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Exploring alternative assessments for signing deaf candidates

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Abstract

Attitudes to sign languages, or language policies, are often not overtly discussed or recorded but they influence deaf young people's educational opportunities and outcomes. Two qualitative studies from Scotland investigate the provision of British Sign Language (BSL) as an accommodation in public examinations. The first explores the views of deaf pupils and staff about the official system for face-to-face interpretation of exam papers. The second investigates a centrally translated digital paper with embedded video questions. Discussion focuses on contrasts between the USA and UK approaches to accommodations, raising issues of standardised technical terms in signed languages, the right to respond in sign, and candidate choice.

Keywords: assessment, BSL, ASL, examinations, language policy, deaf

Exploring Alternative Assessments for Signing Deaf Candidates

Deaf candidates are a small and heterogeneous group amongst all pupils taking public examinations. While in the USA there have been many studies about exam and assessment accommodations (Cawthon, 2010; Cawthon & Leppo, 2013; Cawthon, 2015; Higgins et al., 2016; Bruce, Luckner & Ferrell, 2018), in other countries there has been much less research. The purpose of this article is to compare public examination arrangements in the USA and the UK to explore access that deaf candidates have. We present a discussion of existing exam arrangements for deaf candidates in the UK, including both text adaptation and use of sign language. We then focus on two studies from Scotland where the policy environment is more favourable to the use of sign language. Drawing on theories about language policy (Tollefson, 2011; Mathews, 2018), we explore these inconsistencies and discuss why further international research is needed to support fair access for deaf candidates in education systems across the world.

Literature Review

Equality legislation and exam systems

In the USA, the place of sign language in education was secure until the 1890s, when manual signing approaches based on English predominated. The 1920s represented the height of anti-signing approaches in schools, but by 1971 simultaneous speech and sign was back, and by 1978 a bilingual bicultural approach was again dominant in large deaf schools, such as the Pennsylvania School for the Deaf (Fisher et al., 2018).

Rosen reports (2006) that since the 1999 amendments to the Individuals with Disabilities Education Act (IDEA), more qualified American Sign Language (ASL) interpreters have been employed in the education system. However, Schick, Williams and Kupermintz (2005) argue that Federal Law at that point was unspecific about the qualifications needed by educational interpreters. The definition of interpreter is broad in

USA legislation and includes ASL, transliteration (speech to signed English), cued speech and electronic speech to text reporting (Individuals with Disabilities Education Act, 2004a). The statutes now state that educational interpreters should be qualified (IDEA, 2004b) and the Educational Interpreter Performance Test (Classroom Interpreting, 2018) is widely used to maintain this standard.

In the UK there is much less specificity about what interpreting means for deaf children in the education system. In the current guidance from the Joint Council for Qualifications (JCQ, 2018) interpreters are not mentioned, but people providing interpretation in exams are called Communication Professionals, being qualified to a minimum of BSL level 3, ideally level 6 (JCQ, 2018; 5.13.4 p.62).[1] The choice of terminology is a type of language policy, illustrating that qualified interpreters hardly work in the UK education system.

Under the UK-wide Equality Act (2010) disability is one of eight protected characteristics. Schools must make reasonable adjustments in anticipation of disabled pupils attending, to prevent them facing a 'substantial disadvantage' (Section 20). Exam boards must "minimise the extent to which disabled persons are disadvantaged in attaining the qualification because of their disabilities" while maintaining reliability and public confidence in the qualification (Equality Act, 2010; Pt. 6, Ch. 3 S.96 (8)). The term *reasonable* is unspecific, which critics have argued has led to little improvement in the rights of pupils with disabilities (British Deaf Association, 2015; Porter, 2015). Private schools, for example, have used this law to argue the local authority or family should pay for adaptations needed by a pupil with a disability (Garrod, 2016).

Attitudes to minority languages in education systems

Language policy does not simply refer to government enforced top-down policies, for example government encouragement in Wales to use Welsh in the education system, but

also to the informal agreements from professionals, and bottom-up demands and practices from linguistic minorities which determine which languages are to be used, for what purposes and when. As Tollefson puts it (1991, p.187) "When a relatively weak linguistic minority gains some rights, the group may have a more secure foundation for improving its economic circumstances, increasing its power and eventually gaining greater rights. That is, language rights are grounded in struggle."

When a deaf child is born into a hearing family, which is true of 96% of deaf children (Mitchell and Karchmer, 2004), families have an early introduction to a medical view of deafness and little contact with alternative viewpoints from deaf adults (Mathews, 2018). The positioning of medical and professional discourse as neutral in comparison with deaf community viewpoints as biased and political has been noted by Komesaroff in Australia (2008) and Mathews in Ireland (2018). Schools are not neutral places; their language ideologies and language policies come from dominant professional and medical viewpoints, affecting relationships with children and families, and asserting the expectation of normalisation. Even at an international level, as Murray, Snodden, De Meulder and Underwood have argued (2018), despite principles in the United Nations Convention on the Rights of Persons with Disabilities (UNRCPD) to respect sign languages in the education system, the result has been their systematic exclusion.

The purpose of this article is to examine how these often-undiscussed language policies affect deaf children in the exam system. Two accommodations to examinations are widely used for deaf candidates in UK school and college systems: modification of the questions into plain English, which can be seen as a compensatory strategy, and using British Sign Language, which recognises pupils' linguistic rights.

