place, the location or when, the time frame. This location or setting can also be considered the "ground" in a sentence. Emmorey (2005) notes the importance of "grounds" in ASL as she found Deaf signers establish these first before placing "figures" in the signing space.

Other triggers for enrichment and a way to enhance text cohesion is through the clarification of reference or the replacement of substitute words such as "one," "so" and "did" with some aspect of the earlier discourse (Halliday & Hasan, 1976). Verbs can also be enriched and Karttunen (1971) suggested that to "forgot to" do something implies it wasn't "remembered" for a while (p. 341). Peccei (1999) explained how "realize, discover and find" entail initially "not knowing" (p. 22).

Agentless passive voice is another candidate for enrichment. In English or ASL, the speaker or signer can choose to omit the agent responsible for an action. However in ASL, unlike in English, the inflection of the sentence verb outside of the signing space implies someone other than the signer was performing the action (Janzen, O'Dea, & Shaffer, 2001). Power and Quigley (1973) found that Deaf students even into their late teens had a difficult time understanding the meaning of such agent-deleted passive constructions in isolated sentences in written English.

Several studies of sign language interpreters found they did indeed enrich their ASL target texts when working from English, for example by including a concept and its antonym (Livingston, Singer, & Abramson, 1995; McDermid, 2012; Russell, 2002). In Russell's (2002) study an interpreter translated the English phrase, "...it really didn't hurt that much..." as LIGHT, NOT HARD, HURT NOTHING (p. 101), and included both the concepts of a "light hit" and its antonym "not a hard hit."

Halliday and Hasan (1976) also describe overall lexical cohesion, the addition of synonyms or near synonyms. The strategy of enriching broad classes of objects (superordinate terms) by including examples (hyponyms) or enriching holonyms (whole objects or processes) through the addition of their parts (meronyms) is an example of

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this and was identified in the literature on translation and signed language interpretation (Livingston et al., 1995; McDermid, 2012; Nida, 1964).

1.4.3 Implicature

The final level of meaning in the framework of this study was that of implicature. Implicatures are potential meanings implied by a speaker that the audience has to then infer (McDermid, 2012) or work out in context (Bach, 1999; Grice, 1975). The study by Livingston et al. (1995) found interpreters used the strategy of “explicitness” by “overtly stating the sub-text of the story which included the implicit meanings” (p. 165). Russell (2002) notes how an interpreter took the interrogative “And is your teacher in court today?” and rephrased it as an imperative in ASL, POINT WHERE? (p. 100). In McDermid’s (2012) study, some of the interpreters interpreted the interrogative “She then asked me where I was at the Deaf rally for ASL rights...” as an accusation WHY YOU NOT SHOW-UP, and the three Deaf native ASL raters supported that interpretation (p. 186). Implicatures can be denied or negated by the speaker, which is one of the tests used to determine their characteristics (Peccei, 1999). This means that if an interpreter adds explicitness to the target text, there is a risk the original interlocutor may deny having said that.

2. Research questions

Having chosen project-based learning delivered through an online environment, and having structured the lessons and assessments around a model of the interpreting process, the research questions posed for this study were:

- 1) Can a model of multidimensionality be used for teaching and assessment of signed language interpreters within an online environment?
- 2) How effective is self-directed project-based learning pedagogy for adult learners or signed language interpreting in an online learning context?
- 3) What are some of the criteria to create a successful online, project-based learning environment for signed language interpreters and what are some of the impediments?

3. Methodology

This study followed a mixed methods approach by collecting both qualitative and quantitative data. This section describes the project the participants worked on, an English text entitled “Art Class,” a discussion of the online lessons and an explanation of how the qualitative and quantitative data were collected.

