Castledown

OPEN ACCESS

Language Education & Assessment
ISSN 2209-0959
https://www.castledown.com/journals/lea/

Language Education & Assessment, 7(1), 1–18 (2024)
https://doi.org/10.29140/lea.v7n1.1316

The Impact of COVID-19 on Sign Language Assessment

TOBIAS HAUG[a]

FRANZ HOLZKNECHT[a]

WOLFGANG MANN[b]

[a] *University of Teacher Education in Special Needs, Zurich, Switzerland*
tobias.haug@hfh.ch; franz.holzknecht@hfh.ch

[b] *University of Cologne, Germany*
wmann@uni-koeln.de

Abstract

This study investigated through an online survey how sign language practitioners changed their sign language assessment practices during the COVID-19 pandemic. The survey consisted of five sections and 29 questions overall. It was provided in written English and German as well as in International Sign and was administered online between October 2021 and December 2022. Twenty sign language testing professionals from a wide variety of countries participated in the survey. The results indicate a sharp increase of online testing during the pandemic, a decrease in the testing of sign language interaction and reception, a decline in the variety of testing purposes with a stronger focus on assessment for learning, and a shift to the use of more online tools such as video conferencing. Additionally, the results show that the home set-up of test takers, including reliable internet connection and access to appropriate hardware, are essential for online sign language testing. Sign language testing professionals reported different measures that were introduced to minimize cheating, such as live video monitoring during sign language exams or the implementation of proctoring software. The paper finishes with recommendations for future sign language assessment.

Keywords: sign language testing during COVID-19, remote sign language testing, online sign language testing

Copyright: *© 2024 Haug, Holzknecht, Mann. This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.*
Data Availability Statement: *All relevant data are within this paper.*

Introduction

The health security measures that governments worldwide had to implement during the COVID-19 pandemic, such as social distancing or lockdowns, affected all of us at different levels in our personal and professional lives. In the educational sector, various countries implemented different measures to reduce the spread of the virus. For instance, in some countries, primary and secondary schools were closed only during the initial lockdown (e.g., Switzerland), while tertiary education transitioned entirely to online teaching and assessment during lockdowns in others (e.g., Bangladesh; Haque & Hossain, 2022).

While numerous studies have been published during and after the pandemic related to online teaching and assessment in education in general, as well as language testing more specifically, very few studies are available on how the pandemic influenced language testing practices in sign language education. This study aimed to document changes in sign language assessment practices during the pandemic and draw insights for future assessment scenarios.

Literature Review

In the following sections, we will provide a brief overview of studies related to (1) opportunities and (2) challenges of online testing in higher education and language testing, (3) test security and (4) formats of test delivery in online testing, and (5) the impact of online test delivery on the assessment of deaf and hard-of-hearing children.

Opportunities of Online Testing During the Pandemic

Although the rapid transition to online teaching and testing presented numerous challenges (discussed below), it also offered various opportunities. From the perspective of teachers, online testing allows for time savings and provides the potential for immediate feedback, facilitating a quicker marking and grading process, depending on the testing method employed (e.g., Haque & Hossain, 2022). Learners have reported that online assessment provides them with greater flexibility in terms of where to participate in a course or take an exam (Haque & Hossain, 2022). Another advantage was reported by Green and Lung (2021) in the case of an English writing exam, in that essays needed to be typed instead of hand-written by test takers and were therefore easier to read and grade.

Challenges of Online Testing During the Pandemic

Despite these positive aspects, the rapid shift to online test delivery was challenging in many respects. Both in the contexts of higher education and language testing more specifically, one of the biggest challenges during COVID-19 was a slow or inconsistent internet connection (e.g., Hafeez Alvi et al., 2021; Haque & Hossain, 2022; Isbel & Kremmel, 2020; Ockey, 2021; Zakaria et al., 2022), especially in remote areas (Mariadi et al., 2022). Some studies also report that the cost of internet access was an issue in certain contexts, leading to problems in test delivery (e.g., Astiandani & Anam, 2021; Hafeez Alvi et al., 2021). Slow internet connections often resulted in an increase of emails from students' asking for support (e.g., Green & Lung, 2021). Other issues that are reported in the literature was the lack of access to the appropriate hardware (i.e., a computer) to attend online courses and testing (Diarsini et al., 2021; Ghanbari & Nowroozi, 2021; Purpura et al., 2021) – or even worse – electricity blackouts (Ghanbari & Nowroozi, 2021).

Besides these technical challenges, another challenge in some contexts was limited computer literacy of both test administrators and test takers (Ghanbari & Nowroozi, 2021; Green & Lung, 2021; Poonpon, 2021). Not only the general skills on how to work with a computer, but also skills to use specific programs for online teaching and testing was a challenge (e.g., Hafeez Alvi et al., 2021; Mariadi et al.,

2022), which some universities addressed through various support mechanisms (e.g., Poonpon, 2021). For online teaching and assessment, different video-conferencing tools such as *Zoom* or *MS Teams* as well as different messenger apps were used (e.g., Haque & Hossain, 2022). In addition, testing platforms such as *Kahoot!, Plickers*, or *Quizizz* (e.g, Astiandani & Anam, 2021) made the administration of online tests easier for teachers.

Issues of Test Security During the Pandemic

A major downside of the rapid change to online testing was that institutions were not prepared for (or had to react to) a sudden increase in cheating (e.g., Astiandani & Anam, 2021). Strategies to react to this increase varied. Some test providers introduced questions about students' personal experiences, i.e., students could not just copy from their course materials but had to combine their learned content with personal experiences, moved the test to an open-book exam at-home, or added plagiarism checkers for written exams (Arnold, 2022; Astiandani & Anan, 2021). In addition, different forms of online test administration were used, e.g., written exams were monitored online through *Zoom* calls (Hrbáčková et al., 2020).