Language modification as an exam access strategy

One strategy for improving deaf candidates' access to examinations in the UK has been termed *language modification*. Stemming from classroom practices of simplifying texts for deaf students, from the 1980s members of the National Association of Tertiary Education (NATED) asked vocational exam boards in England to simplify and clarify the language of exam questions for deaf candidates (British Association of Teachers of the Deaf [BATOD], 2011). The practice has been widely evaluated in the USA in relation to students who have English as an additional language (see Abedi, 2014 for an overview).

Following the UK Equality Act (2010), particular groups of disabled candidates were no longer automatically eligible for such special treatment, but the exam boards continued the practice of modifying papers for all candidates, using the expertise of teachers of deaf children (BATOD, 2011). This could be seen as a Universal Design approach which supports a wide range of other pupils who may have difficulties with reading (Ralabate, 2011). The strategies include simplifying syntax, re-ordering, using consistent exam instruction terms, avoiding idiom and phrasal verbs, choosing more frequent non-technical terms, retaining subject specific terminology, and improving text cohesion, layout and use of diagrams (Abedi, 2006; BATOD, 2011).

BSL used as an exam access strategy

The Scottish exam system allows deaf candidates to use BSL to receive their exam questions and to sign their responses due to an influential report to the Scottish Qualification Authority (SQA) by sign linguist Mary Brennan (2000). The SQA is the Scottish governing body responsible for all national school qualifications. SQA courses can also be undertaken in college settings. A candidate who opts to have their exams signed will have an individual *communicator* assigned to them; this is the term the SQA use to refer to the person who interprets the exam into sign language. The candidate can opt to respond in sign or write their answers or a mixture of signed and written responses. The candidate's signed responses are

filmed and then translated after the exam at the school or college exam centre. SQA set up a system to check the quality of translations of pupils' signed responses (SQA, 2016); translated scripts are checked by a central review group against videos of the candidates' signed responses, then forwarded to be marked in the usual way. This review group allows quality control over the standard of the translation of responses from BSL to English.

The exemplar materials from SQA with sample translated exam questions illustrate that technical terms in BSL should be used, but this is not explicitly discussed in the guidance (SQA, 2015). In England, by contrast, deaf candidates can have the questions signed to them, but technical terms must be fingerspelt to them in English (Joint Council for Qualifications, 2018).

As BSL is a language which was explicitly excluded from the academic side of deaf education from 1880 – 1975 (Ladd, 2003), there were few technical terms for school subjects, particularly science, which was taught in very few deaf schools until the 1980s (McLoughlin, 1987). From the early 1990s, deaf students were able to claim government funding to pay for notetakers and BSL / English interpreters at university; a decade after this many deaf signing Science, Technology, Engineering and Maths (STEM) students had graduated and some became teachers. The Scottish Sensory Centre (SSC) BSL Glossary of curriculum terms (SSC, 2018) has over the last decade built up a bank of 1,500 technical STEM terms and definitions in BSL created and collected by groups of deaf scientists and BSL linguists (Cameron, Quinn, and O'Neill, 2011; 2013).

Scotland and British Sign Language in the education system

In Scotland, only 26% of severely or profoundly deaf children use BSL or Sign Supported English in school (CRIDE, 2018), with the remainder using speech. The majority of these signing children are educated in specialist deaf schools or bases in mainstream schools although some are individually placed in mainstream schools. If we look back to the

1970s, this figure would have been higher because the language was acquired informally in residential schools, but it would not have been used for academic purposes. Now the figure is lower because of newborn screening, early aiding, early cochlear implantation and the usual attendance of deaf children in the local school. Consequently, despite the provision of signed exams for deaf pupils in Scotland, few select this option. Figure 1 below shows that from when the Scottish system started, the number of pupils applying for the use of BSL in exams has been variable, with a reduction in 2014 when a new national exam system removed external exams for lower achieving pupils, replacing them with internally assessed assignments. There has been a gradual expansion in requests for exams in BSL since then.

Figure 1 about here

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SQA point out that these are requests for particular subjects and not all these arrangements were taken up by candidates. Despite the passage of the BSL (Scotland) Act in 2015, these figures suggest that only a few deaf candidates are requesting BSL each year. Expertise in BSL is also low in the specialist teaching workforce: 9% of teachers of deaf children in Scotland have fluency in BSL while 58% need to use sign in some form in their work (Ravenscroft and Wazny, 2016).

In 2015 the BSL (Scotland) Act was passed, promoting the use of BSL with a National Plan and requiring all local authorities, colleges, universities to make local plans (Lawson, McLean, O'Neill, and Wilks, 2019). No government budget has been attached to the plans, so it remains to be seen if the minimal offering of BSL in the school system will continue. However, the achievement gap between deaf children and all pupils without any additional support need (ASN) in their highest level of achievement when they

leave school remains: 70% of children with no ASN achieve Scottish Credit and Qualifications Framework (SCQF) 6 or above, that is they are probably eligible for direct entry to Higher Education, compared to 42% of deaf school leavers (SG, 2018b, Table A3.1). There are many reasons for this difference, including continuing late diagnosis, low socioeconomic status and additional disability (Marschark, Shaver, Nagle and Newman, 2015; O'Neill, Arendt, and Marschark, 2014, p. 106). Language policy is another factor; in the USA, for example, ASL is much more widely available than in the UK and has fairly high status: it is a language commonly studied by hearing people at high school and tertiary level (Rosen, 2015). BSL is a lower status language, and fluent models of the language are usually not available in the local schools or resourced schools in Scotland (O'Neill et al., 2014).

Purpose of the two related studies

The purpose of Study A was to investigate the existing exam system for deaf BSL-using candidates in Scotland. Study B was a feasibility study into a new system for SQA to demonstrate the production of centralised electronic exam papers in BSL for deaf candidates. Both studies investigate signing deaf candidates at secondary school in Scotland, and their teachers and exam communicators.

