Learning Japanese Sign Language as a foreign language:
the impact of online tools in creating equal learning opportunities for Deaf students.

Margherita Melotti
Ca' Foscari University of Venice

Abstract

The Covid-19 pandemic-driven shift to a mainly digitized learning environment has raised criticism regarding a widening digital divide which minority groups, like people with disabilities, were already experiencing (Duplaga 2017; Scanlan, 2021). However, the increasing attention for e-learning tools, inclusivity and accessibility related problems has paved the way for the development of new inclusive teaching methods (Hashey, 2014; Lago, 2017; Alsadrani, 2020). This study aims to identify inequalities in education of Japanese language for students with disabilities, and to observe the positive impact of JSL e-learning tools in creating an accessible learning environment for students who are deaf or hard of hearing (e.g. online dictionaries, video technology, contents with caption). The study has been conducted via electronic surveys, which were distributed to hearing students of Japanese and Italian Sign language, Deaf students, and teachers of Japanese at Ca' Foscari University of Venice. In the surveys, the three groups of participants were asked to express their opinion on some major problems concerning the difference in accessibility of foreign language (FL) e-learning tools and traditional FL teaching methods. The survey also addressed the possibility of having access to Japanese Sign Language e-learning tools to investigate (i) motivation of hearing students for Japanese in learning JSL; (ii) motivation of deaf students in learning a foreign SL with online materials; (iii) the opinion of teachers on whether JSL e-learning tools could be useful in creating equal learning opportunities for deaf and hearing students. The findings of the quantitative and qualitative analysis of the responses to the survey showed a high level of motivation of hearing students in learning JSL, a considerable number of Deaf students interested in learning a foreign sign language, and a general perception by teachers that traditional teaching methods are not sufficiently accessible to deaf students. The data will be analyzed and discussed to understand how JSL e-learning tools can be implemented to fill the learning opportunity gap between hearing students and deaf students when it comes to foreign language learning.

Keywords: digital divide, inclusive e-learning, disability, deaf students, JSL, foreign language learning

Introduction

After the Covid-19 pandemic, education has seen a complete revolution towards digitalization. In response to fears of a growing digital divide among students, attention has been placed on how to use online tools to create an inclusive learning environment for students with disabilities (Duplaga 2017; Scanlan, 2021). In this paper, I will focus on the accessibility and inclusivity of learning materials for d/Deaf FL learners. Specifically, I will investigate if online tools and JSL e-learning materials can improve the educational experience of d/Deaf students who are interested in Japanese Languages. The FL learning situation of d/Deaf students has been largely overlooked in previous research, based on the stereotypical assumption that d/Deaf students are simply "not suited" for language learning. As a consequence, there are very few learning materials that are designed for the needs of d/Deaf students, and most are focused on spoken lingua francas like English (e.g. *Talking Hands, A basic English Course for Deaf and Hard-of-Hearing Learners*, 1999; Domagala-Zynk et al., 2013). Language teachers are also rarely prepared to address the needs of Deaf students in their classrooms. By asking Deaf learners about the difficulties they encountered in their FL learning experience and what their preferred learning materials are, this study wants to investigate which online tools can be implemented to fit the individual needs of d/Deaf language learners. The possibility of access to foreign SL learning material, specifically JSL, to improve motivation and understanding among Deaf students was also investigated.

1. Deaf Population, deafness, Deafhood: notes on terminology.

As a medical condition, deafness is a sensory impairment that involves various levels of hearing loss. According to the World Health Organization (WHO), about 5% of the people in the world have a disabling hearing loss[1]. Of these, about 7% are children that are born deaf. Depending on the age of onset and severity of hearing loss (mild, moderate, severe, profound), deafness can have a strong impact on cognitive and linguistic development, often leading to a lack of linguistic competence in oral languages (Capirci et al., 1989; Bertone et al., 2009; Cardinaletti et al., 2016). Culturally and linguistically, Deaf signers are those making up the "Deaf community". Many Deaf authors and activists have argued that Deaf people (with capital D) have a shared cultural identity and should be considered part of a culture-linguistic minority rather than being identified as persons with a disability (Lane, 1995, 2005; Ladd, 2003; Chatzopoulou, 2014). This is best explained through the

[1] https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss, last seen 15.09.2021

concept of *Deafhood* introduced by the Deaf author Ladd Paddy. In his work *Understanding Deaf Culture – in search of Deafhood*, Ladd (2003) *deafness* refers to the experience of hearing loss as a medical condition, e.g. the elderly who become "hard-of-hearing" with age. The term *Deafhood* refers instead to the collective experience of being Deaf as a consciously practiced and continuously negotiated cultural identity. Members of the Deaf community value their experience as a culture-linguistic minority, taking pride and comfort in their language and values which they are committed to pass on to the next generations (Ladd, 2003; Chatzopoulou, 2014).

It is important to underline that not all deaf people are signers and not all consider themselves to be part of the Deaf community. The present work distinguishes between these medical and cultural implications by using the word "deaf" spelled with "d" when referring to the audiological condition, and the word "Deaf" spelled with a capital "D" when referring to being a member of a linguistic and cultural minority. The spelling "d/Deaf" is used when referring to both implications. Both the medical aspect and the linguistic-cultural aspects of d/Deafness were considered part of the educational experience of d/Deaf students.