3.1. Text Construction

Based on the review of the literature and the model of translation chosen, the text “Art Class” (Appendix A) was constructed. The text was created so that it could be translated at a literal level but triggers for enrichment were included such as agentless passive voice and the inclusion of substitute words “so” and “do.” Some information was elided, for example adjuncts, which were then potential triggers for addition. This text was then read aloud and recorded with a pause of 3 to 4 seconds at the end of each sentence. Pauses were inserted at the end of each sentence to accommodate the needs of newer interpreters and to allow the participants to focus on the translation process. The mode of translation chosen for the study was sight translation, again to accommodate the needs of novice interpreters. Unlike the consecutive or simultaneous mode, the sight translation process provides the interpreters with the full text and time to practice translating different aspects of it. This parallels the experience of professional interpreters, who may be given a written speech or handout to interpret, as it is later read aloud. A transliterated version was also provided for the Deaf interpreter who took part in the study. In the transliterated

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version, the interpreter signed or spelled each word and followed the exact order of the English source. The recording was approximately a minute and a half in length and included a total of 12 sentences. As seen in Appendix A, there were a number of enrichments and implicatures added to the text by the participants.

3.2. Lesson Construction

Based on a review of the literature and the theoretical framework chosen to assess the translation products of the participants, four lessons were created. These included “Antonyms,” “Figure and Ground,” “Verbs,” and “Reference.” These focused on various ways to enrich a text when working from English into ASL. Each webpage had a number of activities in written English, either sentences or stories, which the participants could practice enriching. Some pages had learning activities such as “fill in the blank” games. Each page had a discussion form at the bottom where the participants could post questions or add their comments. Students were also encouraged to post links to videos of their translated works. Examples of how to enrich the original text “Art Class” were also included in written English. The focus of each website was to prepare the students to create a second draft translation of the story “Art Class.” The activities typically started with working from written English into written English, the first language of most of the participants. The participants were then asked to work from English into ASL. This added some elements of scaffolding to each lesson.

3.3. Participants

An electronic invitation was sent to the education programs listed in the database maintained by the Registry of Interpreters for the Deaf and to the Conference of Interpreter Trainers. An invitation was also sent to the interpreter education programs in Canada. All participants confirmed they were a minimum of 18 years of age and had conversational fluency in American Sign Language and English. Each participant was given an identifier, the letter “P” with a number, designating the order in which they joined the study.

A total of 61 individuals registered for the lessons. However approximately two-thirds of these individuals did not participate in any aspect of the study. Twenty individuals completed the demographic questionnaire and submitted a first draft of “Art Class.” Of these individuals, 19 identified as “hearing” and one as Deaf. Seventeen were female and three were males. The mean age was 35.66 years (Median 30, Mode=23, Standard Deviation 13.01). The range was 21 to 63 years old. When asked how many years they have used ASL, the mean was 14.66 years (Mode = 6 and median = 7, Standard Deviation=12.49) with a range of from 3 to 43 years. Nineteen considered English their first language while Indian Sign Language was the first language of one participant. Five were certified interpreters.

3.4. Procedure

Initially, the participants were given the option of submitting a baseline translation of “Art Class” and only 20 did so. These 20 were then instructed to attempt as many of the four lessons as they wanted and at their own pace. When they were ready, they were asked to submit a second translation of “Art Class” and to complete an evaluation of the course.

3.5. Data Collection and Analysis

The data for this study was collected during a three-month period and from a number of different sources. These included:

- A demographic questionnaire,
- The comments shared by the participants on the discussion boards for the lessons or via email,
- An analysis of the baseline sample translations of "Art Class" (Appendix A),
- An analysis of the second, final translation of "Art Class," and

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- An anonymous overall evaluation at the end of the process.

For the qualitative data, the investigators conducted a thematic analysis as other authors have done in problem-based learning studies (Imafuku, Kataoka, Mayahara, Suzuki, & Saiki, 2014). The quantitative data was analyzed using descriptive and non-parametric statistics, where the samples of translation were converted to a frequency count and then compared at the level of omissions, literal, enriched and implicature levels for a total of four possible rankings per sentence. Given 12 sentences in the English text, there were a potential 48 different rankings possible per individual, where they either omitted the sentence, produced a literal translation, enriched the sentence or included an implicature. The Mann-Whitney test was then used as the sample sizes were quite small and the resulting data was not uniformly distributed. Due to the small sample sizes, the power of the study is low, and the findings should be considered tentative.