Study A: the existing exam system

Introduction

Eileen Burns, the researcher for Study A, is a Scottish teacher of deaf children who is fluent in BSL. As a science specialist she was particularly interested to see how deaf candidates and communicators experienced the science exams. The Research Questions were:

a) What are the skill levels of exam communicators, and how confident do they feel about undertaking this role?

b) What signing protocol do communicators adopt when signing SQA exams?

c) What are the main issues perceived by deaf signing candidates about sitting their SQA

exams under the examination arrangements in place in Scotland?

The aim was to explore the participants' personal experiences and perceptions.

Method

Thirty-three people were involved in this small piece of research:

- 20 school staff who had undertaken the role of communicator for deaf signing SQA

  national examination candidates completed questionnaires.

- Eight exam communicators who had signed papers for deaf candidates this year

  participated in individual interviews; this included teachers of deaf children,

  interpreters and support workers.

- Five deaf signing candidates aged 16-17 who had just taken science exams that year

  were also interviewed.

Measures and procedure. The researcher piloted a 24-item questionnaire for school

staff who had undertaken the role of exam communicators. Three questions were amended as

a result of comments from the teachers who completed the pilot questionnaire. Ten of the

items in the final version asked about experiences in particular science exams undertaken a

few days before, or in previous years. These included if the candidate signed their responses,

or just wanted the questions signed to them; the form of signing used; knowledge of

vocabulary in the exam; the time allowed; and use of fingerspelling. Four of the items asked

about the BSL Glossary, whether technical science terms from the Glossary had been used in

the science exam, and if the communicator knew the technical signs. Three questions

focused on times when the candidate asked for a repetition of a question, and whether the

communicator felt they had signed it differently on repetition. Six questions asked about the

communicator's confidence in translating questions, an evaluation of their own BSL level,

the role of the person translating after the exam and their confidence in undertaking the task. Finally, participants were asked for an evaluation of the current SQA system.

The questionnaire was distributed online through the Scottish Sensory Centre (SSC) network to all 32 local authorities of services for deaf children in Scotland, and by post to resourced schools and a deaf school during the exam period (Burns, 2012, Appendix B).

Interviews took place just after the summer science exams so that the arrangements were fresh in their minds. Interviews were semi-structured following themes identified by the literature and the researcher's own experience in interpreting exams for deaf candidates. Interviews with deaf pupils took place in BSL and were video recorded. One exam communicator was deaf, also video recorded, with the remainder being audio recorded.

Ethical approval. The second author, Burns, gained ethical approval for her MEd study through the Moray House School of Education ethics committee. The first author, O'Neill, supervised the project. All adult participants gave their consent, parents of the young people gave written consent and deaf pupils had the chance to find out about the project in BSL, and then gave their assent.

Data analysis. The data from both questionnaires and interviews were predominantly qualitative. This study used a Grounded Theory approach, where the researcher found codes, wrote memos, and proposed categories; then through looking at the data repeatedly, we explored larger themes which gave explanations or described the phenomenon (Morse & Clark, 2019; Gregor, 2006). The questionnaire responses were word-processed making them searchable and easier to compare in a table. At this first stage in the process, initial codes were proposed, and memos supported emerging categories. The researcher translated and transcribed the interviews, finding codes in an iterative process, being open to what was discovered, deciding on what data to collect next based on initial findings, and constantly comparing the findings to contribute new theory (Walsh et al., 2015).

Results

Eight codes which emerged from the data were grouped to help construct themes. These themes attempt to describe the phenomenon of the process of providing exam in a minority language to build wider theory to explore the situation. The themes can perhaps apply to wider contexts where deaf children and (mainly) hearing staff negotiate a way through the education system (Urqurhart, 2019). Typical quotations have been provided to illustrate these codes and themes.

Theme 1. Working Together: trust and control.

Candidates' and Communicators' experience of working together. Usually the candidate was familiar with the communicator: "You get used to the different teachers and their signs over the years because they have been with you for the subject." (Candidate 1). Some staff and students, however, reported that they had not worked together before the exam. "This was the first for both of us." (Communicator 6).

Candidates having little choice of communicator. Both staff and pupils raised the issue of not having much choice. If there were several candidates taking an exam in the same subject, several communicators would be needed at the same time: "Two (pupils) asked me but, it had already been agreed that I'd do him first anyway so I had to say no to the other person so they got somebody else." (Communicator 5).

The frequency of candidates' requests for question repetition. In the questionnaire, exam communicators were asked if they felt the deaf candidate would benefit from having the question signed again, even though the candidate did not ask for this. Twelve out of the 20 participants agreed. In an interview a possible explanation for candidates not asking for questions to be repeated was, "admitting to their teacher that they do not understand." (Communicator 2). There were mixed responses from the candidates about their feelings and practices about requesting a sign repetition of a particular question. Some said they asked

many times. One candidate said that he asked for one repetition and if he still did not understand he guessed. One candidate as an explanation for not requesting repetition said, "I think sometimes if you keep asking you start to get worried what the person signing thinks." (Candidate 1). From both staff and candidates' views, then, asking for a repeated question can be difficult, partly because the communicator is usually the pupil's teacher.

Theme 2. Skills of the communicator.

Communicator's level of subject knowledge. Because of the need for several communicators to be available at the same time for popular examinations, some communicators felt ill-equipped with respect to examination subject knowledge. "Two months of learning all the signs and actually understanding the words because in science certainly at the level that the boys are doing, the signing – a lot of it is new to me." (Communicator 3).