Test providers also implemented software from commercial proctoring firms, however this can be challenging for test takers. For example, Green and Lung (2021) report that test takers struggled to install a plug-in to Google Chrome to enable the use of a specific proctoring software. Purpura and colleagues (2021) report about technical problems during the integration of a commercial proctoring system (in this case, *Honorlock*) into an existing computer-delivered test. In addition, the authors expressed concern about some test takers' low English skills, which might have impacted their understanding of the proctoring instructions. Isbel and Kremmel (2020) also mention different forms of proctoring that language test providers implemented to react to the health security measures, for example, live video proctoring during testing or the recording of test takers with subsequent (AI-based) reviewing. Several human and/or AI-driven proctoring services record the laptop screen of test takers as well as the test takers themselves (e.g., through the monitoring of eye-gaze behavior through the test takers' webcam) (Papageorgiou & Manna, 2021).

Different Forms of Test Delivery During the Pandemic

Whereas before the pandemic many high-stakes language tests were conducted face-to-face in test centers, during the pandemic most test providers moved to online at-home exams, although some tests were still administered face-to-face outdoors (Ockey, 2021). Depending on the test method, moving a test online was challenging. For example, in the speaking part of the English language test IELTS (Clark et al., 2021), where an interaction between an interviewer and the test taker took place in a test center before the pandemic, the interviews had to be conducted online during the pandemic, which had consequences for the training of the interviewers and raters. A different approach is reported in Poonpon (2021), in that an academic English test was changed in such a way that it focused only on reading and writing to react to the COVID-19 restrictions.

Assessing Deaf and Hard-of-Hearing Populations During the Pandemic

Given the heterogeneous make-up of people that are deaf or hard-of-hearing with regard to (sign) language experience and proficiency, the process of (regularly) assessing spoken and/or sign language is of particular importance to inform decisions related to intervention and support. The high complexity of language development as well as the relationship between language development and the development of other areas, such as cognitive and physical development, also highlight importance of early testing and intervention for children who are deaf or hard-of-hearing (Tohidast et al., 2020).

Few studies have captured the effects of online-assessment on deaf and hard-of-hearing people, and there is hardly any research that investigated this subject with specific focus on sign language assessment. While test publishers of many standardized tests for spoken language offer guidelines for online administration, these guidelines may not be suitable for test administration with deaf and hard-of-hearing people. In their study, Dale and Neild (2023) highlight the need for clinicians and other test administrators to make special considerations when carrying out assessments with signing deaf and hard-of-hearing children, such as presenting all test materials in sign language or administering the test with the help of a sign language interpreter. However, due to the already limited research on these formats for assessments carried out face-to-face, testing in the virtual environment introduces further interpretive error as the assessments used have not been standardized with virtual administration procedures (Dale & Neild, 2023).

Administration of tests via virtual platforms may also provide less visual support for test takers than face-to-face administration, and visual cues particularly affect speech perception in people with hearing loss (e.g., Lalonde & McCreery, 2020). However, a study by Lund and Werfel (2021) shows that with careful preparation of all stakeholders involved, online testing of hearing-impaired people can also work well. The authors assessed repeatedly spoken vocabulary (by means of the PPVT; Dunn & Dunn, 2007) along with phonological awareness and print knowledge in children with hearing loss between the ages of 4–6 and studied possible effects of switching from in-person assessment to online assessment during the pandemic. Online testing was carried out via *Zoom* due to its enhanced security and operating features. To support motivation during the task, children received virtual "high fives" or "fist bumps". In addition, they were trained on using the "annotate" feature on *Zoom* and point to the picture named by the administrator. Other adjustments to facilitate remote assessment were asking parents to be mindful to any background noise in the testing environment and to reduce this noise prior to the testing, if needed, or to check their child's hearing equipment prior to starting with the assessment. To accommodate possible complications related to internet access, families were provided with computer devices and internet hotspots. Parents were also encouraged to stay close during the assessment, following a recommendation by Blaiser (2016), so they could familiarize themselves with the goal of responses for the administered tests. Finally, assessment sessions were split into shorter blocks to minimize children's fatigue. In the end, no difference in the children's slopes of growth before and during the pandemic were observed, which shows that online testing of deaf and hard-of-hearing populations can be successful despite all the challenges outlined above.

Research Questions

Although many studies have addressed the challenges of the COVID-19 pandemic on testing and assessment in (language) education around the globe, we could find hardly any research related specifically to sign language assessment, targeting both young and adult users of a sign language. Therefore, based on the literature review, the current study aims to fill this gap by investigating the following research questions:

- RQ1: To which degree did in-person vs. online sign language assessment change during the COVID-19 pandemic?
- RQ2a: To which degree did sign language testers adjust test methods to assess receptive, productive, or interactive sign language skills during the COVID-19 pandemic?
- RQ2b: To which degree did sign language testers change assessment purposes during the COVID-19 pandemic?
- RQ2c: To which degree did sign language testers change tools/platforms to assess receptive, productive, or interactive sign language skills during the COVID-19 pandemic?
- RQ3a: Has sign language tests administration changed during the COVID-19 pandemic? If yes, how?

- RQ3b: Has the test takers' home set-up affected the testing of sign language skills during the COVID-19 pandemic? If yes, how?
- RQ3c: Have test takers' technical skills affected the testing of sign language skills during the COVID-19 pandemic? If yes, how?
- RQ4: Were security measures implemented to avoid cheating while testing sign language skills during the COVID-19 pandemic? If yes, which ones?

Methodology

Survey Instrument

We investigated the research questions by means of an online questionnaire administered through *LimeSurvey*, hosted on a server from the first author's university. The questionnaire contained five sections and a total of 29 questions and was available in English or German. Both language versions also included videos with translations in International Sign. The choice of English and German was influenced by the authors' personal contacts who were mostly in the English and German speaking part of the world, and who filled out the survey or were asked to disseminate it in their circles (see also description below). The translation into International Sign was motivated by the assumption that International Sign can serve as a Lingua Franca for deaf study participants (e.g., Kusters, 2021).