3.6. ASL Proficiency Rating

The participants were asked to assess their ASL fluency using the Sign Language Proficiency Interview descriptors utilized by Caccamise and Samar (2009). The process of self-assessment has been used in other studies of signed language interpreters (Stauffer, 2011; Laird, 2005; McDermid, 2014) and authors have written that the descriptors are clearly written for untrained raters (Stauffer, 2011; Laird, 2005). In at least three studies, a high inter-rater concordance was found between the self-assessments of untrained and professional raters within one category on the SLPI or a similar protocol (Laird, 2005; McDermid, 2014; Stauffer, 2011).

3.7. Inter-rate Concordance

Inter-rate concordance was part of the analysis process, by having at least two of the researchers review the written submissions and translation samples. For the qualitative data, the researchers compared their self-identified categories and properties and jointly agreed upon common themes and sub-themes. To assess the samples of translation, two researchers created a frequency count of the number of times a participant omitted a sentence or interpreted it at the literal, enriched or implicature level. This data was compared and there was high inter-rater concordance with only a few variances of two to three items per participant, out of 48 potential rankings. These were discussed and agreed upon by the researchers.

4. Findings: Evaluation of online learning

Due to the nature of this study as a self-directed project-based online experience, the participants engaged with the lessons and process to varying degrees. For example, 20 individuals submitted an original base-line draft of the video “Art Class” but then only 11 were active in the lessons to varying degrees and of those, only eight completed a second draft of “Art Class” and an evaluation of the experience. To assess the data, therefore, the decision was made to separate these groups into two, the “original twenty” and the “final eight” to discuss the findings. In the next section, the qualitative data collected from the online discussion boards and the overall evaluation by the “final eight” will be reviewed first. This will be followed by a quantitative examination of the characteristics of the first draft of “Art Class” by the “original twenty” and then a comparison with final draft of the same text by the “final eight” participants.

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4.1. Qualitative Findings of Final Eight

4.1.1 Participation

For the purpose of this study, active participation was defined as having submitted at least one translation and completion of the evaluation or participation in a least one discussion board. All of the “final eight” submitted at least on translation of “Art Class” and participated in a minimum of one lesson. Participant P32 was the most active having contributed 13 responses in the discussion boards, one video submission (baseline) and the evaluation followed by P34 who performed eight tasks and P3 and P16 both of whom performed seven tasks.

4.1.2 Amount of Work

In the evaluation, when the eight were asked about the amount of time it took and given three options (1 “The course didn’t take up too much time,” 2 “Neutral,” 3 “More time than I was willing to give”), no one checked off “more time than I was willing to give.” Six selected, “The course didn’t take up too much time” while two were “Neutral.” When asked how much they interacted with their peers (1 A lot of interaction, 2 Neutral, 3 No interaction) no one checked off “A lot of interaction.” Instead four (P3, P16, P37, P32) checked off “No interaction” while three were “Neutral” (P17, P34, P61). When asked to discuss their interaction, descriptors included “limited” (P32) or “minimal” (P37, P61). One person talked with a peer offline (P16). Another participant wrote, “I put out a thought in one module and read some of the replies.” (P17). Reasons given were a lack of time (P3, P61) or problems with the technology (P34, P61), which will be reviewed in section 4.1.6.

4.1.3 Benefit of the Lessons

As part of the evaluation, the participants were asked if the lessons improved their ability to interpret from English into ASL. Six of the eight checked off “Yes” (P3, P16, P32, P37, P61) while two were unsure (P17, P34). One person explained by writing, “So, I tried to incorporate what I learned in the lesson to my second video and it felt like a 'stretch' for my brain.” (P3). Some learned new terminology to describe their work (P34) or found it a review of what they knew (P3, P34, P37, P61). For example, one wrote, “It confirmed that I have a handle on these foundations.” (P61).

In terms of the lessons, one called them “relevant” (P3) and two used the term “fun” (P16, P34). A fourth noticed how the skills “were compounding as you progress” (P32). Several liked seeing samples of interpretation (P16, P17, P37). One wrote, “I really enjoyed having a higher level of self-monitoring and actively making language choices with intent, I felt more engaged in the work.” (P3). When asked which lessons they had applied, three chose all four lessons (P3, P16, P32). One selected three lessons (P17). Three checked off “not yet” (P34, P37, P61).