Balance of subject knowledge and sign language skill. Some communicators felt that a candidate's level of access to the exams varied, depending on which communicator they had assigned to them: "You would be advantaged if you had A, Less advantaged if you had B, and even less advantaged still if you had C." (Communicator 4). In one school a qualified interpreter was employed to undertake the role of exam communicator, the view of the school being that they wanted the communicator to have a high level of sign language skills. When interviewing the interpreter, it became clear that she was unfamiliar with the subject content of the exams. That year she provided interpretation for a wide range of technical subjects.

> And some of those, that paper really worried me because I know nothing about that
> subject, and all the sort of like 'CADs', elevation, end elevation, all that were all new to
> me, and I didn't even know what they meant.   (Communicator 1)

It was clear that those undertaking the communicator role worked hard to fulfil it to

the best of their ability. If a communicator had not worked with the candidate throughout their course, they spent much time learning the signs for technical vocabulary and subject knowledge. However some communicators were still not confident about their level of subject knowledge and ability to interpret the exam effectively.

In the questionnaire to specialist staff acting as exam communicators, 18 responded about BSL qualifications. Only 3 had interpreter qualifications; 5 had reasonable fluency (see note 1), and 14 had conversational levels of BSL – their courses had not involved translation skills. The deaf candidates were quite aware of these levels: "You don't want hearing interpreters with level 1 you want level 3 which means you don't get poor quality signing, you get good quality signing." (Candidate 4).

Communicator practice when repeating exam questions. Teachers and communicators were asked how they repeated a question if a candidate asked them to. A few respondents stated that they signed differently if they felt their first translation could be improved upon. A few said that they signed the same way twice, then if asked a third time to repeat the question they altered the way they signed the question. **"**Signed the same way- if I had signed it differently this may have given the candidate extra information." (Questionnaire respondent 17). One person wrote that he/she simplified the question if asked to repeat for a third time, **"**When a third repeat was asked for I simplified the question and therefore the signing."   (Questionnaire respondent 13). One of those interviewed said that she may put a question within a context candidates would be familiar with.

Theme 3. Translation issues and technical signs

Fingerspelling versus technical signs: which is more valid? From the staff questionnaire responses, 11 of the 15 who answered the question about fingerspelling said they would fingerspell a technical term even when they knew the sign. This is not the guidance in Scotland, but it is in England. The main explanation given was that it was felt that if the

sign were used, it could give the deaf candidate an unfair advantage due to its visual nature:

"Radius…is so visual it would have given the answer" (Questionnaire respondent 5).

Candidates were often unhappy with the communicators' fingerspelling:

> Sometimes when the interpreter fingerspells things they make mistakes and you don't
>
> know what it means. You need to have correct finger spelling. Sometimes you don't
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> understand their finger spelling they get the letters wrong so you ask for it to be
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> fingerspell again, sometimes as many as three times you need to ask for it to be
>
> repeated "again please slowly", and sometimes you still don't understand and you
>
> give up. (Candidate 5)

Time provided to Communicators to prepare their translations. Half of the

questionnaire respondents stated that they did not have enough time before the exam to fully

prepare themselves for translating the paper into BSL. It was felt that some exams require

more preparation time than others. The SQA special exam arrangements state that

communicators can have access to the exam paper up to one hour before the exam

commences.

Using the SSC BSL Glossary of technical signs. Questions in the questionnaire and

during interviews asked about the usefulness of the SSC's bilingual glossary of science

signs[2]. The majority of responses stated that the glossary was extremely useful and was used

regularly. However, a sizeable minority had not made use of it. A few respondents felt that it

would be useful to have the glossary in DVD format because they found it difficult to access

using the Internet in school. Candidates interviewed had made use of the glossary and felt it

helped them understand science concepts better. Asked how the glossary could be improved,

several suggested more signs. One respondent felt the signs covered were of too high a

standard while another respondent felt that the glossary would be improved if it contained

more SQA Higher exam level terms. Having more signed definitions of technical vocabulary

was also stated as a way of improving the glossary.

Discussion of Study A

The results of this Scottish study show the close relationships between deaf

candidates, teachers and communicators, but also the unequal power relationship between

them in the exam room. The pupils often raised issues of equity and quality in exams; the

communicators found the role stressful and often felt they were not skilled enough to take on

this role. Yet the staff sometimes decided on language policies for themselves, which did

not follow the SQA guidance, such as using fingerspelling or simplifying a question after two

repetitions. This change could threaten the validity of the paper, as different candidates would

be likely to receive different questions (Steinberg et al., 2009). Both subject knowledge and

a high level of BSL skills were recognised as essential by deaf students and communicators.

SQA revised its guidance in 2016 taking into account some of these findings (SQA,

2016). They call for "an appropriate level of skill in sign language" (p4), also insisting

that the communicator must have subject knowledge. The guidance clarified that

communicators must not provide guidance to candidates. Centres can now ask to see papers

more than an hour before the exam if they apply. There is no guidance about the use of

fingerspelling, the use of technical signs, or how to manage repeated questions; but notes are

provided on filming and later translating the responses (SQA 2015; 2016).

The word *appropriate* is often used in the UK in relation to additional support needs,

and like *reasonable adjustment* it can mean anything. The Scottish Government use a similar

vague term when describing the level of sign language skill needed by teachers of deaf

children: "a minimum level of competence in BSL, at least to BSL Stage 1, and a

requirement to upgrade skills *to meet pupil support needs.*" (Scottish Government, 2007,

Section 8, our emphasis). These policy statements are not based on a human rights model,

despite the UK ratifying the United Nations Convention on the Rights of Persons with

Disabilities (UNRCPD) in 2009. As signing deaf pupils are young and use a low status

minority language, they are not in a strong position to argue for the specialist staff that work

with them to upgrade their skills. Despite the passage of the BSL (Scotland) Act in 2015,

deaf young people still face inconsistencies and inequality in the presentation of signed

examinations. Listening to deaf and disabled people is an important part of UNRCPD

implementation (O'Neill, 2017).