In Section 1, an introductory page first outlined the purpose of the study, before participants had to sign a consent form. After signing the form, participants were directed to a page with instructions on how to upload video responses in International Sign, should they choose that option for open responses (they could also type in their answers to open responses).

In Section 2, participants were asked seven questions about biodata, including their gender, hearing status, country, affiliation, professional role, role related to sign language assessment, and context of their involvement in sign language assessment.

The third and main section of the questionnaire included 15 questions about participants' sign language assessment practices before and during the COVID-19 pandemic. For the first eight of the questions in this section, participants had to indicate whether several pre-defined responses applied to their context either before or during the pandemic, or both. Participants could also add responses which were not listed by choosing "other". If they chose "other", they were asked a follow-up question to specify their choice in the form of an open response. As described above, open responses could be typed or signed in International Sign and uploaded. An example question is shown in Figure 1.

In the following two questions, participants had to indicate the approximate proportion (in percent) of in-person and online assessments they conducted before and during the pandemic. The final five questions in this section were in yes/no format, and participants had to elaborate on their choice in a follow-up question. The answers to the follow-up questions could again be typed or signed in International Sign and uploaded.

Section 4 of the questionnaire included six questions about what participants learned during the pandemic in terms of sign language assessment and how this might influence their testing of sign languages in the future. The questions in this section were again a mix of closed questions, yes/no questions, and open responses, like the questions in Section 3.

The fifth and final section of the questionnaire asked participants whether there was anything else related to sign language assessment during COVID-19 that they you would like to share, in the form of an open response.

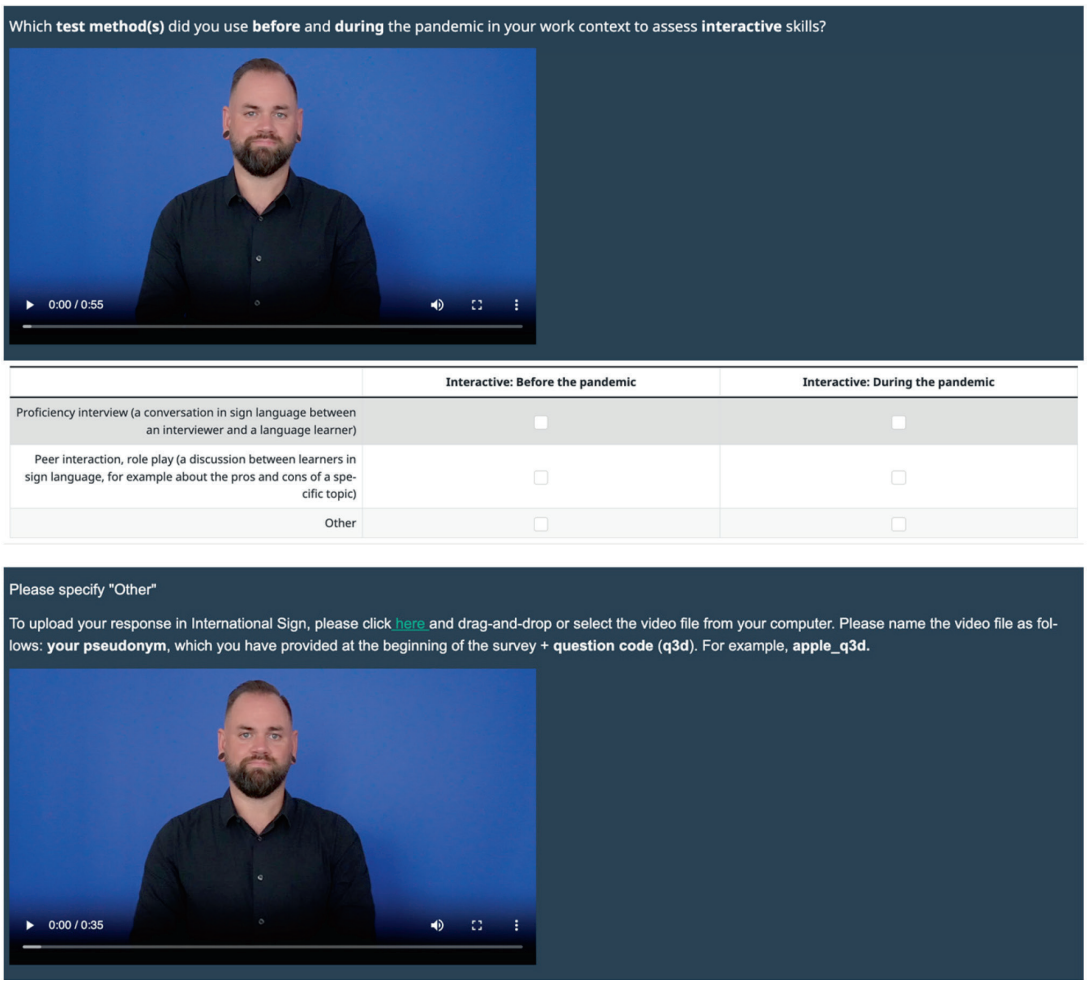

Figure 1 *Example question from Section 3 of the questionnaire.*

We piloted the questionnaire with two participants and changed the wording and order of several questions based on the findings of the pilot. We then shared the questionnaire through professional and personal networks online in October 2021 and sent a reminder through our networks in January 2022. The questionnaire was shared through two mailing lists in the international sign linguistics community, the Sign Language Linguistics List and the mailing list of the Sign Language Linguistics Society, the Sign Linguistics and EALTA SIG for SIGN Facebook groups, as well as through personal contacts. Due to a relatively low response rate, we sent another reminder in October 2022 and closed the survey in December 2022. The complete questionnaires in English/International Sign and German/International Sign are available at https://signlanguages.eu/index.php/908070?lang=en and https://signlanguages.eu/index.php/908070?lang=de, respectively.