2. Methodology and participants

The study was conducted via electronic surveys that were distributed by the author to three groups of participants. All questions and answers to the surveys were written in Italian and were translated in English by the author. All surveys were completely anonymous. The research project and the surveys were approved by the ethical commission of Ca' Foscari University. The DPO of the university performed all necessary checks to ensure the total anonymity of the surveys.

Table 1 shows the participant's profile for all groups. All students and teachers were from Ca' Foscari University of Venice, except for three participants in the DS survey who were students from other universities (namely University of Padua, University of Catania, and University of Trento). All the d/Deaf students had studied at least one foreign language (ranging from 1 to 5). Both Deaf signing students and deaf oralist students participated in the survey.

Type of learning material	Student n°	(%)
Videos (e.g. from YouTube)	3	42.9
Videos (e.g. form YouTube) with captions	9	69.2
Movies / TV series	0	0
Movies / TV series with subtitles	11	84.6
Textbooks	6	46.2
Visual-written material (images, photos with captions)	7	53.8
Written text (books, magazines, comics)	7	53.8
Others (…) "Human interaction"	1	14.3

Table 1 *Participant's profile divided by survey group*

The DS survey contained questions on the students' experience with FL learning and on their thoughts about accessibility of traditional and online learning materials. Students were also asked if they were interested in learning a foreign SL. The survey consisted of 18 questions, 11 of which were multiple choice and 7 were open-ended. The HS survey contained questions on the familiarity of the participants with SL and their interest in learning a foreign SL. The survey consisted of six multiple choice questions.

The JT survey contained questions on the accessibility of Japanese teaching methodologies, and on the teachers' experiences with d/Deaf learners. The survey consisted of 14 questions, 9 of which were multiple choice questions and 5 were free text where the participants were asked to motivate their answers.

Considering that some Deaf students might not feel confident in writing in an oral L2, questions with written response were not compulsory. Unfortunately, the author did not have the opportunity to translate the questionnaire in LIS to ensure full accessibility to the questionnaire. However, because the informants are students at Italian Universities and therefore primarily use Italian learning material, it was reasonable to consider all participants to have sufficient proficiency in Italian to understand the questions. The process for distributing the DS survey took several months of work and supervision from the Disability Office of Ca' Foscari University. Eventually, the delayed distribution of the survey negatively affected the number of participants, which remained lower than expected. Moreover, only one Deaf student among the participants studied Japanese. Public blog posts of d/Deaf students of Japanese were referred to as meaningful data for qualitative analysis.

3. Understanding the Deaf language learner

Deafness is a complex condition with both medical and cultural-linguistic implications. When speaking about "d/Deaf students" it is important to consider that their preferred learning style may be determined not only by their hearing ability, but also by their educational and linguistic background. In fact, language development in d/Deaf children is influenced by a variety of physical and educational factors, such as the age of onset of deafness and severity of deafness, whether the parents are also Deaf and are native speakers of a sign language, how much oral linguistic input they give to the child, etc. (Mayberry, 2002; Mole et al., 2005; Bertone et al., 2009). The preferred communication method of the student (e.g. signed or oral) and their stage of language development are important factors that should be taken into account with regard to FL learning material. It should also be considered that deafness can have consequences on the cognitive development that persist even after years of speech therapy, and it is not unusual for d/Deaf children and adults to have a lower linguistic competence and reading ability than their hearing peers (Geers et al, 1989; Bertone et al., 2009; Mayer, 2002). Because of the difficulties experienced by many in the acquisition of an oral L1 or L2, d/Deaf students have been traditionally discouraged from learning a foreign language. In fact, the FL learning situation for d/Deaf students has been largely overlooked in previous research. However, d/Deaf people *can* be successful and, most importantly, motivated language learners. Many Deaf people learn English, ASL or International Sign Language as a *Lingua Franca.* Previous research by Mole, McCall, Vale (2005) and Csizer, Kontra (2020) on motivational factors for FL learning also showed that d/Deaf and hearing students indicate similar answers when asked why they wanted to learn a foreign language, e.g. for travelling abroad, having better job opportunities and because of interest in other countries and cultures. A significant difference in the two experiences seems to be the lack of access to specific materials, teaching methodology and representation, which is a cause of frustration and demotivation among d/Deaf students (Kontra, 2017; Csizer et al., 2020; Ferreiro-Lago et al., 2021).

Confusion on how to approach language learning leaves d/Deaf students with networking as the only means to find suitable materials. The following blog posts show two deaf users of *Wanikani*, a web application to memorize Kanji, and *Japanesepod101*, an online platform for learning Japanese which counts more than 2 million YouTube subscribers[2], asking fellow learners for advice and expressing their doubts on self-efficacy.