Regarding learning styles, three liked having discrete skill sets to work on (P16, P32, P37). One individual, who chose to remain anonymous shared, “It provided more deliberate practice” while another wrote, “...and the way the lessons were broken down were clear and helpful” (P32). A third replied, “I’ve found that the best way to improve my overall interpreting is to pick one thing to focus on for a while before picking a new topic or else it can be overwhelming. The [lessons] were a nice way to break down different aspects of interpreting and allowed my mind to think about it while working without being overwhelming.” (P16). A fourth shared, “I like the detailed explanation in each module of what passive voice is, what an entailment is, what figure and ground is, and how they apply to our interpretations.” (P37).

4.1.4 Concerns about the Lessons

In the evaluation, one participant questioned the underlying but unstated goal of one lesson in particular, Figure and Ground, which was to encourage the addition of a referent as needed. This person wrote, “...I wonder when it is too much? What if we pick the wrong ground? It can mess the interpretation up. e.g.: "I took an art class" if I

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choose at a college and later it turns out to be a private studio; then maybe the subsequent 'grounds' may be wrong; like where I got the list of supplies, etc.” (P17).

Another (P61) responded to this,

Hi (name of P17) that's a good question you have there and I think this is where our on-going monitoring as interpreters comes in and if we are fortunate enough to be working with a co-interpreter this is where their support is invaluable. I think we mitigate the errors by doing our prep, advocating for consistency in interpreters (i.e., we work in places where we have context), etc. What do you think? Then there are the times when we have provided too much or incorrect 'ground' and we have to repair it. I guess what I am thinking is that there is no magic bullet. Thoughts? (P61).

A third (P32) wrote back,

(name of P17) I am so glad you brought that up! My instructors have DRILLED the risk of "additions" into my brain. I'm so careful not to take too many liberties as we will have enough repairs when we THINK we had the message correct. However, there are clearly some places where background is pretty clear. I'll work on including those in my interpretation. Regardless, we will have to make repairs with any interpretation, I guess! (P32).

Another issue raised by 3 participants was around critique. When asked to submit a video translation for review one wrote, “GULP! So nervous to make a public video.., but here is my try without too many attempts.” (P32). She also wrote, “Please don't think I'm being critical-I'm NOT. I'm so green and am trying to learn from you guys. Honest. I would welcome ANY suggestions on my interpretations or homework submissions.” (P32). In another assignment, a second person (P37) made a point of saying he/she was open to comments and wrote, “Here's a video of my interpretation to the verb story. Open to feedback.” As part of the overall evaluation, a third shared, “I really liked the fact that nobody was bashing other student's work.” (P34).

4.1.5 Benefits of Online Learning

There were positive comments concerning the online learning environment from four individuals. They liked that it was “truly self-paced” (anonymous) “on my own time” (P34) and one appreciated “the convenience of online learning” (P3). One participant said, “not the weekly time lines in other online classes that become stressful when life interferes with my plans” (anonymous). A second shared, “I like being able to think about what I want to say and then comment. If most people in the class approach it right, it's like having a curated conversation with someone and its enjoyable to read and re-read comments and reflect on them.” (P3). A fourth wrote, “It got me to think about my work and it was nice to see other's perspectives because I don't always have a way of interacting with my peers like that.” (P17).

4.1.6 Concerns about the Technology

Four people were concerned about the technology (P32, P34, P45, P61), and it impeded the participation of at least three (P34, P45, P61). One wrote,

I was not able to figure out how to use the website interface in order to respond until the end of the course. I also struggled finding a video program I know how to use, is compatible with my computer, and had quality and clarity of picture that I was satisfied with. (I'm still not satisfied with the quality and clarity.) Technology tends to be a big barrier for me.” (P34)

This same participant wanted a video tutorial on the interface (P34). Participant 32 was frustrated translating the videos on the website and shared,

...the format was tough to access/reply/edit and the YouTube links would normally stall on me causing lots of headaches and delays. I ended up just doing them off paper [with the script] rather than SI [simultaneous interpreting] attempts because I was getting so frustrated and frazzled.” (P32).

