

# Hands in Motion: Learning to Fingerspell in Irish Sign Language

*Lorraine Leeson, Sarah Sheridan, Katie Cannon, Tina Murphy,*

*Helen Newman and Heidi Veldheer*

*Centre for Deaf Studies, Trinity College Dublin*

[leesonl@tcd.ie](mailto:leesonl@tcd.ie), [sherids1@tcd.ie](mailto:sherids1@tcd.ie), [cannonk@tcd.ie](mailto:cannonk@tcd.ie), [murphyt9@tcd.ie](mailto:murphyt9@tcd.ie),  
[newmanh@tcd.ie](mailto:newmanh@tcd.ie), [veldheeh@tcd.ie](mailto:veldheeh@tcd.ie)

## **Abstract**

Irish Sign Language uses a one-handed alphabet in which each fingerspelled letter has a unique combination of handshape, orientation, and, in a few cases, path movement. Each letter is used to represent a letter from the Latin alphabet (Battison, 1978; Wilcox, 1992). For ISL learners, fingerspelling is a strategy that is used to bridge lexical gaps, and so functions as an interlanguage mechanism, which we hypothesise is more prevalent for new learners (A-level learners in the Common European Framework of Reference for Languages (CEFR) (Council of Europe, 2001). Across 2018–19 we marked up a subset of data from the Second Language Acquisition Corpus (ISL-SLAC) for use of fingerspelling. Here, we document how these learners use fingerspelling, and explore the phonology of the fingerspelled items presented by M2L2 learners (handshape, location, movement and orientation), comparing to the production of native signers', drawn from the Signs of Ireland corpus. Results indicate that ISL learners make greater use of fingerspelling in the initial phases of acquiring the language, and that, over time, as they develop a robust lexical repertoire, they reduce the frequency of fingerspelling. Fingerspelling also provides a strategic interlanguage that can be reverted to when vocabulary is unknown.

**Keywords:** *Fingerspelling, Irish Sign Language, M2L2 Learners, Teaching and Learning Sign Languages, Corpus Sign Linguistics, ISL-SLAC*

## **1. Introduction**

In this paper, we present an initial analysis of a sub-set of data from the Second Language Acquisition Corpus for Irish Sign Language (ISL-SLAC), a project that tracks the language learning journey of adult sign language learners. Here, we present a first snapshot relating to the development of fingerspelling competency over time by adult learners of the language. For most, this is their first foray into learning a language in another modality, which brings with it additional challenges (e.g. see Sheridan 2019). In the literature, such learners are referred to as second modality second language, or M2L2, learners. ISL-SLAC participants were, at time of data collection, students of the Bachelor in Deaf Studies, a 4-year programme delivered by the Centre for Deaf Studies, Trinity College Dublin. We begin with a brief discussion of existing studies in the field of M2L2 learning and then turn to present an overview of the ISL-SLAC project and the use of fingerspelling within the data set.

## **2. Sign Language Teaching and Learning**

While sign language teaching and learning has been formalised to varying extents since the 1960s in many parts of the world (McKee, Rosen & McKee, 2014), with the teaching and learning of Irish Sign Language dating back to the late-1980s (Leeson, 2011; Teresa Lynch, personal communication). Across the world, there remains a scarcity of empirically driven research in this domain (Chen-Pichler, 2012; Haug, 2017; Haug, Ebling, Boyes-Braem, Tissi & Sidler-Miserez, 2019; Leeson, Fenlon, Mesch, Sheridan, & Grehan, 2020; Leeson, Muller de Quadros & Rossi Stumpf, in press; Napier & Leeson, 2016). Clearly, deeper insight into M2L2 learning will have positive pedagogical ramifications and is something that the field requires (Chen-Pichler, 2012). Chen-Pichler & Koulidobrova (2015, p. 218) report that the learning of a signed language “... may pose unique challenges not observed in typical (unimodal) L2 acquisition.” In more recent years, we have seen a growing body of research that aims to capture the challenges faced by learners by identifying common patterns in M2L2 acquisition, and/or, phenomena associated with learning through a new modality (ibid.). An additional area of interest is how co-speech gestures can be potentially leveraged “as a rich source for cross-linguistic incorporation into L2 signing” (ibid., p. 220).