Participants

Twenty participants completed the online survey. Thirteen were female, six were male, and one participant identified as "other/diverse". Fourteen participants where hearing and six were deaf. As shown in Table 1, the participants came from a wide range of countries, with most of them from the Netherlands ($N = 4$) and the United States ($N = 4$).

All participants worked at a university or university of applied sciences. Table 2 displays the participants' roles within their institution. They could indicate more than one role. As shown in the table, most participants were professors ($N = 9$), followed by lecturers ($N = 6$) and researchers ($N = 4$).

Table 1 *Study participants' countries*

Netherlands	4
United States of America	4
Germany	2
Turkey	2
Belgium	1
Canada	1
Finland	1
Greece	1
Japan	1
New Zealand	1
Switzerland	1
United Kingdom	1

Table 2 *Participants' roles within their institution*

Professor	9
Lecturer	6
Researcher	4
Post-Doc	2
PhD student	2
Teacher of the deaf (primary/secondary education)	1

Table 3 *Participants' roles related to sign language assessment*

Researcher	15
Test developer	13
Test administrator	10
Rater	8
Coordinator	7

We also asked participants about their roles in relation to sign language assessment. Participants could again choose more than one role. Most participants had roles in sign language assessment research ($N = 15$), test development ($N = 13$), or test administration ($N = 10$) (see Table 3).

By far the largest number of participants practiced sign language assessment in tertiary education ($N = 15$), while a smaller number also used it in secondary ($N = 2$), primary ($N = 5$), or pre-school contexts ($N = 2$). For this study, we have categorized all participants as "sign language testing professionals". We use the term *sign language testing professionals* "to refer to a heterogenous group of people who are either involved in sign language testing research (e.g., through validation study), through test development, or because they use these kinds of tests in school" (Haug et al., 2023).

Analysis

We analyzed the data in two main steps. First, for the closed questions, we calculated descriptive statistics including number and percentage of participants for each response category. Second, we coded the open responses by grouping the answers to each question and identifying common themes, following guidelines on thematic analysis by Braun and Clark (2006). For each open-ended question, one author identified common themes, and the themes were then double-checked by another author. Cases of disagreement were discussed until a consensus decision was reached for each response and each theme. Some responses were ascribed only one theme, while others were coded with more than one theme. Through this process, we identified 10 themes for RQ3a, 11 themes for RQ3b, and 12 themes for RQ3c. In a final step, we calculated the number of comments ascribed to each theme for each question.

Results

RQ1: To which degree did in-person vs. online sign language assessment change during the COVID-19 pandemic?

As shown in Table 4, the frequency of in-person and online sign language assessment reversed because of COVID-19. Although study participants reported using online testing in 15% of their tests already before the pandemic, the proportion of online testing increased to 86% during the pandemic.

RQ2a: To which degree did sign language testers adjust test methods to assess receptive, productive, or interactive sign language skills during the COVID-19 pandemic?

Table 5 shows how many of the participants assessed the three sign language skills (receptive, productive, and interactive) before and during the pandemic. While the number of participants assessing productive skills slightly increased during the pandemic, fewer participants assessed receptive (–10%) and particularly interactive skills (–20%) during the pandemic.

In terms of test methods used before and during the pandemic, no major differences emerged for assessing sign language reception and sign language production, although we observed a slight decrease in usage across most test methods for sign language reception (Table 6). However, as shown in the table, considerably fewer participants used test methods for testing interaction during the pandemic compared to before. These results thus mirror the findings presented in Table 5 below.

Table 4 *In-person and online sign language testing before and during the COVID-19 pandemic*

	Before	During	Difference
In-person	82%	15%	–67%
Online	18%	86%	+68%

Percentages indicate the proportion of tests used as reported by participants.

Table 5 *Sign language skills assessed before and during the COVID-19 pandemic*

Language skills	Before	During	Difference
Receptive	90%	80%	–10%
Productive	80%	85%	+5%
Interactive	45%	25%	–20%

Percentages represent number of participants.

Table 6 *Test methods used in sign language testing before and during the COVID-19 pandemic*

Test Methods	Before	During	Difference
Reception			
Multiple-choice	65%	60%	–5%
Matching	20%	15%	–5%
Yes/No	35%	30%	–5%
Checklists	45%	40%	–5%
Acting out	25%	20%	–5%
Other	30%	30%	0%
Production			
Repetition	35%	35%	0%
Sentence completion	10%	10%	0%
Translation	20%	15%	–5%
Naming and describing	50%	55%	+5%
Retelling of a story	55%	50%	–5%
Presentation	35%	40%	+5%
Other	20%	20%	0%
Interaction			
Proficiency interview	30%	15%	–15%
Peer interaction, role play	35%	15%	–20%
Other	10%	0%	–10%

Percentages represent number of participants.

Table 7 *Assessment purposes in sign language testing before and during the COVID-19 pandemic*

Assessment Types	Before	During	Difference
Placement	15%	10%	–5%
Diagnostic	35%	25%	–10%
Assessment for learning	25%	30%	+5%
Achievement	30%	30%	0%
Proficiency	55%	45%	–10%
For research purposes	35%	30%	–5%
Other	10%	0%	–10%

Percentages represent number of participants.

RQ2b: To which degree did sign language testers change their assessment purposes during the COVID-19 pandemic?

The results are displayed in Table 7. There was a general decrease in assessment purposes during the pandemic, apart from achievement testing, which did not change, and assessment for learning, which was used by slightly more participants during the pandemic compared to before.

RQ2c: To which degree did sign language testers change tools/platforms to assess receptive, productive, or interactive sign language skills during the COVID-19 pandemic?