The study has several limitations: the researcher was known to most adult participant

as a fluent BSL user, which may have affected their responses. The study is small and the

themes analysed by one researcher. However, most of the interviews took place soon after the

actual exams, which was a strength of the study.

Having looked at the current system in Study A, the next study investigated

possibilities which might provide better access for signing deaf candidates in exams.

Study B: Exploration of embedded video questions

Introduction

The second related project aimed to explore the feasibility of centrally produced digital

exam papers in BSL so that deaf candidates could control the speed and repetitions

themselves working on a computer. It was conducted by the three core members of the BSL

Glossary of Curriculum terms team at the SSC: Audrey Cameron, a deaf chemistry teacher,

Gary Quinn, a deaf BSL linguist and Rachel O'Neill, a hearing lecturer in deaf education.

The aims of the project were:

a) To develop BSL science terms in Chemistry and Biology then translate three sample

SQA science exam papers into BSL;

b) To investigate ways of embedding video clips into a digital exam paper and for candidates

to sign their responses independently; and

c) To trial the system and gather views of deaf students and teachers / support staff.

Rationale for the project. Mary Brennan's report to SQA, "Fair Assessment for Deaf Candidates" (Brennan, 2000) argued that deaf candidates who use BSL were at a disadvantage if they had to write their answers in English, as deaf pupils who sign often have limited access to English. She proposed that SQA should set up a system of centrally translated exams in BSL, distributed digitally to centres, and that pupils should be recorded in signing their answers. Brennan's reasons for the proposals were that it would allow the most accurate possible prepared translation of questions, it would give deaf candidates the same question so they would sit the same exam, and that deaf candidates would not be disadvantaged by the variable level of teachers' signing.

The development of a large bank of BSL technical vocabulary for Science, Technology, Engineering and Maths (STEM) subjects with BSL definitions from 2006 allowed the team to consider science exam subjects as an important trial of a new system (Cameron, Quinn, and O'Neill, 2013). In the USA there has been rapid progress over the last decade in presenting deaf candidates with embedded video in online state tests. The National Center on Educational Outcomes (2018) keeps an updated list of all states and the accommodations allowed for use of sign language in state assessments. Today 44 states allow sign interpretation of the test instructions, 42 allow interpretation of the questions, but only four allow interpretation of candidate responses (National Center on Educational Outcomes, 2018). Twenty-three of these 44 states buy in tests from several large companies; ASL is embedded into the test for the questions, but there is no provision for deaf candidates to sign their responses. This may be because most tests are multiple-choice in the USA (Partnership for Assessment for Readiness for College and Careers, 2017).

Only nine of the 44 states mention the range of signing styles which deaf candidates might have, for example Signed Exact English or an individual signing style, and these were

states which did not use ASL video. Only 10 states stipulate that the sign language interpreter should be qualified, though in the 23 states which provide ASL video exams, the human interpreters candidates see on screen will be qualified. Five states mention issues in relation to technical language in their guidelines; the state with the most detailed discussion of this issue is Oregon (Oregon Department of Education, 2018, pp.86-90). In general, the USA has much more developed provision of centrally translated signed exam papers. However, in the UK we wanted to develop a system which could collect longer signed answers, as these are much more common in the UK than multiple-choice tests.

The BSL Glossary development team in Scotland explored ways in which deaf candidates could respond in BSL as well as using embedded video in digital exam papers, ideally under the deaf candidate's control and not dependent on a teacher.

Development work. Three SQA science papers were chosen for translation: Intermediate 1 Biology, Standard Grade Credit Biology and Intermediate 1 Chemistry, all papers taken by pupils aged 16. Using the BSL Glossary, the team identified technical terms where BSL signs were not yet collected or coined. The team held a sign development workshop involving seven deaf science teachers, graduates of STEM subjects from across the UK and sign linguists, all fluent in BSL (Cameron, Quinn, and O'Neill, 2013). The method involved an introduction from the BSL linguist in the team, Gary Quinn; discussion of STEM terms already known to this group and used in science contexts; discussion of possible BSL terms based on the sign concept, iconicity at a metaphoric level, or metonymy (see Cameron et al., 2011 and 2013 for more details). This process yielded 450 additional draft BSL terms which were checked by the group then uploaded to the Glossary website so that deaf pupils would have an opportunity to refer to them before the exam period. Ideally this would have been available throughout their course. Definitions in BSL have since been added.

The research team investigated an electronic version of the examination paper in pdf format, already produced as an access arrangement by SQA for pupils with physical and visual impairments. This adjustment allows candidates to type their answers on the digital paper.   Using this electronic version, the team explored ways of embedding videos of translations of each question in the digital papers. The aim was that students could read the text and watch the BSL video, replaying the question as often as needed. The questions were translated into BSL by the core Glossary team and quality checked for accuracy.

Figure 2 about here

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When a clip is activated for playing by clicking on the BSL image, the video expands with the control bar visible whenever the cursor is moved over the image (Figure 2). Users can move the video image around the page area or scroll the digital paper up and down to ensure they can also read the question. The digital exam papers with embedded video were stored on USB memory sticks for schools to use and evaluate. This style of embedded video question is similar to the system recently developed by large testing organisations in the USA.