In contrast, there exists a multitude of studies on bilingual learning, language processing, phonological acquisition and pedagogical principles for spoken language L2 acquisition (e.g. Bochner, Christie, Hauser & Searls, 2011; Hilger, Loucks, Quinto-Pozos & Dye, 2015; Ortega-Delgado, 2013; Rosen, 2004). The emerging field of M2L2 sign language acquisition

is now also starting to slowly feed into these domains, although longitudinal, corpus-based studies are not yet (publicly) available (Leeson et al., 2020; Leeson et al., in press). Boers-Visker and van den Bogaerde (2019) point out that there is currently little data available that provides insight into the developmental stages that M2L2 learners navigate. They ask whether interlanguage exists in M2 acquisition and specifically explore the use of space by two learners of Sign Language of the Netherlands (NGT) across a 4-year period. Their findings support previous studies (e.g. Marshall & Morgan, 2014) and anecdotal evidence from sign language teachers that interlanguage constructs exist for M2L2 learners and that learners of NGT study do not produce classifier verbs in a “conventionalized manner” (Boers-Visker & van den Bogaerde 2019, p. 440). Such research demonstrates the potential for longitudinal studies to shed light on M2L2 interlanguage and other learner phenomena. In line with this, while our work on the Irish Sign Language Sign Language Acquisition Corpus (ISL-SLAC) is preliminary, we seek to provide insights into the process around how new ISL learners develop competency using fingerspelling, a phenomenon frequently used in Irish Sign Language.

### **3. SLAC Project**

Work on the Sign Language Acquisition Corpus (SLAC) commenced in 2013 as a venture between the Centre for Deaf Studies, Trinity College Dublin and the Sign Language Department at Stockholm University, Sweden. Across 2013–15 we built a parallel corpus of data from adult learners of Irish/Swedish Sign Language second language learners in university classrooms, with (in Ireland) research ethics permission granted by the School of Linguistics, Speech and Communication Sciences Research Ethics Committee, Trinity College Dublin. This parallel corpus is, to the best of our knowledge, the world’s first corpus of hearing second modality-second language (M2L2) learners. Data was collected at four points across a period of eighteen months (see Table 1). In this paper, we refer to data collected at point 1 as ‘datapoint 1’ or DP1, at point 2 as DP2, and so on.

<i>Collection Point 1: Autumn 2013</i>	<i>Collection Point 2: Winter 2013</i>
<i>Collection Point 3: Spring 2014</i>	<i>Collection Point 4: Autumn 2014</i>

*Table 1: Collection points for ISL Data*

The primary purpose of the SLAC is to identify milestones that apply to adults learning Irish Sign Language (ISL). We are also committed to leveraging the corpus to evaluate the empirical efficacy of the Council of Europe’s Common European Reference for Language (CEFR) descriptors for sign languages, published by the European Centre for Modern Languages (Leeson, Van den Bogaerde, Rathmann & Haug 2016), and this goal impacted on the tasks we asked corpus participants to complete. Table 2 presents the global descriptors that outline the competencies that basic users of a sign language master.

Basic User	A2	Can understand sentences and frequently-used expressions related to areas of most immediate relevance (e.g. basic personal and family information, shopping, local geography, employment). Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Can describe in simple terms aspects of his/her background, immediate environment and matters in areas of immediate need.
	A1	Can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. Can introduce him/herself and others and can ask and answer questions about personal details, such as where he/she lives, people he/she knows and things he/she has. Can interact in a simple way provided the other person communicates slowly and clearly and is prepared to help.

*Table 2: Common Reference Levels: Global Scale for Sign Languages – Basic User Global Descriptors (Leeson et al. 2016, p. 6)*

In the first phase of ISL-SLAC, twelve learners of ISL completed a number of tasks at four intervals in the first eighteen months of their undergraduate studies (Table 1). Our Swedish counterparts collected an identical dataset over this same first year period, but here, we report only on the ISL data.

We collected data that focused on learner productive and interactive competence. One of our goals is to identify a baseline for communicative competence. To capture this, each M2L2 participant engaged in a video recorded conversation in the target sign language with a deaf lecturer. The rationale for this was to map student progress over time to CEFR descriptors (Council of Europe, 2001; Leeson et al., 2016), or indeed, identify misalignment of descriptors in CEFR for sign language learners. The conversation began with a focus on basic personal information (personal identification, daily routine, hobbies) and in subsequent recordings became more detailed in nature (how the student’s studies were progressing, what subjects they enjoyed studying, etc.). The other tasks remained constant on each occasion. These were the retelling of the “Frog, where are you” picture story (Mayer, 1969) which draws on an established tradition for asking participants to tell a story, guided by an

illustrated source (Berman & Slobin, 1994), prompting use of both lexical and productive signs (see Leeson & Saeed, 2012 for definitions of these terms), and requires the grammatical use of signing space along with gesture and use of fingerspelling to bridge lexical gaps. We also asked learners to sign what they saw in a series of contrasting images that prompt use of transitive sentences (Volterra, Radutsky & Natale, 1984). These elements have previously been used in the generation of L1 sign language corpora and allow for future comparison of the M2L2 data set with a native signer control corpus.

In the third and fourth data point, additional tasks were added. Participants watched a short 1-minute film clip which they had to retell in ISL and they also completed a comprehension task where they looked at an L1 signer discuss a trip to the supermarket, subsequent to which, they were invited to answer a number of written questions which tested their understanding of the content. The amalgam of these various tasks will allow us to consider a range of aspects in M2L2 attainment. Here we focus on fingerspelling.