[2] Last accessed 11.11.2021

“I love Japan when I was about 10 years old. I know other Japanese and I can write some Japanese sentences. I've always wanted to study animation and get a job in Japan. But I am deaf, I'm worried that no one will help me or take a note. Will everything be fine if I'm alone to study then get a job?”

kochya0_51963 on Japanesepod101 forum, 9.01.2018

“I've suffered from hearing loss since birth [...] This has always caused me problems in my first language, although recently I’ve been able to access hearing aids which help a lot. Even with hearing aids however, I’ve been having a terribly difficult time distinguishing sounds in Japanese when listening without subtitles. [...] Anyway, what I’m wondering is: is there anyone else out there in a similar position who might like to share their experience of learning a language with hearing loss? Also, am I doing the right thing in learning a language with this setback, or is it a futile endeavour?”

hughesgeorgem on Wanikani Community, 20.06.2020

One Deaf student who participated in the DS survey and attended University in Japan explained his experience with Japanese learning in the following way:

“I studied Japanese for 2 years, but I managed to only reach an N5-N4 level because language teaching is not inclusive […] I tried taking classes in Japan, but I stopped almost immediately since I couldn’t understand much. My only option was self-study, but I am not very committed. I also stopped speaking with other people after the CORONA breakout because everyone started wearing masks, and this prevented me from accessing communication through lip reading. It was very stressful for me […]. I really love Japan and Japanese, and I don’t want to ruin my experience with this language just because I’m having such a hard time learning it”.

4. Language teaching and accessibility in the (online) classroom

Current services for d/Deaf students in the classroom include a variety of specialist personnel who support the learners inside and outside the classroom. Examples of support staff include Sign Language interpreters, note takers, Special Needs learning assistants, Tutors, and many more (Mole, 2005; Aguzzi, 2020).

One main problem of providing accessibility through support staff is that human resources are limited and expensive. As a consequence, services are often kept to a bare minimum once the d/

Deaf student starts higher education. For example, Ca' Foscari University of Venice provides LIS interpreters only for 1-2 courses per semester. Considering that a student at the same University must take on average 4-5 courses per semester and that teachers are rarely proficient in Sign Language, Deaf students will have equal access to communication in the classroom for (at best) half of their courses. It is also very uncommon for a SL interpreter to have sufficient knowledge of a third language to interpret a FL lesson. Therefore, students will most likely have to rely on self-study and on teachers' abilities to implement inclusive/accessible teaching strategies. Unsurprisingly, teachers are often unprepared to meet the challenges of having a d/Deaf student in the classroom (Mole, 2005; Smith et al., 2010).

In the JT survey, professors of Japanese language at Ca' Foscari University, Foreign Language assistants, TA and Tutors were asked to express their opinion on the accessibility of Japanese language teaching methodologies and materials for d/Deaf students. To the question "Have you ever studied JSL, LIS or another SL?" only 1 out of the 21 interviewees responded to have basic knowledge of JSL and LIS although they had not studied them formally. 57% of the interviewees stated that they never studied a SL but would be interested in it, and the remaining 38.1% stated that they are not interested in studying a SL.

To the question "have you ever taught to d/Deaf students", only one Foreign Language Assistant responded affirmatively, although not at Ca' Foscari University.

To the question "Are you aware of what reasonable accommodations are made for d/Deaf students that are enrolled at DSAAM courses?", 85% of the interviews responded "no". Of these, 16% stated that they did not know *because* they never had the chance to teach d/Deaf students. 9.5% of the interviewees said they were "somewhat" aware of what reasonable accommodation was made and only one interviewee responded affirmatively, correctly listing the types of reasonable accommodation for d/Deaf students (tutoring and special communication services).

To the question "Do you think that the Japanese language teaching methods that are currently in use in our university are accessible to d/Deaf students?", 47.6% of the interviewees responded that they believed teaching methodologies to be completely inaccessible, whereas 42.9% responded that they believed teaching methodologies to be formally inclusive but that, in practice, they do not offer

equal opportunities. The remaining 9.5% stated that they were not aware of what accommodation the University made for d/Deaf students and therefore could not give a clear answer. *None* of the interviewees thought that the teaching methodologies were completely accessible to d/Deaf students.

In the DS survey, d/Deaf students were asked questions about the accessibility of teaching methodologies for FL language learning. Unfortunately, no d/Deaf students are currently enrolled in Japanese courses at Ca' Foscari University. Nonetheless, all participants had studied at least one foreign language during their scholastic experience, and one participant was learning Japanese as an autodidact.

Students were asked to indicate what difficulties they had encountered during their scholastic experience when studying a FL. Participants could choose between options listed by the author or give a personalized answer (Table 2):

Difficulty	Student n°	(%)
There is no LIS interpreter	5	38.5
There is no specialized interpreter for FL	5	38.5
The teacher speaks too fast and I cannot lipread	1	7.7
The class arrangement does not allow me to lipread what the teacher says	1	7.7
The class arrangement doesn't allow to lipread what my classmates say	7	53.8
The class arrangement doesn't allow me to hear the teacher and classmates	7	53.8
Priority is given to hearing comprehension exercises	3	23.1
Priority is given to conversation exercises	3	23.1
Few written exercises are made	4	30.8
I don't feel included in group tasks with hearing classmates	3	23.1
Few visual materials are used (YT videos, pictures…)	5	38.5
Visual materials (YT videos, pictures…) are used but they are often without captions/subtitles	2	15.4
Others (…)	1	7.7

Table 2 *Percentages of d/Deaf students that experienced difficulties in FL learning.*

Because of the Covid-19 Pandemic in Italy, classes of higher education institutions have primarily been online or in blended modality since March 2020. The so-called “DAD” (“Didattica A Distanza”, online learning/remote learning) is a teaching modality that uses online tools and virtual meeting platforms like Zoom and Google Meet instead of traditional face-to-face methods. Online classes were recorded in order to be accessible for students who did not have a stable internet connection and for students with special needs. Interpreting services for Deaf students were still available in this learning modality, but automatic captions or subtitles were not implemented in live streaming and recordings of online classes. In previous research by Ferreiro-Lago et al. (2021), d/Deaf learners indicated subtitling of videos, availability of SL speaking personnel and translation of texts in SL as resources that should be implemented to guarantee accessibility in online learning. The research showed a direct correlation between the absence of these resources and dissatisfaction among d/Deaf students in e-learning.