A third shared at one point, “I have a video to upload but YouTube is being really slow. I will try again later” (P45). Participant 61 didn't like the quizzes embedded in the lessons that were computer corrected, especially the

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fill-in-the-blank exercises, and wrote, “I think the quiz technology could be less clunky i.e., the one that required the exact word for the answer.” (P61).

4.2. Quantitative Findings

4.2.1 Baseline Translations of the Original Twenty

Next the researchers analyzed the ASL translations of the English text “Art Class” beginning with the baseline submitted by the original 20 participants. Examples of the participants’ enrichments and implicatures can be seen in Appendix A. The non-parametric Mann-Whitney test was used to compare the findings (Stangroom, 2017).

Everyone enriched his or her text in ASL to some degree in the first draft. The enrichments ranged from as low as two to a maximum of 17 aspects of the text (see Appendix A for examples). The average number of enrichments was 10.5. Fifteen of the 20 participants also added at least one implied meaning, an implicature.

A between groups comparison was done of the first, base-line sight translations of the certified interpreters (5 individuals) to the non-certified interpreters (15 individuals). The assumption was that the certified interpreters would produce more enrichments or implicatures and so a one-tailed test was used. However, no significant difference was found for enrichment ($U = 35.5, Z = 0.13, p = .45$) or implicatures ($U = 27, Z = -0.87, p = .19$).

Next, six comparisons were done using Spearman’s Rho within the group to see if there were any correlations between years using ASL, self-reported level of fluency in ASL, and the participant’s age. These were compared to the number of enrichments and implicatures included in his or her target text. No significant correlations were found as noted in Table 1 Correlations.

Table 1: Correlations

Years using ASL and Enrichments	$R = 0.23, p = .32$
Years using ASL and Implicature	$R = 0.39, p = .09$
ASL Fluency Scale and Enrichments	$R = 0.08, p = .74$
ASL Fluency and Implicature	$R = -0.03, p = .88$
Age and Enrichment	$R = -0.12, p = .60$
Age and Implicature	$R = 0.10, p = .68$

4.2.2 Baseline and Second Draft of Final Eight

Next, and within a test-retest paradigm, the first and second drafts submitted by the final eight participants were compared. Assuming a practice effect, a one-tailed Mann-Whitney assessment was used. While the use of enrichments was statistically greater in the second draft ($U = 10, Z = -2.26, p^* = .01$), the inclusion of implicatures was not ($U = 20.5, Z = -1.15, p = .12$) though it had increased for four of the eight participants.

Table 2 provides some examples in written English of the enrichments or implicatures that were included by three of the eight interpreters (P03, P16, P17) in their second translation of “Art Class” that differed from their baseline translation. The nature of the enrichments was categorized based on one of the four lessons posted in the online learning environment (as the addition of an antonym, figure-ground, verb entailment or reference).

Table 2: Examples of new enrichments or implicatures post-lessons

Source	P03	P16	P17
I took an art class years ago.	Ground – I took a class, in a college	Ground - A place offered the class. Verb – They offered and I took it.	Verb elaboration – Decided to take and enrolled
My goal was to become a painter.	Ground – to paint on a canvas	Ground – to paint on a canvas	