#### **4. Annotating the Corpus**

Sign languages have no written form and therefore, documentation and analysis of sign languages requires access to filmed datasets. The annotation of such data is incredibly time consuming (Leeson et al., 2020). The primary reason for this is that there is no automated system for the recognition of sign languages or parts of speech tagger. This is due to a myriad of factors; the 3D nature of sign language and the simultaneity of the articulators (e.g. use of both hands interacting with other parts of the body in complex ways), the interplay of sign language and gestures, and the use of non-manual gestures for linguistic effect (Vermeerbergen, Leeson, & Crasborn, 2007; Vogler & Goldenstein, 2008). Therefore, annotation is currently carried out manually, and is, as Crasborn (2014, p. 110) notes, intensive: "...glossing in annotation software can take as much as 200 times real time to do consistently – assuming there is already a full lexicon with ID-glosses available for reference", that is, a 'Signbank', such as that developed for Auslan (Australian Sign Language) (see <http://www.auslan.org.au> (Accessed 21 August 2019)). In the Irish context there is currently no Signbank with ID-glosses (lemmas) available, which results in the process becoming even more labour intensive. To mitigate the challenge, we have focused on specific properties and populated only these designated tiers, allowing for further annotation and analysis of other aspects of the corpus over time, a common approach in corpus sign linguistics.

## **5. Fingerspelling**

Irish Sign Language uses a one-handed alphabet in which each fingerspelled letter has a unique combination of handshape, orientation, and sometimes also path movement.<sup>1</sup> Each fingerspelled item represents a letter from the Latin alphabet (Battisson, 1978; Wilcox, 1992). Thus, fingerspelling is a representation of the orthography of a written language where specific hand configurations are used to represent letters of the alphabet (Johnston & Schembri, 2007). Sutton-Spence (1994) reports that fingerspelling was initially devised by hearing educators of deaf people as a means of communication, and today, fingerspelling holds a solid position within sign languages, serving as a tertiary system insofar as signers do not use fingerspelling continuously, but draw upon it for specific purpose (Davis, 1989; Mulrooney, 2002; Padden & Gunsauls, 2003). Different sign languages have differing fingerspelling systems. For example, British Sign Language, Australian Sign Language, New Zealand Sign Language, Czech Sign Language and Turkish Sign Language all make use of two-handed fingerspelling systems<sup>2</sup> while Irish Sign Language (like most other European sign languages) has, as noted above, a one-handed fingerspelling system.

The frequency of use of fingerspelling varies from language to language. For example, American Sign Language (ASL) seems to make greater use of fingerspelling than European sign languages (Baker, van den Bogaerde, Pfau & Schermer, 2016; Johnston & Schembri, 2007; Nicodemus et al., 2017). In Irish Sign Language, where gendered generational variation has long been recognised (Fitzgerald, 2014; Grehan, 2008; Leeson & Grehan, 2004; LeMaster, 1990, 1999-2000, 2002; LeMaster & O'Dwyer, 1991; Leonard, 2005; National Association for the Deaf, 1979), we know that there are differences with regard to how men and women use fingerspelling: men are more likely to use fingerspelling than women, and older men make greater use of fingerspelling than younger men. There is also a correlation between use of mouthings and use of fingerspelling: the more fingerspelling is used, the fewer accompanying mouthings arise, a pattern most evidenced in older Irish male signers, who use fingerspelling more than any other cohort in the Irish Deaf community (Fitzgerald, 2014). Indeed, Fitzgerald (2014), building on Mohr-Militzer (2011) proposes that there are two sub-types of mouthing in Irish Sign Language that co-occur with fingerspelling. She goes on to note that, following from the implementation of an oral education system, which was staggered across the boys and girls school for the deaf in Dublin in the 1940s and 1950s (thus, there is a gendered, generational impact), we see an increase in mouthing in ISL and fewer fingerspelled items amongst younger generations of ISL signers.

Fingerspelling serves several functions in sign languages. It can bridge a lexical gap – either because there is no existing lexical equivalent in the host sign language (e.g. proper nouns) or if a lexical sign is unknown to a signer. Fingerspelling may also be used as a form of code-switching whereby words from a spoken language are introduced into a signed language for specific purpose such as emphasis, clarification (often accompanied by the lexical sign), or emotion (e.g. Adam, 2012). Sutton-Spence (1998) reports that in a British Sign Language corpus containing 19,450 fingerspelled items, the clear majority of these items are related to nouns. Nouns made up 60% of the vocabulary in Sutton-Spence’s data, while verbs amounted to just 14%. Fingerspelling may also be used as a vehicle for loan signs borrowed into the language (Sutton-Spence, 1998). In Irish Sign Language, this includes fingerspelled items such as the months of the year e.g. #JAN, #NOV or the sign, s.t.e.p^FATHER, where the compound sign that evolved comprises an initial fingerspelled element and a lexical sign. Fingerspelled items can become lexicalised, incorporated into the vocabulary of the language. ISL examples include the signs #WHY, #BUS, and #BANK. Furthermore, lexicalised signs can be abbreviated or show phonological deletion, as in the ISL sign for the city of Limerick, which is articulated as #LMK (Leeson & Saeed, 2012).