In the DS survey, students were asked if the recent DAD methods had influenced their learning experience or solved any difficulties they had previously indicated. Responses to these questions were heterogeneous, with most students (both signers and non-signers) indicating additional difficulties. Positive aspects of online classes seemed to be the possibility of having access to recordings, and the change to a quiet environment thanks to the virtual meeting platforms. Positive answers to this question included:

“It gave me a chance to go back when something wasn't clear”

“Yes, because there is no background noise and voice-echos, which are typical elements of classroom environments.”

“Registrations”

“No problem at all, DAD works fine with zoom”

Many students felt that their learning experience did not improve with DAD online tools. Negative aspects of this learning method included difficulty to concentrate, frequent loss of internet connection, low quality of audio, lack of subtitles, difficulty of lipreading. Although some of these aspects are certainly common to all students, the lack of subtitles and low video/audio quality is a serious threat to accessibility for d/Deaf students. Examples of Negative experiences with DAD included:

“Subtitles should be added to these programs”

“No, the problems remain as before, in fact it is worse than before”

“Difficulty to follow in the absence of subtitles and lip view”

“I had some difficulties. Sometimes I lose internet connection and I can’t concentrate after half an hour”

“I had difficulties because of the low-quality audio and internet connection problems”

5. Online tools that can be implemented for d/Deaf language learners

Dissatisfaction of the interviewed students with DAD methods show that online tools are not inclusive if they don’t take students’ special needs into account. Few online and traditional language learning materials are made specifically for d/Deaf students. To the author’s knowledge, no such materials are developed for Japanese and JSL as a foreign language for d/Deaf learners (although many JSL learning materials exist, they are primarily written in Japanese and are created for Deaf Japanese users). Nonetheless, online/multimedia tools such as online dictionaries, video technology, contents with captions have been proven to improve understanding and accessibility for d/Deaf students undertaking foreign language learning (Castillo et al., 2002; Debevc, 2004; Yoon et al., 2015; Senni, 2020).

n the DS survey, d/Deaf students were asked to indicate what online tools they found useful for learning a foreign language. Participants could choose between options listed by the author or give a personalized answer (Table 3).

Type of learning material	Student n°	(%)
Videos (e.g. from YouTube)	3	42.9
Videos (e.g. form YouTube) with captions	9	69.2
Movies / TV series	0	0
Movies / TV series with subtitles	11	84.6
Textbooks	6	46.2
Visual-written material (images, photos with captions)	7	53.8
Written text (books, magazines, comics)	7	53.8
Others (…) "Human interaction"	1	14.3

Table 3 *On-line tools for FL learning that are preferred by Deaf students*

Contents with captions seem to be a popular solution for both deaf and Deaf students. 50% of participants indicated videos with and without captions, textbooks, and visual-written material as their preferred learning material. The most popular answers (85.7%) are movies/TV series with subtitles and written texts (books, magazines, comics). Content without captions was only voted for by the participants who stated not to be LIS users (therefore we can assume their L1 is oral language and that they have audiological equipment or enough residual hearing to access oral content). No participant indicated movies/TV series without captions as a useful learning material. This is possibly because even learners who have some degree of hearing will have to rely on lipreading, and a long-time exposure to oral-only content leads to listening fatigue. One participant who stated to be a LIS speaker indicated "human interaction" as their preferred way of learning a language online. Although it was not further explained, we can assume the participant referred to online tools such as language exchange apps or video platforms which have recently been implemented in online learning.

According to DS responses, visual material, written text, and captioned content are considered useful to learn a foreign language. Multimedia offers many advantages in language learning and acquisition by representing content through symbolic systems (visual and written form) which aid the learners' comprehension and self-regulation (Mayer, 2005; Plass et al., 2005; Huang et al., 2004).

Most learning strategies for d/Deaf students focus on written text to guarantee accessibility (Yoon et al., 2011; Vanderplank, 2016). However d/Deaf students have individual preferences and learning methods. Some students might not be satisfied with only learning a written language and might want to also work on lipreading, hearing and speaking skills (Mole, 2005). Thus, self-regulation is a key aspect to guaranteeing learning material accessibility to d/Deaf students.

Multimedia e-learning platforms are especially useful in this case because the students can personalize their learning path, at any levels, speed, and modality. The possibility of self-regulation also eliminates the problems of online learning that derive from audio/video-quality and bad internet connection. The online platform *JaLea* (Mariotti, Mantelli, 2016) is an interesting example of an accessible e-learning multimedia platform for learning Japanese (FIG.1)[3]. The aim of the JaLea project is to improve the learners' experience by providing authentic materials that students can enjoy without being discouraged by proficiency levels and artificial content. JaLea's authentic materials are visual and are all provided with captions and Italian translation. The captioned content is also analyzed so that every grammatical element is linked to the corresponding grammar explanation page with a simple click thanks to the simultaneous use of various reference tools (Aikawa, Mantelli, Mariotti, 2017). This learning method could prove to be suited for d/Deaf learners since it resembles Logogenia®, a method developed for the language learning of individuals with Specific Language Impairment[4]. The method is based on discovering the functional elements of language and their role within written text, allowing learners to improve their understanding of written language (Radelli, 2011; Bertone et al., 2009). Learners can also customize the speed of video contents, allowing d/Deaf learners to practice lip reading. Written Japanese text is also transliterated in romaji (through the Hepburn system), which additionally helps in the development of lipreading abilities. The volume of audio content can also be customized, so d/Deaf learners with residual hearing can practice listening skills at the volume that best suits them. Contents for learning the basics of JSL are also currently available on the platform.