The responses on this research question are summarized in Table 8 (for sign language reception), Table 9 (for sign language production), and Table 10 (for sign language interaction). For all three language skills, there was a considerable increase in the use of online tools and platforms for assessment purposes. This increase was most pronounced for video conferencing tools, which were only used by one

Table 8 *Tools and platforms used in testing sign language reception before and during the COVID-19 pandemic*

	Before	During	Difference
Video conferencing	0%	60%	+60%
Learning platforms	25%	50%	+25%
File sharing/Cloud storage	20%	30%	+10%
File sending/Uploading systems	20%	30%	+10%
Survey tools	5%	15%	+10%
Messenger Apps	10%	10%	0%
Other	30%	35%	+5%

Percentages represent number of participants.

Table 9 *Tools and platforms used in testing sign language production before and during the COVID-19 pandemic*

Tools/Platforms Used	Production		
	Before	During	Difference
Video conferencing	5%	65%	+60%
Learning platforms	15%	35%	+20%
File sharing/Cloud storage	20%	20%	0%
File sending/Uploading systems	10%	25%	+15%
Survey tools	10%	15%	+5%
Messenger Apps	5%	5%	0%
Other	20%	20%	0%

Percentages represent number of participants.

Table 10 *Tools and platforms used in testing sign language interaction before and during the COVID-19 pandemic*

	Before	During	Difference
Video conferencing	0%	25%	+25%
Learning platforms	0%	10%	+10%
File sharing/Cloud storage	0%	0%	0%
File sending/Uploading systems	0%	0%	0%
Survey tools	0%	0%	0%
Messenger Apps	0%	0%	0%
Other	5%	5%	0%

Percentages represent number of participants.

participant for assessing productive skills before the pandemic, but by the majority of participants (60%) for assessing both receptive and productive skills during the pandemic. Other popular tools for assessment purposes during the pandemic were learning platforms, followed by file sharing and file sending systems. It is also noticeable that considerably fewer tools were used to assess interaction (Table 10), which again mirrors the relative lack of interactive sign language assessment during the pandemic outlined above.

RQ3a: Has sign language test administration changed during the COVID-19 pandemic? If yes, how?

In this section of the survey, 85% of participants indicated that the way they administered tests changed during the pandemic. Participants were also asked a follow-up question to indicate how their testing practices changed, in the form of an open response. The open responses were coded into 10 themes, displayed in Table 11. As expected, several participants indicated that they shifted their assessment to online formats, which mirrors the findings presented in Table 4 above. Three of the other themes were mentioned twice each (additional test security measures implemented, increased need for test taker preparation, and testing suspended during the pandemic), while the other themes were each mentioned once.

RQ3b: Has the test takers' home set-up affected the testing of sign language skills during the COVID-19 pandemic? If yes, how?

More than half of the participants (55%) indicated that their test takers' home set-up affected the testing of sign language skills during the pandemic. The main problem was a slow or inconsistent internet connection, followed by hardware problems, difficulties related to varying set-ups between test takers, and problems with visual access to test takers (Table 12). However, two comments also referred to advantages of online remote testing, in that test takers improved their 2D receptive skills and they were less distracted during online testing compared to in-person assessments.

RQ3c: Have test takers' technical skills affected the testing of sign language skills during the COVID-19 pandemic? If yes, how?

We asked this question twice (once in Section 3 of the questionnaire and once in Section 4 with a slightly different wording) and participants answered it slightly differently each time. The first time,

Table 11 *Common themes across the open responses to the question "In which ways has the way how sign language tests were administered during the COVID-19 pandemic changed"?*

Themes	*N* comments
Shift to online testing format	6
Additional test security measures implemented	2
Increased need for test taker preparation	2
Testing suspended during the pandemic	2
Change to more closed-ended testing formats like multiple-choice	1
Handling of video files after recording as a challenge	1
Implementation of training for test administrators and raters for online tests	1
More preparation time needed for teachers	1
Technical issues during testing	1
Test takers' anxiety regarding failure of technology	1

Table 12 *Common themes across the open responses to the question "In which ways has the way how sign language tests were administered during the COVID-19 pandemic changed"?*

Themes	*N* comments
Slow/inconsistent internet connection	5
No appropriate hardware to join online platforms	2
Difficulties related to varying home set-ups	2
Problems with visual access to test takers	2
Concerns with privacy and confidentiality	1
Data limitations/restrictions for mobile devices	1
Difficult lighting conditions	1
Improved 2D receptive skills through online classes and testing	1
Loss of data	1
Reduced distraction during online testing (compared to live testing)	1
Younger test takers need support to set everything up	1

Table 13 *Common themes across the open responses to the question "How have test takers' technical skills affected the testing of sign language skills during the COVID-19 pandemic"?*

Themes	*N* comments
Only a few problems with technology involved to carry out/complete testing	4
Unreliable set-up, e.g., unstable wi-fi, cheap/outdated equipment or software	4
(Unexpected) technical problems or unfamiliarity cause stress	2
Limited technical knowledge, which may directly affect test takers' response choices	2
Some support required by test takers	2
Comparable to pre-COVID	1
Considerable support required by test takers	1
Few problems for test takers with some technical training	1
Issue with visual access to test taker (keeping person in the screen)	1
More stress for test takers who are new to technology	1
Problems due to old/lack of equipment	1
Reliance on loan equipment	1

35% of participants indicated that test takers' technical skills affected the testing of sign language skills during the pandemic, whereas 65% of participants indicated that they did not. The second time, the proportion of yes/no answers shifted to 45%/55%. Participants were asked a follow-up question both times, the answers to which were combined and coded together. The results are shown in Table 13. Four comments indicated that there were only a few problems related to test takers' technical skills to carry out testing, while another 4 comments suggested that problems occurred due to unreliable set-up (which may not be related to test takers' technical skills, but rather their home set-up, see RQ3b above). The other themes identified in the open responses were only mentioned once or twice.