As we shall see, the ISL-SLAC corpus presented instances of learners using ISL fingerspelling for all of these functions. Further, we note that for sign language learners, fingerspelling is a strategy that can be used to bridge lexical gaps, and so functions as an interlanguage mechanism, which, we suggest, is more prevalent for new learners (A-level learners in the CEFR) than for those who are at intermediate or advanced levels (B-C learners in the CEFR).

While this study presents an initial window into use of fingerspelling by M2L2 learners of ISL, it is worth noting that Nicodemus et al. (2017) looked at a cross-linguistic sample of interpreters, including 4 ISL/English interpreters who provided an ISL version of President Obama’s first inaugural address. While appreciating that these examples come from a specific kind of language use (interpreting a Presidential inaugural speech), by a cohort of professional interpreters, they offer the only snapshot of any kind of ISL M2L2 users use of fingerspelling to date, and as such, are useful to note here. All four ISL interpreters in Nicodemus et al’s study were ‘new signers’, that is, they had all acquired ISL as a second or subsequent language as adult learners. As such, it represents the only other reference to ISL fingerspelling by M2L2 learners (albeit with higher order linguistic skills) in the literature.

The study also included interpreters working into American Sign Language (ASL), Italian Sign Language (LIS), British Sign Language, Australian Sign Language and New Zealand Sign Language. In terms of frequency of use, the ASL interpreters produced the most fingerspelled items (137 tokens), almost seven times the number of the LIS interpreters. The ISL interpreters produced the second highest number of fingerspelled items (96 tokens), though the number of fingerspellings produced varied from interpreter to interpreter (one interpreter produced 11 tokens (the lowest for ISL) and another produced 47 tokens (the highest for ISL)). ISL rendered English lexical items that none of the other language groups in the study fingerspelled. For example, the words “enemy” and “loyal” were produced as fingerspelled sequences only by the ISL interpreters, while “muslim” was produced as a fingerspelled sequence six times, but only by ASL interpreters. Lexicalised fingerspellings were also evidenced in the ISL sample in this study, with 10 instances of #WHY, 4 instances of #IF, and 2 instances of #OR. This study demonstrates that M2L2 ISL users who have attained fluency in the language use fingerspelling to present nominal information, to bridge lexical gaps, and for emphasis. They also leverage lexicalised fingerspelled items.

## **6. Data Analysis**

Across 2018–19 a subset of the ISL- SLAC corpus was marked up for use of fingerspelling, with research assistance from a group of undergraduate students at the Centre for Deaf Studies, and co-authors in this paper (Cannon, Murphy, Newman & Veldheer). They looked at four participants from the corpus, all female, aged between 20 and 53 years. At the beginning of the data collection process, these participants presented with varied experiences of prior learning of ISL:

- Participant 3 (P3) had been learning ISL for four years ahead of her arrival at Trinity.
- Participant 4 (P4) had been learning ISL for two years.
- Participant 6 (P6) had been learning ISL for five years (on and off).
- Participant 9 (P9) had been learning ISL for only two weeks, since arrival at the Centre for Deaf Studies. At the same time, this participant had a deaf sibling, and as a result reported that some idiosyncratic “home sign” was used by the family.

We note that prior to commencing studies at the Centre for Deaf Studies, students who had completed evening classes in ISL may have completed approximately 40–50 hours of

instruction a year, and they would not necessarily have been taught by a trained ISL teacher. Once at the Centre, they completed 9 hours of ISL class time per week, along with exposure to ISL in other classes delivered by deaf lecturers with interpretation into English. Classes run across an eleven-week term, with students completing 297 hours of ISL classes across the 18 months in which the ISL-SLAC data was collected. Therefore, any advantage that the M2L2 learners may have had arising from prior learning of ISL would typically be eliminated by the end of the first academic term.

Corpus data was marked up in ELAN. ELAN is the software favoured by sign linguists, as the annotation and visual stream can be time-aligned (See Figure 1). The annotation standards (tags) applied when analysing L1-M1 corpora (native sign language users) have been discussed at length with researchers aiming to develop an annotation standard to ensure consistency and to be able to share corpora for the purpose of contrastive analysis (e.g. see Digging into Signs project <http://www.ru.nl/sign-lang/projects/digging-signs/> (Accessed 14 August 2019)).