[3] https://jalea.unive.it/jalea/, last accessed 15.09.2021

[4] http://www.logogenia.it, last accessed 15.09.2021

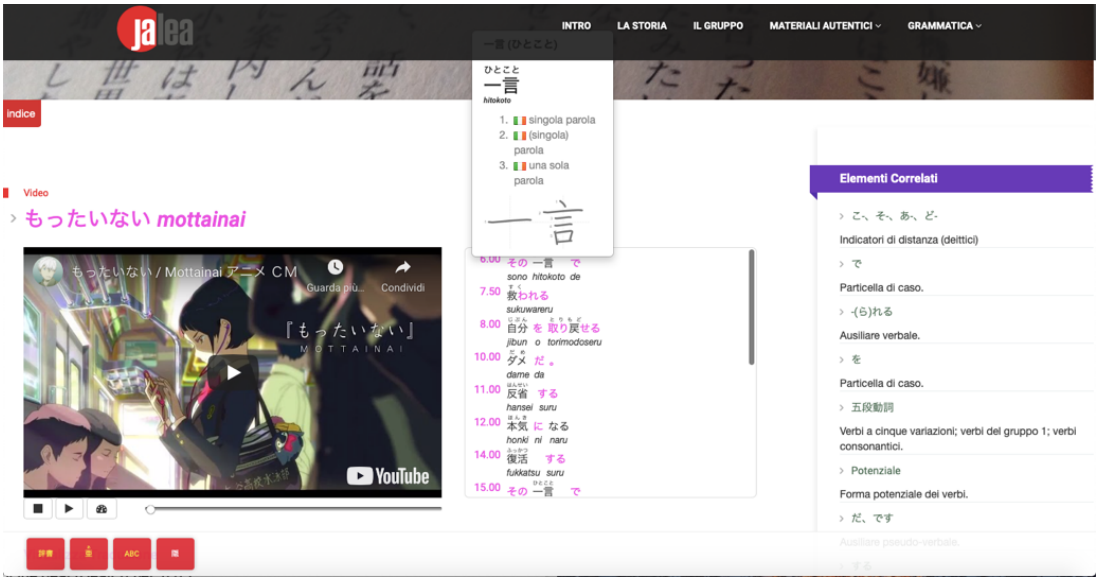

Figure 1 *Example of accessible multimedia content for learning Japanese, available at JaLea.*

A limitation of JaLea is that captioned content is not always accessible for Deaf students. For example, it is not unusual for Deaf people to have lower literacy levels and reading ability than their hearing peers (Mayer, 2002). In this case, the use of contents with captions might not be inclusive. In addition to captions, a video translation in the learners' Sign language could be implemented to ensure understanding (Martins et al., 2015; Ferreiro Lago et. al, 2021). Currently, JaLea provides the option of accessing a translation of the captioned content only in written Italian, thus it is not fully accessible for Deaf students who not are native speakers of Italian. However, multimedia platforms are very flexible, and contents can be continuously revised and implemented.

6. JSL as a foreign language: JSL online material to increase motivation and accessibility for Deaf learners of Japanese languages

Minority languages, like JSL, are rarely considered a target of Foreign Language Learning (FLA). In many countries, like Italy until March 2021 and Japan, SL are not awarded full recognition as "languages", but are rather considered a form of communication for people with hearing disabilities. However, linguistic research has proven the linguistic legitimacy of SL and of the communities that use them. Sign languages (LS) are natural languages that are based on visual-gestural modalities that include hand movement, facial expressions, and body posture (Branchini et al., 2016; Merzagora et al., 2011). Each nation has its own Sign Language, with further regional varieties. As examples we mention JSL (Japanese Sign Language), LIS (Italian Sign Language), and ASL (American Sign Language). Japanese Sign Language (JSL) is a language system different from vocal Japanese, with its own grammatical, syntactic, morphological, and lexical rules. Sign

languages are an important tool for cultural transmission which allows Deaf people equal access to communication. Sign Languages are also used by people who are not Deaf but have a communication disorder or SLI.

There are several reasons to learn Sign Languages. Firstly, SLs are natural languages that should be equally valid in education as spoken languages. Secondly, the knowledge of SL is essential for new and much needed professional figures like interpreters, teachers for the Deaf and cultural mediators. Learning a SL also allows students to become familiar with cultural and linguistic issues of minority groups, which is an opportunity of social and professional growth (Cardinaletti, 2017; La Grassa, 2014).

Research on SL acquisition as an FL/SL by Deaf learners is very scarce (Pichler, 2015; Suzuki et al.,). A major problem in accessing learning material is that it is usually made for local Deaf learners, therefore a knowledge of the local spoken and written language is also necessary. JaLea currently has a work-in-progress section of JSL dedicated to Deaf and hearing students who wish to learn JSL as a foreign language (FIG. 2). The advantage of the JSL section on the JaLea platform is that it presents authentic multimedia content made by Japanese native speakers of JSL in an accessible way, since all audiological and visual elements are transcribed, analyzed, and translated in Italian.