The feasibility of candidates recording their answers in BSL without the involvement of a support worker or teacher was also explored.   The equipment used to test this, the Voxur "yellow box", see Figure 3, was employed to collect students' views about the exam papers after trialing them. Pupils watched standard questions in BSL about their experience with the electronic exam paper. The use of this method showed that it could be possible in future to record deaf candidates' BSL responses to exam questions independently, without a teacher or support worker being involved. This approach would also allow the candidates to

independently review their responses and film them again if they were not satisfied, a

provision not available in schools at present.

Figure 3 about here

   Participants. This project used a similar methodology to the Communication Access

Literacy and Learning (CALL) Scotland project (2004) to pilot and implement digital

examination papers. The BSL project involved trialling translated digital exam papers

with deaf students who had taken these same exams a few months earlier. For example, SQA

papers taken in May and June were then used for the pilot project in September, with the

same pupils.

   There were ten deaf pupils from four schools involved in this feasibility study with

comments from 19 teachers of deaf children from across Scotland who saw the practice

exams taking place (11) or who evaluated the materials (eight). These members of staff

had been acting as communicators in the face-to-face BSL science exams.

   Measures and Procedure. The Scottish team took the digital papers to four schools

and pupils chose an exam they had taken recently or the level they were planning to take

next. Pupils were invited to answer the exam questions by watching the BSL videos on the

digital paper on a computer and they typed their answers in English on the digital exam

paper. After the exam, their views were collected using an evaluation questionnaire in BSL

administered through the Voxur system. Teachers were often present for the exam and their

views on the same questions were collected by interviews in spoken English. For centres

which did not participate in the trial, teachers' views came through open-ended questions on

a survey. Pupils completed a paper questionnaire with the researcher to compare the science

paper they sat the summer before with the digital signed paper. This questionnaire asked them to compare their comprehension of the support worker who signed for them in the exam with the digital paper translation. For further details of the study see Cameron et al., (2011) appendices A and C.

Data analysis. Interviews with staff were in spoken English and were transcribed. Responses from teacher questionnaires were word processed and compared with the pupil responses to the questionnaire, which were translated from BSL onto the evaluation form. Pupil responses to the questionnaire about ease of viewing and preparedness for the exam were collated in Excel. Responses were read iteratively by two members of the team to identify themes, cross-checking with each other to establish categories.

Ethical approval. The Moray House School of Education gave ethical approval for this study. Teachers gave written consent to be interviewed, parents of deaf young people of 16 and under gave written consent, and pupils gave written assent (see appendix D, Cameron et al., 2011).

Results

Pupil views on the signed exam papers. Nine of the ten pupils were positive about the signed exams.

> I think it is easy to use and can understand the BSL translation of the questions. I can click the translation again and again. With an interpreter, we may be embarrassed to ask them to repeat the question. I don't like to ask the interpreter. I rather to use this and can click to watch the translation again and again.   (Pupil from resourced school, aged 16.)

> I think the electronic paper is better. If I am not sure what the question means, I can click and watch the signer on the video clip translating the question. I can understand

him and it is easier. If I am not sure, I can click again to watch the signer again. I

think it is the better way.   (Pupil from deaf school, aged 16).

I feel better on my own because it is easier to concentrate. (Pupil from resourced

school, aged 16.)

One pupil preferred his teacher signing because he knew his way of signing; this student had

autism in addition to deafness. Another commented on the importance to him of having a

deaf translator on screen, comparing it to the daily interaction with school staff:

My confidence depends on the signing level of the person who is doing the

translation. Sometimes, they say "what?" when I sign. I find it easier to understand

deaf people. I want someone who can understand sign without saying "what?"

(Pupil from resourced school, aged 16).

Teacher and interpreter views. The people who usually do the translation of the

papers were also enthusiastic about the centrally prepared trial:

I think the new version of the exam is fantastic. Before it was terrible when I had to

sign an exam. I can't sign. It was terrible. It was hard, only one hour before the exam

to practise. It was not enough. I found it really difficult. (School teacher at deaf

school).

"I have noted that sometimes, students look uncomfortable when having someone sitting near

them during the exam waiting to be asked to sign the question." (Schoolteacher from a

resourced school).

One teacher felt that the signed paper might take longer, as she thought pupils would

replay questions more often than they would ask for a repeat in the face-to-face exam.

However, when the 10 deaf candidates sat their mock papers with embedded BSL video

questions, nine finished in the usual time without the 25% extra time usually given for

candidates who need accommodations. This was not a real exam situation, however. In

general the teachers and exam communicators were impressed by the embedded video translations: "The translations are clear and succinct. Quality of translations far superior to any translation produced on the spot having had one hour to look at the whole paper." (Teacher, questionnaire response).

Discussion of Study B

The feasibility study showed that centrally produced BSL exam papers are feasible, and would be welcomed by deaf candidates and the people currently acting as exam communicators. An interesting contrast between the two studies relates to requests for repetition. Deaf pupils were delighted in the trial to have repeats under their control without having to ask the communicator, often their teacher, for repeats. Teachers were relieved too, because there is considerable pressure on them to reproduce a translation exactly when asked for repetitions.

Despite the young people and teachers mostly supporting centrally produced BSL exam papers, evidence from the study supported the view that schools should be able to continue to choose which method candidates prefer. Some pupils wanted a live English speaker (with minimal signs) or the reassurance of a known person translating the exam. The research team suggests that future translation teams should continue to have a mixture of skills: subject knowledge, translation skills from English to BSL and technical skills, a conclusion also reached by a USA team working on accessible assessments (Higgins et al., 2016).