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But before I did I checked into the requirements.	Reference - The college class requires things. Ground - The requirements were on a list.	Substitute word - did - Before I went to class Verb elaboration - typed on the computer, scrolled, looked	Substitute word - did - Before I joined the class Reference - required for the course
I found out that I would have to pay \$500 for the course.		Verb - it cost \$500, I paid it.	
I also got a list of supplies I would need.	Reference - The college gave me the list.	Reference - The teacher gave me the list Verb - I would need and I bought them	Reference - The school gave me the list Verb elaboration - I got and they gave it to me
Now you have to understand that painting was a new skill for me.	Antonym - Was I skilled, no, that was not true		Verb elaboration - painting was a new skill, I had to learn.
So I was a bit concerned about how well I would do.	Verb elaboration - I looked at the canvas. Ground - I would paint on a canvas.	Verb elaboration - looked the canvas	Ground I would do, painting on a canvas.
In fact, I wasn't even sure I would go when the time came.	Verb of Judgment - It was hard to decide	Antonym - go or stay	
When I got there, I thought I was going to be judged!	Implicature - I decided to go to class.	Verb elaboration - students would make negative comments	Reference - students and teacher would judge me
But thankfully it wasn't so.	Antonym - They were nice, not judge Substitute word - They didn't look down on me	Antonym - nice, not judge	Verb of judgment - I was wrong
The instructor, much to my happiness was very supportive.	Ground - I showed him the canvas (my work)	Implicature - I was proud Verb elaboration - supportive, applauded me	Verb elaboration - teacher looked at my work, gave feedback, commented positively Ground - canvas
I ended up realizing I was a lousy painter but I really enjoyed the class!		Ground - canvas Verb elaboration - looked at the canvas	

Of the eight who submitted both a first (baseline) and second draft of "Art Class," only six actively participated in the lessons (P03, P16, P17, P34, P37, P61). The translations of those six were then specifically examined to see if there was a difference in their performance pre- and post lessons. Again, a one-tailed test was used. The six significantly increased their use of enrichments ($U = 4$, $Z = -2.16$, $p = .02$) but not their addition of implicatures ($U = 10.5$, $Z = -1.12$, $p = .13$).

4.2.3 Original Twenty compared to Final Eight

Finally the baseline translations of the original 20 and the final eight were compared to see if the groups were somehow different. The group of eight produced significantly more enrichments ($U=18$, $Z=-2.28$, $p*=.02$) and implicature ($U=18$, $Z=-2.28$, $p*=.02$) in their first draft/baseline than their 12 peers.

Overall and as a summary of the findings, the "final eight" participants found the lessons beneficial but also noted how the implementation of the technology could impede their participation. Even prior to engaging in the lessons, the "original twenty" included some enrichments in their target texts in ASL. However no difference was found in the target texts of the certified or non-certified interpreters and no correlations were noted between various characteristics of the participants, for example in terms of years using ASL and the frequency of enrichments. The "final eight" increased the number of enrichments upon having completed at least one of the online lessons, and they also evidenced more enrichments than their peers who did not submit a later second draft.

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5. Discussion and Conclusion

Returning to the research questions, the first asked if a model of multidimensionality could be used with signed language interpreters within an online environment. While not conclusive due to the small sample size, there was evidence that such a model could be used to characterize the baseline abilities of interpreters and to note their growth after having participated. For example, even prior to enrolling, it would appear that all of the participants viewed the process of translation from English to ASL as multidimensional based on the fact they enriched their baseline ASL target texts. Fifteen of the original 20 also included at least one implicature, such as CLASS EXPENSIVE to translate “I found out that I would have to pay \$500 for the course,” (Appendix A, Line 4). Lawler (2008) may have called this an example of adding in the implied meaning to the verb of judgment “pay.”

The presence of enrichments and implicatures in the baseline texts supports Klaudy’s (1998) theory that a process of explicitation should be expected in the translation process. In the field of signed language interpreting, Wilcox and Shaffer (2005) argued against a literal model of processing and here is evidence that it is occurring.

Examples of enrichments in the ASL target texts included the addition of antonyms such as COURSE NOT FREE or SCHOOL CHARGE-me to the English source, “I would have to pay \$500 for the course,” (Appendix A, Line 4). These antonyms demonstrate a converse relationship as discussed by Murphy (2010). The superordinate word, “art supplies” (Appendix A, Line 5) was translated using hyponyms such as PAINT, BRUSHES, PAPER, CLOTHING. The substitute words “so” and “did” (Halliday & Hasan, 1976) were embedded in the English source text as in “But thankfully it wasn’t so,” (Line 10) and “Before I did, ...” (Line 3). “So” was often replaced in ASL with a repetition of the earlier utterance “I was not judged by others,” though some participants created a verbatim translation like, “Luckily or thankfully, it did not happen.” In the sentence “Before I did, I checked into the requirements,” “did” was often replaced with the previous phrase “Before I took the class...”