Figure 2 *Example of accessible multimedia content for learning JSL and Japanese, available at JaLea.*

Having access to JSL online material could benefit Deaf students' learning experience because of the following factors:

a) *Modality:* being based on visual modality, Sign Languages are the most natural form of communication for Deaf people. Especially in the case of Deaf signers, having access to JSL learning material would mean having the possibility to study a foreign language whose modality the student is comfortable with.

b) *Representation:* Causes of demotivation for Deaf language learners were frequently found to be the lack of representation of the Deaf Community in study material and the lack of specific content for Deaf students (Csizer, 2020). Learning JSL means having access to materials that were developed *by* and *for* members of the Deaf community.

c) *Aid in VL learning:* To the authors knowledge, there is no previous research on whether the combined knowledge of a SL and VL of the same linguistic area would be an efficient method for FL learning. There is however evidence of this in research on Second Language Acquisition, were Deaf signers achieved better proficiency levels when learning a spoken language (Mayer et al., 1999; Mayberry, 2002; Kontra, 2016), and in students' personal experiences recorded in the present research and in previous research by Csizer (2020).

In the DS survey, students were asked if they were interested in learning a foreign SL. 58.3% of the participants answered "yes", while 33.4% had already learned a FSL (namely: ASL, IS, DGS, LSE). Only one participant answered "no".

Students were also asked if they thought learning an SL together with a VL of the same language area (ex. ASL + English) would help their foreign language learning experience.

46.2% of students answered "yes"; 30.8% answered "no" and 23.1% answered "maybe". Responses to this question varied between signers and non-signers. Some Deaf signing students left the following comments to explain their answers.

"They are culturally and linguistically linked. The preparatory learning / knowledge of an LV / LS would be useful for the learning of the respective LV / LS (personal experience)".

"For me it could be clearer in sign and in the meantime, I would know Spanish with its Sign Language".

"I have learned several words in Japanese through JSL by speaking with my friends. For example <Haneda> (羽田, the airport n.d.a.) is signed with <wings> (羽 , n.d.a.) and <rice field> (田, n.d.a.), just like the kanjis".

Deaf students who were non-signers felt that learning an SL would not help them learn a VL of the same language area. Students motivated their answers as follows:

"I don't know if learning how to sign would make language learning easier for me".

"Because I have unilateral deafness, I don't speak SL, so it wouldn't be helpful in my case".

7. Creating an inclusive learning environment through JSL e-learning.

The aim of developing the JSL section on the JaLea platform is to introduce hearing and deaf students to Sign Language and the Deaf community, and to give Deaf students the opportunity to learn a foreign SL. A shared knowledge of JSL would favor mutual understanding and communication in a heterogenous group of students, thus helping to create an inclusive learning community.

The last questions of each survey investigated the motivation of hearing and d/Deaf students in learning a foreign SL and specifically JSL. Teachers of Japanese were also asked if they thought that access to JSL material would help create an inclusive learning environment.

Responses to the DS survey showed a high interest level of Deaf students in learning a foreign SL. Majority of students also stated to be interested in specifically learning JSL. Hearing students of Japanese and LIS were also asked about their interest in studying a foreign SL or JSL, and Teachers of Japanese were asked if they thought.

In the HS survey, students were asked if they would like to have access to JSL learning material. Most of the interviewees responded affirmatively: 83.6% of the students answered "yes"; 10.6% answered "maybe" and only 5.7% answered "no, I am not interested".

Hearing students also showed their interest for JSL through the JaLea Social Media platforms. As a way to raise awareness on Sign Language recognition and Deaf Culture, the JaLea SNS team organized a Q&A day during the International day of Sign Languages 2021. Because Ca' Foscari University has recently published the first grammar of Italian Sign Language (Branchini et al., 2021) we thought it might be the right time to introduce a discussion on these topics from an international perspective. With the help of a fellow CODA student of Japanese, we created a video post in LIS and JSL with a question box, where students could ask questions about JSL (FIG.3; FIG. 3.1). I was impressed by how students actively started researching autonomously about Sign Language and were eager to share their findings and interest with the JaLea online community, showing their engagement with the subject.

Figure 3 *Extract from a video in LIS by R., a CODA student of Japanese who is explaining JaLea on the project's Instagram platform*

Figure 3.1 *Extract from a video in JSL and LIS by the author who is introducing the Q&A day on JaLea's Instagram platform*

In the JT survey, teachers of Japanese were also asked to express their thoughts on the opportunity for students to access JSL e-learning material. Opinions on this topic were overall very positive, with 71.4% answering that it would be a good opportunity, and 28.6% stating that it could maybe be a good opportunity. None of the interviewed teachers thought it would not be a good opportunity for students to access such materials. The interviewees were then asked to motivate their answer to the question. Teachers thought that giving access to JSL materials would help raise awareness on Sign Languages and it would make teaching more inclusive:

"I believe that many students and especially teachers are not sufficiently informed on the specific importance of this topic"

"I think that having access to JSL learning material would help raise awareness on this language form (e.g. LIS), and the whole education system would benefit from it."