The team recommended that SQA investigate the possibility of a pilot exam, that the Scottish Sensory Centre expand the number of subjects with technical terms on the BSL Glossary site, and that more translated past papers should regularly be available on the SQA website. The new Scottish exams, called National 4 and National 5, were first taken in 2014. The exam board asked the BSL Glossary team to produce some exemplar translated

questions from the new exams for the SQA website to assist centres with translation face to face (SQA, 2015). Centres still have to produce a translation for an exam paper within an hour or two, whereas the centrally produced exemplars took a day to translate.

The feasibility study had several limitations. Firstly, the researchers recognise that the deaf candidates did not have time to start using the new technical signs on the website before the practice exam papers were translated. Ideally teachers would have been using these terms throughout their secondary schooling. Secondly, the research team visiting schools included the deaf translator, which may have influenced pupil views. Lastly, it is a small study looking at a small group of pupils in one country of the UK, so generalisations can't be made to wider groups of deaf young people or their teachers.

Summary and general discussion

Study A shows that the current system for signing deaf candidates is not providing valid BSL examinations equivalent to the English print versions because of the widely variable ways the guidance from the SQA exam board is interpreted by schools. Study B explored the feasibility of producing centrally translated BSL exams on digital papers for signing deaf candidates, and trialled and evaluated them just after they had sat their real science exams. Views from pupils, exam communicators and teachers of deaf children were overwhelmingly positive.

These two small-scale qualitative studies from Scotland have taken place in a different policy context from the US, where ASL is much more accepted in the education system than BSL is in the UK. Numbers requesting BSL papers are currently low in Scotland, for which there could be a number of reasons: perhaps deaf pupils use both speech and BSL and have confident writing skills, so prefer to sit in the exam hall alongside their hearing peers; given the low signing base of teachers of deaf children, perhaps deaf young people are not being offered the accommodation of a signed exam paper. Unlike in the USA,

IEPs in Scotland often do not mention examination accommodations. Despite the BSL (Scotland) Act there is no information on SQA's website in BSL explaining the exam system to deaf young people, so there is no independent way that deaf pupils can find out about this adjustment.

There are many advantages of centrally signed exams for providing valid assessments which are consistent and well translated. On the other hand, some issues remain in terms of the variability and individuality of deaf children's language use; a back-up system of a local interpreter who knows the candidate seems the fairest approach.

National Standardised Assessments in literacy and numeracy were introduced in 2017 in Scotland for all pupils aged 5, 9, 12 and 14 (Scottish National Standardised Assessments, 2017). Teachers of deaf children were consulted on assessment accommodations, which could be an opportunity to pilot centrally produced BSL tests, especially in numeracy. So far no special accommodations have been made for deaf candidates; normal classroom support arrangements apply for these online tests. That is, the recent tradition of BSL papers in Scottish public examinations has not been applied to the new national assessment system.

The comparison with the USA has been helpful in our review of the literature and policy. In the USA, 44 states have signed tests and SATs with ASL embedded and under the candidate's control (National Center on Educational Outcomes, 2018). In the UK, in contrast, BSL is available only under limited circumstances in England. In Scotland there are rights to request BSL translations, but a number of barriers to its implementation, both from teachers of deaf children and schools. Centrally produced exams would also need to be recorded in the UK, as multiple-choice tests are rare and long answers are expected for some questions. Our studies suggest that recording answers in BSL could be under the control of deaf candidates, rather than administered by specialist teachers.

Testing and accountability regimes are a political process as much as an educational one, which exist to push up attainment, increase national productivity and to prepare school young people for different parts of the workforce (Sjøberg, 2015). Test accommodations support the right of deaf young people who use a sign language to enter further education and training on their own terms, using their preferred language. In the UK, the existence of six separate exam boards and largely mainstreamed deaf children who are not given opportunities to see or use fluent BSL mitigates against the central provision of exams in BSL. In the USA, on the other hand, the large assessment companies and use of multiple-choice assessments make embedded ASL video more feasible.

Implications

The developments in Scotland, though small scale, raise issues which other countries may want to consider, particularly countries with strong sign bilingual education traditions, such as Brazil, Spain, Germany, France and Austria:

- Establishing a deaf-led glossary of curriculum terms in the signed language;

- Centrally translating exams with embedded video;

- Enabling deaf learners to sign their responses; and

- Setting up a system, as the SQA has, to translate and monitor the quality of these translations before the responses are marked.

Future research

The BSL Glossary project has contact with similar groups in Brazil (Almeida, Schiaffino & Rumjanek, 2014), Ireland (Mathews & Mahon, 2018), Austria (Marsh & Moser, 2016) and the USA (DeafTEC, 2018). Building the technical capacity for signed languages can be seen as a necessary precursor of the provision of signed centrally produced assessments. However, this position is not supported by all deaf communities. Throughout the 20th century non-signing hearing teachers imposed standardisation of devised vocabulary

and grammar (Reagan, 2014). The network of Glossaries we are part of is led by deaf sign linguists and scientists who highlight the importance of technical terminology in classrooms and assessments to boost deaf children's academic achievement. Future research into how these new technical signs are accepted by deaf people and used in education could run alongside more detailed studies of their use in examination and test situations.
Research questions could include:

- How do deaf students and fluent deaf adults perceive and understand the newly collected and coined technical signs? This is a precursor to using them for official functions such as in examinations.

- What are the viewpoints of deaf candidates, teachers of deaf children and stakeholders implementing policy about pilots of embedded video National 5 exams and National Assessments in Scotland?

- What are the effects of different approaches in BSL assessments, for example the use of fingerspelling, technical terms and central or local translations? (e.g. Cawthon et al., 2009).