RQ4: Were security measures implemented to avoid cheating while testing sign language skills during the COVID-19 pandemic? If yes, which ones?

Almost half of the participants (45%) indicated that they put in place special procedures to address test security concerns such as cheating during the pandemic. Out of these, 56% monitored students

Table 14 *Common themes across the open responses to the question "What kind of functions would you like to see in tools/platforms for online assessment?"*

Themes	*N* comments
Automatic lighting improvements	6
Automatic score reporting	6
Automatic sign language recognition	5
Computer-adaptive testing	1
Improved annotation functionality across coders	1
Provide online feedback	1
Receptive tests	1

via video during the exam, 44% used recorded video proctoring and reviewing of the recorded videos after the exam, and 11% used specific exam security software such as *Proctorio* or *Testvision*. Open responses in this section also revealed that individual participants conducted random checks at break-outs, limited exam time so students did not have time to consult external sources, asked students to show their environment by rotating the camera 360 degrees, or randomized the order of test questions.

Recommendations from Study Participants

Study participants were also asked what kind of functions they would like to see in tools/platforms for online assessment based on their experiences during the pandemic. Some examples were provided in the question, such as automatic sign language recognition, automatic score reporting, and automatic lighting improvements. All study participants provided a comment to this open-ended question. In four cases, the comments were not related to the question. The common themes of the comments are shown in Table 14.

The most often named themes were automatic score reporting and automatic lighting improvement (30%), followed by automatic sign language recognition (25%). All three themes were also mentioned as examples in the question.

Discussion

The COVID-19 pandemic posed challenges across all educational levels, spanning from primary to tertiary education. Following the lockdowns, a rapid shift to online platforms became imperative, affecting services such as school- and university-level teaching and testing, and more specifically related to the context of the current study also for sign language testing and language testing of deaf or hard-of-hearing children. This sudden transition to online modes presented a collective challenge. Our interest in this study lay in understanding how sign language testing professionals adapted their sign language testing practices during the pandemic, and what recommendations could be drawn for future sign language assessment scenarios. We formulated a set of research questions to address these objectives by means of an online questionnaire, which was completed by 20 sign language testing professionals around the globe.

Observations from the questionnaire revealed an evident decrease in in-person assessments during the pandemic, with 86% of assessments conducted online. This decline aligns with governmental measures to curb virus spread and is consistent with findings in spoken language testing studies (Ockey, 2021; Purpura et al., 2021) as well as in studies on testing in tertiary education (e.g., Haque & Hossain, 2022).

However, the shift to online testing presented a unique challenge for sign languages. As sign language communication happens visually, online sign language teaching and testing relies on video technology, which in turn puts higher demands on technical infrastructure (e.g., it requires higher bandwidth) and on test takers' and test administrators' technical skills (e.g., ensuring good lighting conditions). Correspondingly, a recurring theme throughout the questionnaire responses was the need for specific training for both test takers and administrators engaged in online testing. In addition, respondents also noted that the dependence on technical skills can induce additional stress for test takers.

These factors may also have influenced adjustments in test methods for assessing receptive, productive, or interactive sign language skills, where we noted a stark 20 percentage points decrease in assessing interaction during the pandemic. We also observed a 10 percentage points decrease in testing receptive skills, and a 5 percentage points increase in testing sign language production. These changes may be attributed to productive signing tests being more easily adaptable to an online format compared to testing interactive or receptive skills. Testing sign language interaction or reception online uses more bandwidth (as multiple videos need to be streamed simultaneously) and requires more technical expertise (e.g., using the "spotlighting" function in platforms such as *Zoom* for testing interaction), while testing sign language production may be comparably easier as only single videos need to be streamed or uploaded. It is also noteworthy that even before the pandemic only 45% of participants reported conducting interactive assessments, suggesting a potential need for more interactive tests in sign languages in general.

When examining changes in sign language assessment purposes before and during the pandemic, a general decline in assessment purposes was observed, except for achievement testing (remaining consistent) and assessment for learning (showing a slight increase). This indicates a decrease in sign language testing overall (some open comments also suggested that testing was stopped altogether in some contexts), and potential shifts in focus. We were not able to find previous research related to a change in language assessment purposes as a consequence of the COVID-19 pandemic, but possible explanations for the trend we observed might be that achievement testing needed to be conducted despite the new circumstances (students still needed to complete their courses), while security concerns may have led to a decrease in (high-stakes) proficiency assessments (see also the discussion below). This in turn may have led to an increase in assessment for learning because practitioners spent less time on other assessment purposes. However, more research would be necessary to confirm this hypothesis.

The shift to online testing also influenced sign language test administration in different ways. Across all language skills (reception, production, and interaction), we noted an increase in using online tools or platforms, particularly with video conferencing tools such as *Zoom* or *MS Teams* showing a substantial increase of +60 percentage points for testing sign language reception and production. A general increase in using more online video tools or platforms to test sign languages during the pandemic is not surprising due to the languages' visual modality, as discussed above. For testing interaction, the increase was lower (25 percentage points), which again indicates that more testing of interactive skills in sign languages may be needed.

Two main challenges related to online test administration were bandwidth and test takers' technical expertise. Five participants commented on problems related to test takers' slow or inconsistent internet connections, which impacted test administration. This has also been found in other studies on (sign) language testing during the pandemic (e.g., Isbel & Kremmel, 2020; Kronenberger et al., 2021; Ockey, 2021). Test takers' technical skills were reported as a problem by four study participants. This may be linked to general issues of computer literacy during the initial shift from in-person assessment to online testing reported in other studies (Green & Lung, 2021; Poonpon, 2021), however it may also be related to the unique challenges of online sign language testing outlined above.