"It is an opportunity not only for learning, but also for personal growth".

"It's interesting and it could be a way of making teaching inclusive in a practical way".

Other teachers also recognized the importance of learning JSL as professional skill:

"Those who are not directly in contact with Deaf people hardly take into consideration the importance of knowing Sign Language. It is a perfectly expendable knowledge in the workplace, especially if your job involves direct contact with customers, and it can very well constitute an element of preference for recruiters when your profile is, for other skills, equal to others. […]"

"It would allow students to find out more about a different aspect of Japanese culture. It would also be a skill that could pave the way for important career opportunities".

Conclusions

In this paper, I have addressed two key questions, namely (i) which online tools can be implemented for d/Deaf learners of Japanese, and (ii) can JSL e-learning tools help create an inclusive learning environment.

By analyzing students' responses to the DS survey, we can conclude that online tools can be an excellent resource for delivering learning content to d/Deaf students if attention is paid to their individual learning needs. d/Deaf students form a heterogeneous group with individual learning preferences that should be respected. Visual contents with captions, which can be implemented through multimedia platforms, were indicated by the interviewed d/Deaf students as their preferred means of learning a foreign language. We can conclude that multimedia content improves their understanding of learning material and helps students to become independent language learners. We can also conclude that JSL e-learning material can be beneficial in creating an inclusive learning

environment, especially for Deaf signing students. By implementing JSL e-learning tools, we can expect Deaf students to increase motivation for FL learning and to develop new professional skills. Moreover, access to JSL material can help raise awareness on Sign Language and deafness among teachers, preparing them for the eventuality of having d/Deaf students attend their classes. We can also expect the shared interest in JSL by hearing and d/Deaf students, which emerged from answers to the survey and from the participation to JaLea social media activities, to be a small step in bridging the societal and communication gap between the two groups. JaLea (Mariotti, Mantelli, 2016) was presented as an example of an accessible multimedia e-learning platform for learning Japanese and JSL.

Two important limitations to the study should be mentioned. Firstly, the surveys were not fully accessible to Deaf signing students because questions were not translated in LIS. This was an obstacle to communication between the author and the interviewees since LIS was the L1 of some students. Secondly, accessibility of the JaLea platform is only theoretical, and should be practically tested with the help of d/Deaf students. Future research on this subject will include a case study on the accessibility and inclusivity of the JaLea platform for both Japanese and JSL content. Ways to implement LIS translation will also be investigated.

Acknowledgements

This research is part of the NoLBrick project ("No Level Brick Foreign Language Education", SPIN Project, Ca' Foscari University of Venice, Prof. Mariotti P.I., 2018-2021). I would like to thank Prof. Mariotti and all the participants of the NoLBrick Seminars for their constructive criticism and assistance throughout all aspects of this study, and for their help in writing this paper.

References

Aikawa, T., Mantelli, A., Mariotti, M. (2017). The next generation of language education: technology and pedagogy side-by-side. *The Proceedings of the 21th Japanese Language Symposium in Europe. The 15th International Conference of EAJS,* 96-119.

Aguzzi, G. (2020). Lingue Straniere E Sordità. Un Percorso Possibile. *Doctoral Dissertation, Università Cattolica del Sacro Cuore di Milano.*

Al Sadrani, B., Alzyoudi, M., Alsheikh, N., & Elshazly, E. E. (2020). The digital divide in inclusive classrooms. *International Journal of Learning, Teaching and Educational Research*, *19* (3), 69-85.

Bertone, C., & Volpato, F. (2009). Oral language and sign language: possible approaches for deaf people's language development. *Cadernos de Saúde*, *2* (Especial), 51-62.

Bettini V., Battista C. (1999). *Talking hands. A basic course for Deaf and hard-of-hearing learners.* Zanichelli, Bologna.

Capirci, O., Cattani, A., Rossini, P., & Volterra, V. (1998). Teaching sign language to hearing children as a possible factor in cognitive enhancement. *The Journal of Deaf Studies and Deaf Education*, *3* (2), 135-142.

Cardinaletti, A. (2017). La LIS all'Università: opportunità di crescita sociale, culturale e professionale per sordi e non-sordi. *Educazione, Comunicazione e Lingua dei Segni Italiana. Atti della giornata di studi del 2 febbraio 2017 su scuola, inclusione e lingue segnate*, 15-29.

Cardinaletti, A., & Branchini, C. (2016). La lingua dei segni nelle disabilità comunicative. *Franco Angeli Editore.*

Castillo, E. M., Lombardi, S., & Sementina, C. (2002). La tecnologia a supporto della didattica: un'esperienza pilota con allievi sordi. *Italian Journal of Educational Technology*, *10* (2), 39-39.

Castillo, E. M., Lombardi, S., & Sementina, C. (2002). La tecnologia a supporto della didattica: un'esperienza pilota con allievi sordi. *Italian Journal of Educational Technology*, *10*(2), 39-39.

Chatzopoulou, A. (2014). The dilemma in the deaf community: linguistic minority or persons with disability? *Doctoral dissertation, EIUC.*

Csizér, K., & Kontra, E. H. (2020). Foreign Language Learning Characteristics of Deaf and Severely Hard−of−Hearing Students. *The Modern Language Journal*, *104* (1), 233-249.

Daloiso, M. (2012). Educazione linguistica e bisogni speciali: costruire l'accessibilità glottodidattica. *EL. L'Educazione linguistica. Language education*, *1* (3).