Working in ELAN, glosses typically capture established lexical signs (Leeson & Saeed, 2012), which may be considered as the ‘parent’ tier for the data set. However, these glosses cannot be analysed in isolation. Therefore corresponding ‘child’ tiers can offer additional phonological, grammatical or contextual information. In the context of M2L2 learners, a notation system which captures learner errors, strategies and commentary on same is also required. As can be seen in Figure 1 below, tiers in the ISL-SLAC have not yet been fully populated: we have focused solely on properties related to fingerspelling and the utterances in which fingerspelled items occur. Across the academic year 2018–19, student annotators marked up fingerspelled items used by the selected subset of ISL-SLAC participants, any mouthings that accompanied the fingerspellings, and any striking features that they noticed (e.g. an unusual or atypical handshape being used, an unusual or atypical place of articulation). This set the scene for exploring both the technique and frequency of these instances, documenting if participants use fingerspelling as a strategy when vocabulary is unknown and how the phonology of the sign (handshape, location, movement and orientation) is produced.

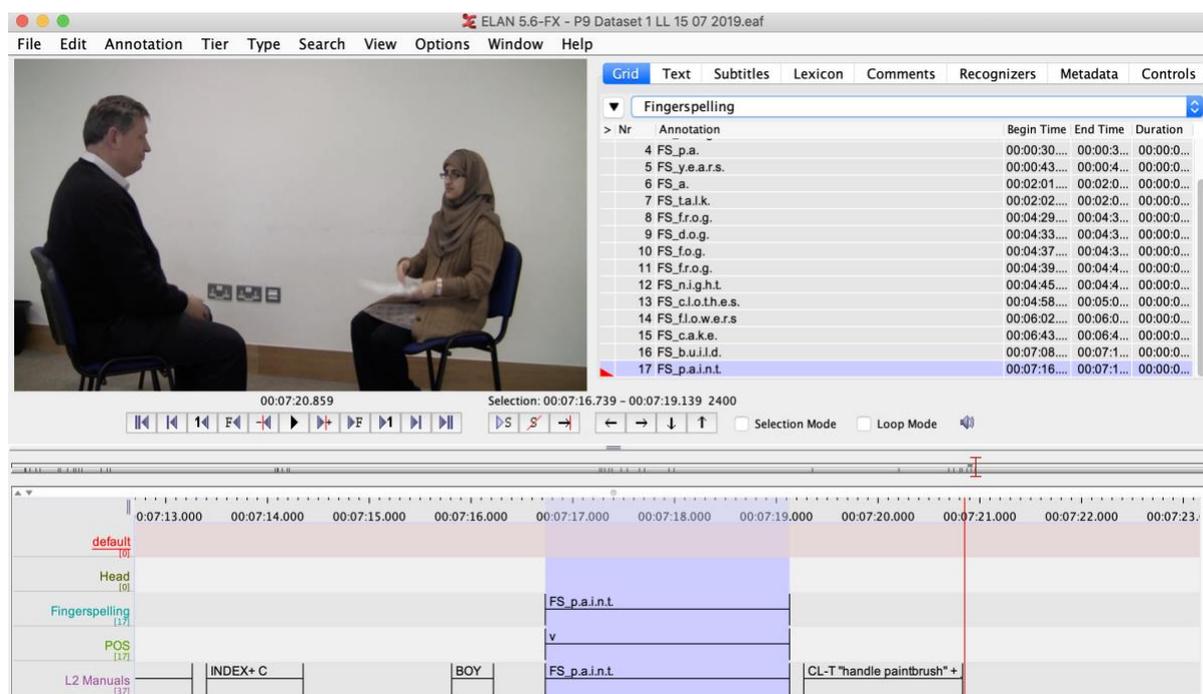


Figure 1: Sample of ISL-SLAC in ELAN

### 6.1. Acquisition of Form

In this section we look at a sub-set of the data relating to the articulation of form in the ISL-SLAC across the parameters of handshape, location, movement, and orientation, the first time that these been documented empirically for a learner group.

#### 6.1.1. Handshape errors

Some handshapes are easier to articulate than others. For example, Boyes-Braem (1990) discusses the ‘e’ hand configuration in American Sign Language (which happens to be identical to the ISL fingerspelled ‘e’) and reports that it is acquired correctly by children acquiring ASL at a later stage than more basic handshapes such as ‘a’, ‘c’ and ‘5’. The ‘e’ handshape also proves challenging for M2L2 learners of ISL. In Figure 2 below, we see that P6 is mis-articulating the handshape parameter. Here, the error arises from use of an open handshape rather than the correct target, a closed ‘e’ handshape. While such handshapes prove problematic for adult M2L2 learners, the ISL-SLAC data shows that the challenge is resolved over time for our sample, most likely following from formative feedback from their ISL instructors, with subsequent opportunities to practice repetition of the target form.