Another significant concern in online sign language testing contexts during the pandemic was test security. Commonly employed measures to enhance test security included monitoring students through video conferencing during exams, reviewing video recordings after exams, and implementing proctoring software. Similar security measures were reported in other studies on online language testing during the pandemic (e.g., Hrbáčková et al., 2020; Isbel & Kremmel, 2020). Open responses indicated the implementation of specific security measures such as limiting exam time or asking students to show their environment.

Despite all these challenges, study participants also mentioned two positive aspects of online at-home testing during the pandemic. One participant noted that test takers improved their 2D receptive skills, i.e., they learned how to better understand sign language via video as compared to real life. Another participant mentioned that test takers were less distracted during online testing compared to in-person assessments.

Study participants also provided some recommendations for future sign language assessment based on their experiences during the pandemic. The most common recommendations were automatic sign language recognition, automatic score reporting, and automatic lighting improvements. However, it should be noted that these themes were also provided as examples in the question, so future research would need to confirm these findings.

Limitations

This study had several limitations, most notably the small sample size (N = 20). However, small sample sizes are a recurring issue when researching sign language practitioners' attitudes and experiences, and the sample size of the current study is comparable to other studies on issues in sign language assessment (e.g., Haug, 2015; Haug et al., 2023). Even though the "call for participation" was sent out more than once, we were not able to reach more sign language testing professionals in different countries. For future studies, we will contact international organizations to share a "call for participation" with their member countries, e.g., sign language teachers' associations. Another limitation is that participants were asked retrospectively about their experiences, so possible memory effects may have had an impact on the results. Finally, researching attitudes and experiences via a questionnaire can only provide indirect evidence, so future research in this area should also consider using qualitative methods such as interviews, focus groups, or think-aloud protocols. Finally, we would also make some changes to the questionnaire. Study participants were able select multiple roles in their sign language assessment context (e.g., researcher, test developer), but we did not differentiate the subsequent questions (e.g., assessment-related topics before and during the pandemic) by role. For future research, study participants should be able to report about their assessment experiences based on their selected role(s).

Conclusion

The current study investigated how the COVID-19 pandemic impacted sign language assessment. Questionnaire responses from 20 sign language testing professionals across the globe showed a significant decrease in in-person assessments during COVID-19, contrasting with a stark rise in online assessments. This shift presented unique challenges for sign language assessment, which relies heavily on video technology when being conducted online, leading to increased demands on technical infrastructure and on test takers' and test administrators' technical expertise. As a consequence, the assessment of interactive and receptive skills was negatively affected during the pandemic. We also noted a decline in testing overall as well as a decline in different assessment purposes, except for achievement testing which remained constant and assessment for learning which increased slightly.

Online tools, notably *Zoom* and *MS Teams*, saw a substantial increase for testing receptive and productive sign language skills. Test security was a major concern, which participants addressed through video monitoring, reviewing recordings, and proctoring software.

Based on the results of this survey, some recommendations can be made for future sign language assessments. First and foremost, it is crucial for successful online sign language testing to provide well-functioning infrastructure, including reliable internet connection, up-to-date hardware, and good lighting conditions. In contexts where this is a challenge, test providers should consider equipping test takers with suitable computers and stable internet hotspots and instruct them in providing adequate lighting. In addition, test administrators and test takers need to be adequately prepared to conduct online assessments, e.g., by offering preparatory workshops and printed guidelines on general computer literacy and specific instructions for specific software such as *Zoom* or *MS Teams*. Such guidelines should ideally also include procedures to ensure test security, which can be a challenge in online testing.

In summary, the COVID-19 pandemic posed unprecedented challenges to sign language assessment for different groups of sign language users, pushing test takers, researchers, educators, and other sign language testing professionals to adapt rapidly. Despite the experienced difficulties, it is our hope that the implemented changes in assessment practices could drive long-term improvements in accessibility, adaptability, and inclusivity in language assessment methods for deaf and hard-of-hearing people.

Funding

This study has been funded by the Swiss National Science Foundation Sinergia project "Scalable multimodal sign language technology for sign language learning and assessment Phase-II (SMILE-II)" (project number: 193686, https://data.snf.ch/grants/grant/193686).

References

Arnold, I. J. M. (2022). Online proctored assessment during COVID-19: Has cheating increased? *The Journal of Economic Education*, *53*(4), 277–295. https://doi.org/10.1080/00220485.2022.2111384

Astiandani, F. R., & Anam, S. (2021). EFL teachers' perceptions towards the implementation of online formative assessment amidst the Covid-19 pandemic. *ELT Worldwide: Journal of English Language Teaching, (8)*2, 269–277. https://doi.org/10.26858/eltww.v8i2.21326

Blaiser, K. (2016). Recommendations for administering early intervention assessments with children who are deaf/hard of hearing via telehealth technology. *Perspectives of the ASHA Special Interest Groups*, *1*(18), 31–40. https://doi.org/10.1044/persp1.SIG18.31

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Clark, T., Spiby, R., & Tasviri, R. (2021). Crisis, collaboration, recovery: IELTS and COVID-19. *Language Assessment Quarterly*, *18*(1), 17–25. https://doi.org/10.1080/15434303.2020.1866575

Dale, B. A., & Neild, R. (2023). Virtual assessment of deaf and hard of hearing students in the schools. *American Annals of the Deaf, 168*(3), 29–40. https://doi.org/10.1353/aad.2023.a917248

Diarsini, M. S., Artini, L. P., Padmadewi, N. N., Ratminingsih, N. M., Utami, I. G. A. L. P., & Marsakawati, N. P. E. (2022). Challenges and opportunities of online assessment implementation during Covid-19 pandemic in Indonesia based on recent studies. *European Journal of Education and Pedagogy*, *3*(6), 82–88. https://doi.org/10.24018/ejedu.2022.3.6.421

Dunn, L. M., & Dunn, D. M. (2007). *Peabody picture vocabulary test–fourth edition (PPVT-4)*. NCS Pearson. https://doi.org/10.1037/t15144-000