Debevc, M., & Peljhan, Ž. (2004). The role of video technology in on-line lectures for the deaf. *Disability and rehabilitation*, *26* (17), 1048-1059.

Duplaga, M. (2017). Digital divide among people with disabilities: Analysis of data from a nationwide study for determinants of Internet use and activities performed online. *PloS-one*, *12*(6), 1-19.

Geers, A., & Moog, J. (1989). Factors predictive of the development of literacy in profoundly hearing-impaired adolescents. *The Volta Review*.

Hashey, A. I., & Stahl, S. (2014). Making online learning accessible for students with disabilities. *Teaching exceptional children*, *46* (5), 70-78.

Kontra, E. H. (2017). The foreign-language learning situation of Deaf* adults: An overview. *Journal of Adult Learning, Knowledge and Innovation*, *1* (1), 35-42.

La grassa, M. (2014) La lingua dei segni per gli udenti, l'italiano per i sordi. Riflessioni per la didattica delle lingue. *Aracne Editore*.

Ladd, P. (2003). Understanding Deaf Culture: In search of Deafhood. Multilingual Matters.

Lago, E. F., & Acedo, S. O. (2017). Factors affecting the participation of the deaf and hard of hearing in e-learning and their satisfaction: A Quantitative study. *International Review of Research in Open and Distributed Learning*, *18* (7).

Lane, H. (1995). Constructions of deafness. *Disability & Society*, *10* (2), 171-190.

Lane, H. (2005). Ethnicity, ethics, and the deaf-world. *Journal of Deaf Studies and Deaf Education,* 10, 291–310.

Long, G. L., Vignare, K., Rappold, R. P., & Mallory, J. (2007). Access to communication for deaf, hard-of-hearing and ESL students in blended learning courses. *International Review of Research in Open and Distributed Learning*, *8* (3), 1-13.

Mariotti, M., Mantelli, A., & Lapis, G. (2017, June). JALEA: an authentic and personal path to JApaneseLEArning. In *Proceedings of the 3rd International Conference on Higher Education Advances* (pp. 835-843). Editorial Universitat Politècnica de València.

Martins, P., Rodrigues, H., Rocha, T., Francisco, M., & Morgado, L. (2015). Accessible options for deaf people in e-learning platforms: technology solutions for sign language translation. *Procedia Computer Science*, *67*, 263-272.

Massariello Merzagora, G., & Dal Maso, S. (2011). I luoghi della traduzione: le interfacce: atti del XLIII Congresso internazionale di studi della Società di linguistica italiana (SLI), Verona, 24-26.

Mayberry, R. I. (2002). Cognitive development in deaf children: The interface of language and perception in neuropsychology. *Handbook of neuropsychology*, *8* (Part II), 71-107.

Mayer, C., & Akamatsu, C. (1999). Bilingual-bicultural models of literacy education for deaf students: considering the claims. *Journal of deaf studies and deaf education*, *4* (1), 1-8.

Mole J., Mccoll H., Vale M., *Deaf and Multilingual. A practical guide to teaching and sup- porting deaf learners in foreign language classes*, direct learn services Ltd. Norbury 2005.

Munoz-Baell, I. M., Alvarez-Dardet, C., Ruiz-Cantero, M., Ferreiro-Lago, E., & Aroca-Fernandez, E. (2011). Understanding deaf bilingual education from the inside: a SWOT analysis. *International Journal of Inclusive Education*, *15*(9), 865-889.

Omagala-Zynk E. (2013) *English as a foreign language for deaf and hard of hearing persons in Europe*. Wydawnictwo KUL, Lublin.

Pichler, D. C., & Koulidobrova, H. (2016). Acquisition of sign language as a second language. *The Oxford handbook of deaf studies in language*, 218-230.

Plass, J. L., & Jones, L. (2005). Multimedia learning in second language acquisition. *The Cambridge handbook of multimedia learning*, 467-488.

Radelli, B. (2011). Logogenia, Logogenia® e Cooperativa Logogenia. In *Franchi Elisa and Musola Debora (eds.), Acquisizione dell'italiano e sordità, Venezia: Libreria Editrice Cafoscarina, 2011, pp. 19-22*. Venezia, Libreria Editrice Cafoscarina.

Scanlan, M. (2021). Reassessing the disability divide: unequal access as the world is pushed online. *Universal Access in the Information Society*, 1-11.

Senni, L. (2020). Italiano LS e didattica digitale. *Bollettino Itals*, *18* (86).

Smith, C., & Allman, T. (2010). Meeting the challenges of deaf education teacher preparation: Innovative practices in online learning. *Journal of Online Learning and Teaching*, *6* (2), 523.

Suzuki, E., Horikoshi, M., & Kakihana, K. (2004). Bilingual Sign Language Dictionary to Learn the Second Sign Language without Learning a Target Spoken Language. In *Proceedings of the Workshop on Multilingual Linguistic Resources* (pp. 86-89).

Vanderplank, R. (2016). Captioned media in foreign language learning and teaching: Subtitles for the deaf and hard-of-hearing as tools for language learning. *Springer*.

Yoon, J. O., & Kim, M. (2011). The effects of captions on deaf students' content comprehension, cognitive load, and motivation in online learning. *American Annals of the Deaf*, *156*(3), 283-289.