Turning to the second research question concerning the efficacy of online learning, eight participants increased the inclusion of enrichments in their second ASL target texts ($p < 0.05$). While the number of implicatures did not significantly change ($p > 0.05$), four of the eight participants included more in their second target text. The implications are that participation did lead to an increase in enrichments.

Regarding these findings, a number of study limitations should be recognized. Due to the small sample size, for example, the power for this study was too small to statistically and conclusively support these findings. Also, it should be recognized that only one text was used to assess the participants’ baseline and subsequent performance. That text was very short and designed for entry level interpreters. Given a different type of text with greater complexity, the participants may have performed differently. In addition, the online learning environment only consisted of four lessons. Again, a greater number of lessons on a larger variety of interpreting strategies may have a more significant impact on the participants’ work.

Despite these limitations, the study has yielded some interesting findings. For example, the use of enrichments is particularly interesting to researchers and educators, as it demonstrates higher order thinking. The inclusion of a plausible or required enrichment requires the ability to work at the level of context and not just the word or sentence level. It may go beyond deductive thinking, such as “What is the correct sign for the word to be translated,” to inductive thinking, where the interpreter looks at the overall discourse to determine appropriate patterns of expected meaning. It may also represent the ability to take into consideration the needs of a potential audience and apply that to a target text in ASL.

The third research question looked at the overall design of self-directed project-based learning pedagogy for adult learners in an online learning context. The literature referred to low rates of completion for online studies (Carr, 2000; Rovai, 2002), which was also found in this study. Of the 61 initial registrants, only 20 submitted a baseline translation, 11 partook in some of the lessons and eight submitted a second draft translation. Researchers interested in conducting similar research may want to address this high attrition rate, perhaps by incentivizing participation through gift certificates or by offering continuing education units (CEUs) for completion.

An interesting difference was noted between the eight participants who submitted two translations and who participated in the lessons compared to the 12 participants who submitted only the baseline. These eight produced significantly more enrichments ($p < 0.05$) and implicatures ($p < 0.05$) than their peers in their first draft. Perhaps the ability to go beyond a verbatim/literal level of meaning suggests a willingness to study the phenomenon and include enrichments and implicatures. Future studies may wish to assess the students’ abilities vis-à-vis enrichment prior to enrolment to see if there is a correlation with initial performance and course completion.

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In terms of impediments to the learning, one may have been a lack of interaction, which was noted by other authors (Alexander et al., 2017; Sachtleben & Crezee, 2015). For example, when the eight who completed some lessons were asked to characterize their level of participation, four checked off “3 no interaction” while three were “2 neutral” (P17, P34, P61) and no one chose “1 a lot of interaction.” As Senior (2010) explained there is a need for language students to develop a connection with each other and rapport with their instructor. According to Massey (2005), to be successful online learning must be “highly interactive” with “a maximum degree of tutor-learner and learner-learner collaboration” (p. 630). Strategies suggested in the literature were language or peer buddy networks for students who live or work in isolation (Sachtleben & Crezee, 2015).

Another impediment to participation may have been concern about public critique, mentioned by two individuals. A third felt the need to clarify that he or she was open to feedback. Again, this is something that must be considered as according to Senior (2010), adult language learners do better in a “supportive social climate” (p. 140). Mulayim and Lai (2015) argued for a Community of Inquiry (COI) framework, a social-constructivist approach, as opposed to a content-focused pedagogy, again which would require open dialogue and a supportive climate.

There were also several concerns about the technology, ranging from not knowing how to use the interface, problems finding software for acceptable video creation and editing, and challenges uploading videos to the Web. One participant wrote that “Technology tends to be a big barrier for me,” (P34) while another eventually used paper and pen as he or she “...was getting so frustrated and frazzled” (P32). Lessons on the interface and video editing could have helped, as promoted in the literature (Carr, 2000).