*Figure 2: P6, DP1: Handshape error, 'e'*

We can also say that ISL learners frequently misspell words. This appears to occur for several reasons. Sometimes the target form is close to that articulated. For example, in Figure 3, 'u' is signed, while the target was 'p'; these two phonemes function as minimal pairs in ISL. In 'u', the index and middle finger are extended, while for 'p', the ring finger is also extended. Learner confusion of 'u' and 'p' arose on several occasions across the dataset. Frequently, new learners partially produce or abbreviate a target fingerspelled item, using English language nothing as a strategy to bridge the communicative gap, to disambiguate between possible targets. In the ISL-SLAC data, and for P9 in particular, there are several examples of false-starts, perhaps as a result of self-consciousness. (We should note that P9's first language is not English, and this could also be a contributing factor here). However, the number of misspellings in her dataset reduced over time, which may be due to increased fluency in ISL over time and/or increased confidence with L2 English after formal study in a tertiary academic environment, or indeed a combination of these factors. A follow-up study could further investigate learners' accuracy, speed and frequency when fingerspelling in a language which does not correspond with their mother tongue.



*Figure 3: Handshape error. Target of handshape is 'p' – articulation is 'u' (P3, DP1)*

#### 6.1.2. Movement errors

Brentari, Fenlon, and Cormier (2018, p. 7) note that “Movements are dynamic acts with a trajectory, a beginning, and an end.” This is particularly true for fingerspelled items where the hand moves as handshapes transition. Geer and Keane (2018) note that most fingerspelled letters in American Sign Language are produced with the wrist extended or slightly hyperextended, elbow flexed past 90 degrees; the forearm is typically rotated so that the palm faces outwards. This holds true for ISL too. Geer and Keane (2018) also note that the methods used in teaching fingerspelling could impact on how students learn and comprehend it. They consider whether ASL learners become overly focused on seeing specific forms in isolation without regard for how they can be influenced by the context in which they appear because they typically learn fingerspelled representations of letters in isolation. They argue that ASL students must learn to focus on aspects of fingerspelling other than just the static portions of the signal. If our goal is to support learners to develop fluid fingerspelling, we should look at what fluent signers do. Jerde, Soechting & Flanders (2003) point out that fluent signers organise a sequence of movements such as that found in fingerspelled items as a unit. Thus, a key requirement for students is learning to transition from one fingerspelled item to the next.

Given that learners' focus of attention appears to be firmly on articulation of form rather than transitional movements, it is unsurprising that movement errors arise in the ISL-SLAC sample. For example, P9 fingerspells 'dog' by articulating each letter in turn, without any of the mediating movement that one typically sees in fluent signers. This contrasts with the movement seen in Figure 5, where Fiona, a native signer, pre-empts the articulation of the 'g'; handshape. Figure 5 shows that as she fingerspells, Fiona's middle, ring and pinky fingers are extending, in anticipation for the word-final element, 'g'.



*Figure 4: P9 DP1 fingerspells 'dog'*



*Figure 5: Fiona (Dublin) Frog Story fingerspells 'dog'*

### 6.1.3. Location errors

Fingerspelling is prototypically articulated in front of the signer's torso. In Figure 5, we see a deaf signer, Peter, articulate 's' as the opening letter in the fingerspelled sequence, 's.c.h.o.l.a.r.s.h.i.p.'. We note that his palm is oriented towards his side-left, when in citation form, the palm would be oriented towards the interlocutor, in anticipation of the second fingerspelled letter, 'c', for which the palm is oriented in this direction. We consider this a coarticulation effect (See, for example, Jerde et al., 2003 for discussion of coarticulation in a population of fluent signers).

In contrast, in Figure 6, we see a new signer place their hand much higher in signing space while articulating the same letter, 's'. (Note also that the handshape target is slightly off, as

the index finger is slightly extended). It is important to note that the positioning of this learner's fingerspelling is not consistently misplaced.



*Figure 5: Signs of Ireland Corpus (18) Personal Stories. Peter (Dublin) articulates 's'*



*Figure 6: Location of fingerspelling for 's' is high (P3, DP1).*

However, the same participant articulates their fingerspelled output at the normative location in Figure 7.



*Figure 7: Normative place of articulation for fingerspelling. (P3, DPI).*

These examples suggest that learner focus is on articulation of handshape rather than on location in the early stages of learning, something that appears to shift as learners progress.

#### 6.1.4. Orientation errors

As indicated in Figure 5, orientation of an element can be modified because of co-articulation constraints (in that case, the transition from ‘s’ to ‘c’ in ‘s.c.h.o.l.a.r.s.h.i.p.’). Fingerspelling can also be modified (location, orientation of palm) to facilitate the introduction of an entity at a given location. We see an example of this in Figure 8, from the Signs of Ireland corpus, where, having indicated to the target location, Eilis then fingerspells ‘d.o.g.’ at a front and central location in signing space, indicating that this is where the referent is established in the narrative space. What is interesting here is that Eilis, a deaf ISL user, modifies the typical orientation of the palm for all elements of the fingerspelled item. That is, we see that the palm is facing the floor in ‘d’. It faces contralaterally during articulation of ‘o’ and remains in this location for the articulation of ‘g’.