- What impact do language policies at a family, school and country level have? Does legislation supporting sign language influence participants' attitudes?

Conclusion

This article has reported on two small, qualitative studies from Scotland. The comparison with signed exams in the USA has led to a discussion of language policies, both stated and unwritten, and how attitudes towards minority languages such as BSL and ASL can affect deaf young people's opportunities to achieve in the education system. Although currently provision for using sign language in school examinations is limited to a few countries such as the USA and Scotland, there are many other countries where sign

bilingual approaches and effective use of technology are rapidly advancing, so the studies

reported here may prove useful beyond Scotland.

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[1] For international readers Level 3 in a modern language in England is equivalent to Interagency Languages Roundtable Scale (ILR) 1+, often used in the USA; to Common European Framework of Reference for Languages (CEFR) B1; and in the Scottish Credit and Qualifications Framework (SCQF) to level 6.

[2] British Sign Language Glossary of Curriculum terms: http://edin.ac/2Qiyn5a
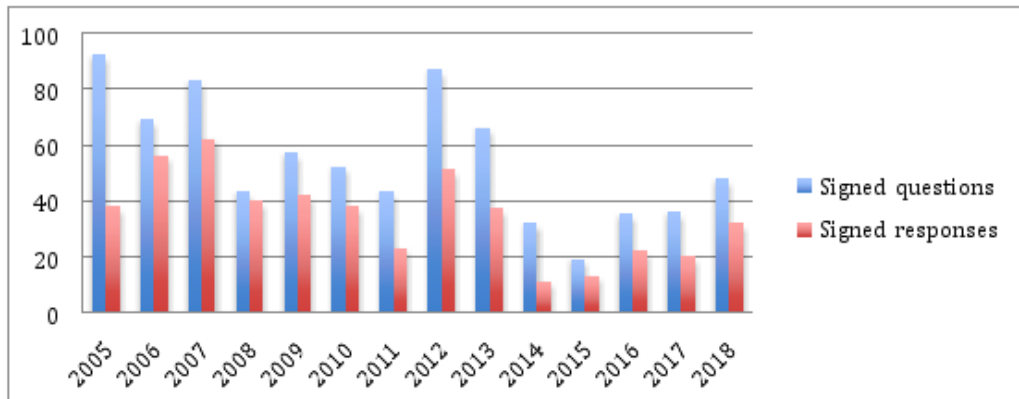
Figure 1 Number of requests for exam questions and responses to be in BSL, Scotland 2005-18

Source SQA (2018): These statistics are administrative rather than official SQA statistics.
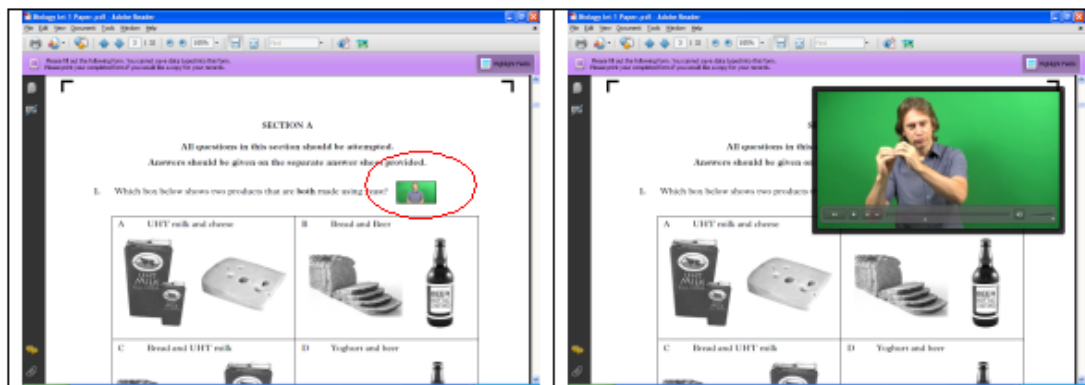

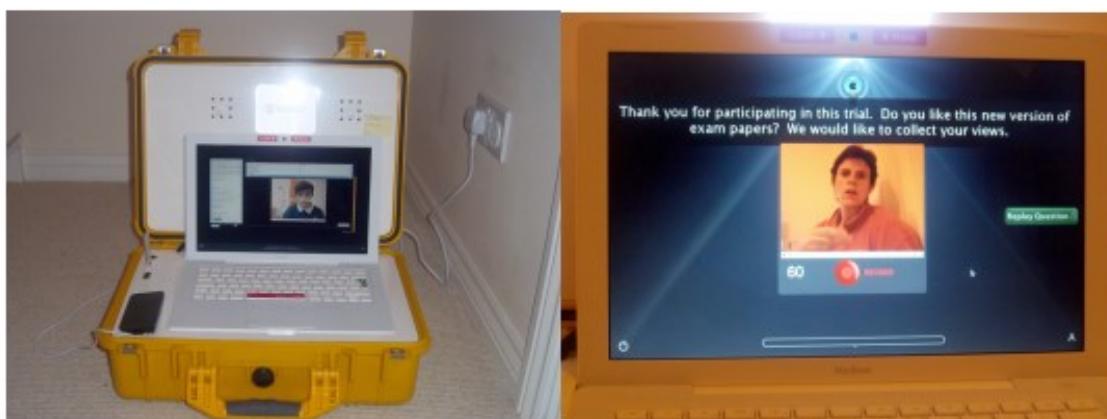Figure 2 Video clip on electronic exam paper initially minimised, then expanded

Figure 3 Equipment used for gathering pupils' views in BSL