Ghanbari, N., & Nowroozi, S. (2021). The practice of online assessment in an EFL context amidst COVID-19 pandemic: Views from teachers. *Language Testing in Asia*, *11*(1), 1–18. https://doi.org/10.1186/s40468-021-00143-4

Green, B. A., & Lung, Y. S. M. (2021). English language placement testing at Brigham Young University–Hawaii in the time of COVID-19. *Language Assessment Quarterly*, *18*(1), 6–11. https://doi.org/10.1080/15434303.2020.1863966

Hafeez Alvi, A., Muhammad Bilal, S., & Abdul Rahim Alvi, A. (2021). Technology, pedagogy & assessment: Challenges of COVID- 19 imposed e- teaching of ESP to Saudi female PY students. *Arab World English Journal, 1*, 334–353. https://doi.org/10.24093/awej/ covid.25

Haug, T. (2015). Use of information and communication technologies in sign language test development: Results of an international survey. *Deafness & Education International*, *17*(1), 33–48. https://doi.org/10.1179/1557069X14Y.0000000041

Haug, T., Mann, W., & Holzknecht, F. (2023). The use of technology in sign language testing: Results of a pre-pandemic survey. *Sign Language Studies*, *23*(2), 243–281. https://doi.org/10.1353/sls.2023.0003

Haque, N., & Hossain, M. (2022). Virtual assessment in English language teaching during COVID-19 pandemic: Challenges and considerations in Bangladesh perspectives. *Script Journal: Journal of Linguistics and English Teaching*, *7*(2), 273–298. https://doi.org/10.24903/sj.v7i2.1008

Hrbáčková, J., Lukáčová, E., & Punčochářová, E. (2020). Language testing in the time of the Covid-19 pandemic 2020. *CASCAL Review*, *10*(1), 186–189. https://mail.cyberpsychology.eu/casalc-review/article/view/14223/11896

Ibna Seraj, P. M., Chakraborty, R., Mehdi, T., & Roshid, M. M. (2022). A systematic review on pedagogical trends and assessment practices during the COVID-19 pandemic: Teachers' and students' perspectives. *Education Research International*, *2022*, 1–13. https://doi.org/10.1155/2022/1534018

Isbell, D. R., & Kremmel, B. (2020). Test review: Current options in at-home language proficiency tests for making high-stakes decisions. *Language Testing*, *37*(4), 600–619. https://doi.org/10.1177/0265532220943483

Kronenberger, W. G., Montgomery, C. J., Henning, S. C., Ditmars, A., Johnson, C. A., Herbert, C. J., & Pisoni, D. B. (2021). Remote assessment of verbal memory in youth with cochlear implants during the COVID-19 pandemic. *American Journal of Speech-Language Pathology*, *30*(2), 740–747. https://doi.org/10.1044/2021_AJSLP-20-00276

Kusters, A. (2021). International Sign and American Sign Language as different types of global deaf lingua francas. *Sign Language Studies*, *21*(4), 391–426. https://doi.org/10.1353/sls.2021.0005

Lalonde, K., & McCreery, R. W. (2020). Audiovisual enhancement of speech perception in noise in school-age children who are hard-of-hearing. *Ear and Hearing*, *41*(4), 705–719. https://doi.org/10.1097/AUD.0000000000000830

Lund, E., & Werfel, K. L. (2022). The effects of virtual assessment on capturing skill growth in children with hearing loss. *Language, Speech, and Hearing Services in Schools*, *53*(2), 391–403. https://doi.org/10.1044/2021_LSHSS-21-00074

Mariadi, M., Mirizon, S., & Sitinjak, M. D. (2022). The challenges of online assessment amidst Covid-19 pandemic disruption: The voice of EFL lecturers. *Englisia: Journal of Language, Education, and Humanities*, *10*(1), 107–126. https://doi.org/10.22373/ej.v10i1.13704

Ockey, G. J. (2021). An overview of COVID-19's impact on English language university admissions and placement tests. *Language Assessment Quarterly*, *18*(1), 1–5. https://doi.org/10.1080/15434303.2020.1866576

Ockey, G. J., Muhammad, A. A., Prasetyo, A. H., Elnegahy, S., Kochem, T., Neiriz, R., Kim, H., & Beck, J. (2021). Iowa State University's English placement test of oral communication in times

of COVID-19. *Language Assessment Quarterly*, *18*(1), 26–35. https://doi.org/10.1080/15434303.2020.1862122

Papageorgiou, S., & Manna, V. F. (2021). Maintaining access to a large-scale test of academic language proficiency during the pandemic: The launch of TOEFL iBT Home Edition. *Language Assessment Quarterly*, *18*(1), 36–41. https://doi.org/10.1080/15434303.2020.1864376

Poonpon, K. (2021). Test takers' perception of design and implementation of an online language testing system at a Thai university during the COVID-19 pandemic. *PASAA*, *62*, 1–28. https://doi.org/10.58837/CHULA.PASAA.62.1.1

Purpura, J. E., Davoodifard, M., & Voss, E. (2021). Conversion to remote proctoring of the Community English Language Program online placement exam at Teachers College, Columbia University. *Language Assessment Quarterly*, *18*(1), 42–50. https://doi.org/10.1080/15434303.2020.1867145

Tohidast, S. A., Mansuri, B., Bagheri, R., & Azimi, H. (2020). Provision of speech-language pathology services for the treatment of speech and language disorders in children during the COVID-19 pandemic: Problems, concerns, and solutions. *International Journal of Pediatric Otorhinolaryngology*, *138*. https://doi.org/10.1016/j.ijporl.2020.110262

Zakaria, Z. A., Abdullah, N., & Mahir, N. A. (2022). The perception of students on online assessment during the COVID-19 pandemic. *International Journal of Language and Education*, *1*(1), 65–73. https://doi.org/10.33102/alazkiyaa.v1i1.9