*Figure 8: SOI 10 Eilis (Dublin) Personal Story. Fingerspelling ‘dog’ at a locus in signing space*

However, when atypical orientation occurs in M2L2 learners, it is often unintentional, and unguided by grammatical or discourse-level principles. An example of an error in orientation for the fingerspelled item ‘s’ can be seen in Figure 9 where P3 articulates this letter (the opening to fingerspelling the place-name, ‘Swords’), with the palm oriented towards the contralateral side of signing space instead of its’ target orientation, facing away from the signer.



*Figure 9: Orientation error – articulation of ‘s’ (P3, DP1)*

### *6.2. Duration of fingerspelled items*

We are not aware of any literature that describes the durational qualities of fingerspelled items by new signers. However, it is very clear, even from our small sample, that M2L2 ISL learners articulate fingerspelled items slowly, and frequently ‘hold’ the last letter of a fingerspelled item. Figure 10 shows a new signer who places an extended hold on the word-final letter ‘e’, in the place name, ‘Pearse’. (The learner’s target is Pearse St. Station). The fingerspelled item is followed by articulation of the lexical sign for STATION. Further research could explore if and how duration of articulation shifts over time, contrasting M2L2 learner fingerspelling duration against that of native/fluent signers of ISL, and how such elements contribute to how M2L2 learners are judged in terms of their fluency in ISL.

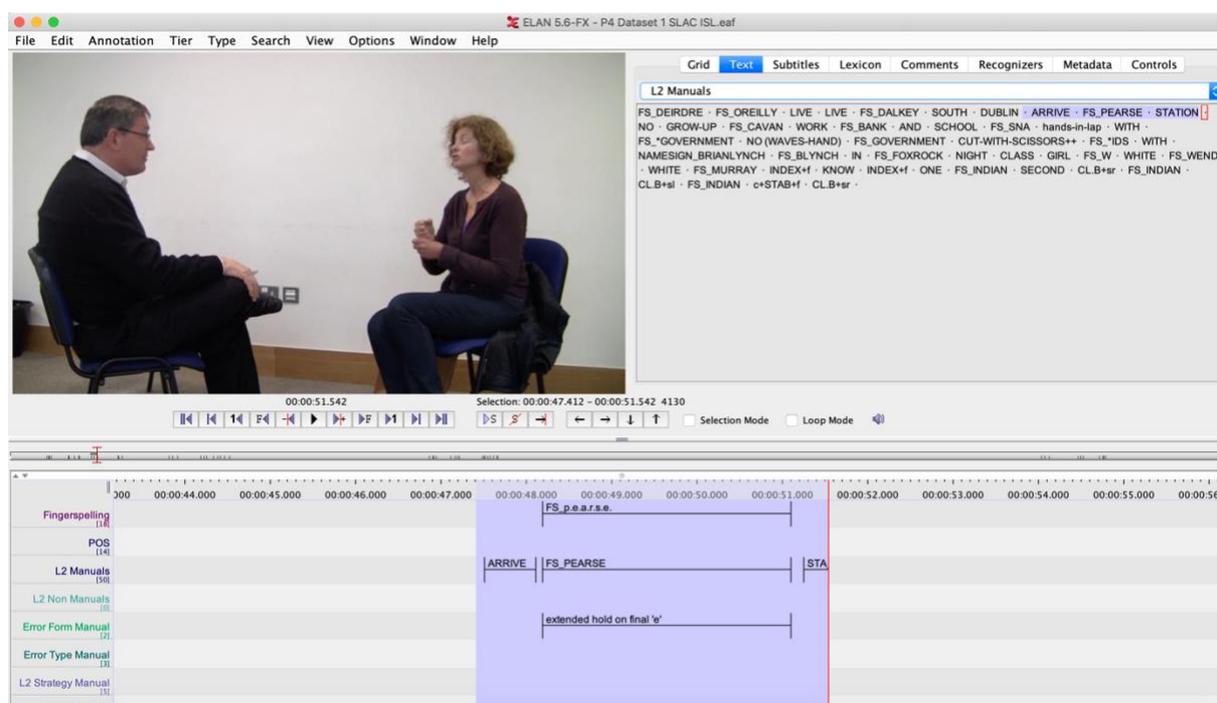


Figure 10: Extended duration of fingerspelled item (P4, DP1).

## 7. Frequency of fingerspelling in the dataset

Preliminary results for this sample indicates that ISL learners may make greater use of fingerspelling in the initial phases of acquiring the language, and that, over time, as they develop a robust lexical repertoire, they reduce the frequency of fingerspelling. Table 3 shows the amount of fingerspelling used by each participant in each dataset. As can be observed, some participants used more fingerspelling than others, probably a combined indication of their prior knowledge of ISL. Table 3 illustrates that the majority of fingerspelled items produced are nouns (n), while very few verbs (v) are fingerspelled. However, it is worth noting that there also seems to be a relationship between the kind of question put to the participant and the nature of the fingerspelled items that we see used in their responses. For example, questions that ask participants their name, where they are from, and where they live are naturally geared to prompt nominal information in response, and these are items that one would normally expect to prompt fingerspelling.