In future studies, strategies to deal with these concerns could include activities that require group or pair work. This could include embedding specific prompts or protocols in discussion boards that students must respond to (Ehrlich et al., 2013). Specific lessons on how to provide constructive feedback may alleviate the participants’ concerns about critique. More variety in review activities, such as student designed assessments, self-assessment rubrics and multiple-choice questionnaires may help (Tercedor-Sánchez et al., 2005). Other strategies could involve more variety in activities, such as the inclusion of clickable images, card matching games, and the use of downloadable files (Alexander et al., 2017).

Despite student concerns, there were many positive comments about the online learning environment. Three liked the self-paced nature of the lessons and “the convenience of online learning” (P3), similar to the students in another study of New Zealand Sign Language (Alexander et al., 2017). Three commented positively on lessons that broke the translation process down into discrete steps that they could then focus on and master. This emphasized procedural knowledge and supported scaffolding as suggested by the literature (Massey, 2005).

Overall, the lessons were described by some participants as a useful review of what they knew or a way to learn new terminology. One characterized it as “...it felt like a 'stretch' for my brain” “...a higher level of self-monitoring...” and feeling “...more engaged in the work” (P3). Another lacked opportunity to interact physically with peers and appreciated the chance to do so online (P17).

Finally, six of the eight checked off “Yes” when asked if the lessons had improved their ability to interpret while two were “unsure.” Given their increase in the use of enrichments, as noted in the quantitative analysis, this observation seemed to be verified, and it also supports similar findings in the spoken language translation and interpreting literature (Moreno et al., 2011; Wang, 2015).

In conclusion, this study found tentative support for the use of online learning in sign language interpreter education. It encouraged the use of a model of the interpreting process to structure the lessons and assessment process, in this case McDermid’s (2012) multi-dimensional model of meaning at the literal, enriched or implicature levels. It also identified impediments to online learning, including the need for activities that promote peer interaction and web-based resources that are easy to use. Further research is warranted that include larger sample sizes and additional types of texts to translate.

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Appendix A Source and Examples of Enrichments and Implicature

	English Source	Enrichment	Implicature
1	I took an art class years ago.	Prepositional Phrase – in a college/school/place.	
2	My goal was to become a painter.	Conjunctive device – I wanted to become a painter, so I took an art class. Prepositional Phrase – I painted...on a canvas.	
3	But before I did I checked into the requirements.	Substitute word “did” – Before I took the class – or Before the class started.... Prepositional Phrase – I checked ...on the computer	What did I have to do first?
4	I found out that I would have to pay \$500 for the course.	Antonym – The course was not free, I paid. Converse – The course cost \$500 and I paid. Prepositional Phrase – paid to the school	It was expensive.
5	I also got a list of supplies I would need.	Superordinate “supplies” – brush, pen, paper, paint, clothing, canvas, etc. Prepositional Phrase – supplies...for class.	I had to go to the store and buy the supplies.
6	Now you have to understand that painting was a new skill for me.	Conjunction – It was a new skill, so I wanted to learn it. Ellipsis – Painting was a new skill for me...to learn.	I never took an art class before.
7	So I was a bit concerned about how well I would do.	Reference – substitute “do” – painting Prepositional Phrase – I painted... on a canvas. Verb entailment – I painted, then I looked at my work...it was awful	
8	In fact, I wasn't even sure I would go when the time came.	Prepositional Phrase – I would go ...to class. Antonym – go or stay (home) or quit Verb of judgment — I was nervous.	I paid for the course.
9	When I got there, I thought I was going to be judged!	Agent – judged by teacher/students Verb entailment– I arrived and went in the class....	
10	But thankfully it wasn't so.	Substitute “so” – They did not judge me. Verb of judgment – The experience was positive	
11	The instructor, much to my happiness was very supportive.	Prepositional Phrase – The teacher looked ...at canvas. Adverbial – As I continued to paint...	Other students were supportive.
12	I ended up realizing I was a lousy painter but I really enjoyed the class!	Antonym –good painter, no. I was awful/so-so/lousy. Adverbial — after the class finished.... Prepositional Phrase – I painted...on a canvas Verb entailment – I looked at the canvas	I learned two things. I painted poorly compared to others