	Dataset 1		Dataset 2		Dataset 3		Dataset 4	
	n	v	n	v	n	v	n	v
P3	13	0	8	0	6	0	9	0
P4	16	0	28	0	33	0	13	0

P6	16	1	12	0	15	0	8	0
P9	13	3	26	1	13	0	15	0

*Table 3: Combined usage – nouns v verbs across learner sample.*

### **8. Function of Fingerspelling in the SLAC sample dataset**

The fingerspelling evidenced in our sample is multifunctional. Some usage presents proper and common nouns for which no established lexical signs exist in ISL. However, there are also examples from the ISL-SLAC where learners fingerspell an item where a lexical sign does exist. Participant 9 continues to fingerspell ‘Drogheda’ in all four data points despite a lexical sign being available, and we would expect that this is something that would have been pointed out in class. Other examples in the ISL-SLAC include fingerspellings for ‘dog’, ‘frog’, ‘flower’ and ‘Indian’, all of which have lexical forms available in ISL. Learners also appropriately used fingerspelling for a range of acronyms like CAO (Central Application Office), CDS (Centre for Deaf Studies), and ISL.

At later data collection points, fingerspelled items were often coupled with lexical signs and we note a visible transition from using just the fingerspelled item in dataset 1 to use of both the fingerspelled item and the associated ISL lexical sign in dataset 2. It may that learners are checking with their interlocutor (an ISL teacher) that they selected have the correct lexical sign and are seeking to clarify or add clarity to their contribution by additionally fingerspelling the target item. An example of this is seen in Participant 3’s dataset, where she discusses Taekwondo. Initially (DP1) she simply fingerspells the item, but in later datapoints (beginning DP2), she moves to use the lexical sign.

Participant 6 follows the same process, moving from fingerspelling i.n.d.i.a.n. in DP1 to simply using the lexical sign in DP2. Yet, there is no evidence to suggest that a learner who has moved from a fingerspelled item towards a lexical item will reliably continue to use the lexical item in future interactions. For example, Participant 6 initially fingerspells c.o.w.b.o.y. in DP1 and in DP2 uses the lexical sign but reverts to fingerspelling the item in DP3. In DP4 she substitutes the target with the lexical sign for MAN, perhaps because she could not recall the lexical sign for COWBOY. At the same time, we note that ongoing work in progress on a cross-linguistic study of delivery of the signed version of the narrative ‘Frog, Where Are You?’ suggests that even where lexical signs exist, L1 signers may first fingerspell an item to

explicitly establish reference (Ferrara et al., in prep). This is, of course, a different functional use of fingerspelling, but one that also needs to be pointed out to M2L2 learners by teachers.

## **9. Conclusions**

This paper presents an initial exploration of a subset of the ISL-SLAC corpus. While this subset is small (n=4), it provides insights into a range of issues associated with fingerspelling development in M2L2 learners of ISL. Our data suggests that at CEFR A1 level, M2L2 learners are focusing on the form of individual fingerspelled letters rather than seeing the fingerspelled unit as a whole (Geer & Keane, 2018), and that M2L2 learners give attention to, and thus gain better control over phonological parameters of handshape, location, movement and orientation. We see that just because a learner has come across a lexical sign for a target item does not mean that they will use the sign – there seems to be a period where the learner may fluctuate between use of the fingerspelled item and the lexical item, or use both. This may be a strategy to check that they have selected the correct target lexical sign or to maximise explicitness of reference to their target item. Such usage deserves follow up work, with protocols (e.g. Think Aloud Protocols) that allow for engagement with M2L2 learners around their language use and development. Other elements which deserve attention include the interplay between mouthing and fingerspelling in the SLAC, something that we know has sociolinguistic relevance for L1 ISL users. Further, the frequency of use of fingerspelled items would be worth considering, especially when mapped against other strategies that new signers might employ, including the use of gesture, paraphrasing, etc. Combined, these will inform our understanding of how learners develop fingerspelling competence, how it moves towards native like usage (or deviates from same). Exploration of the pedagogic approaches adopted in introducing and finessing M2L2 ISL fingerspelling competence is also needed, with room to explore whether form-focused interventions may support learner development. Finally, it would be helpful to have a robust study of fingerspelling in L1 signers which we could map L2 usage against.

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<sup>1</sup> The fingerspelling system in Irish Sign Language can be viewed here: <https://www.youtube.com/watch?v=BB6SztgDpQ0> (Accessed 10 July 2019).

<sup>2</sup> An example contrasting Czech Sign Language's two-handed alphabet and American Sign Language's one-handed alphabet can be viewed here: <https://www.facebook.com/watch/?v=861002957348459> (Accessed 10 July 2019).