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Exploring positional and dimensional aspects of topographic space for advanced-level British Sign Language learners

Nicola Nunn

University of Central Lancashire

This study investigates how British Sign Language (BSL) learners develop positional and dimensional aspects of topographic space. The teaching of BSL has been occurring at an increasing rate, and many people are learning to use BSL to the advanced levels, which are generally referred to in the UK as BSL Levels 4 and 6 and are loosely equivalent to pre-C1 (advanced) and C1 (proficient), respectively, on the Common European Framework for Reference (Languages) scale. Spatial grammar is a crucial aspect of BSL (Brennan 1992), and this article provides insight into issues related to learning how to use topographic space, a feature of spatial grammar whereby real-world referent locations are replicated in the signing production. This study of L2 advanced learners of BSL explores the numbers and types of errors that are made when applying topographic features into their signing, with a particular focus on positioning and dimensionality aspects. Two scenarios are used to do this: classroom layouts (Task 1) and a courtroom layout (Task 2). The study concludes with reflections on how BSL teachers can support L2 learners in improving their development of topographic skills.

Keywords: British Sign Language, L2 acquisition; dimensionality, positionality, topographic space, role-shift, mentally-rotated space

1. Background

The placement and movement of signs in the signing space around the body has been established as the central aspect of spatial grammar since the beginnings of linguistic research into sign languages, which began with Stokoe's (1960) analysis of American Sign Language, and was extended by Stokoe, Casterline and Croneberg in 1965. According to Emmorey, Corina & Bellugi (1995), the signing

space around the body can function topographically to express the location of people and objects in a manner that reflects their positioning in real life space. Spatial relationships in the real world are represented in the signing space by recreating the real-world positioning of referents. As a crucial aspect of the grammar of British Sign Language (BSL), learners are taught how to localise entities, rotate space, and articulate constructed action for beginner level upwards, though the activities are simpler and the expectations of accuracy are much less at the earlier levels. A sign language teacher must, then, teach learners how to consider the positioning and layout of referents in the real world before articulating them in the signing space. A learner has the option to reproduce them from their own perspective, i.e., observer viewpoint, or from a relevant referent's perspective, i.e., character viewpoint. According to Perniss (2012:414), this involves "iconic properties of the visual-spatial modality, as the spatial relationships between locations in sign space match those between the referents in the real or imagined event space being described".

The signer achieves this change in perspective by mentally rotating the signing space. Mentally rotated space is a grammatical feature during which, according to Frederiksen & Mayberry (2019:258), "the signer maps a third person referent onto the body and portrays the verb from that referent's point of view, without any spatial indication of which referent they are acting as". The real-world use of landscape is an important aspect of human geography, and this is reflected in this spatial grammar of many sign languages (So, Coppola, Licciardello & Goldin-Meadow 2005). In a study of the landscape within an anthropological context, Llobera (1996:613) notes that "space is a medium in which human beings play out their activities". Llobera stresses the importance of the individual's *perspective* in relation to real world spaces, an issue that needs to be considered in order for the sign language teacher to show the learners how to place entities in the signing space and how to make effective use of topographic space. The main linguistic elements that can be used to place entities in the signing space are indexes (pointing to referents' locations), nouns marked for location, and classifier predicates (where the placement involves a classifier handshape).

The aim of this study is to explore the use of positional and dimensional aspects of topographic space, with the objective of identifying the number and types of errors made by BSL learners, using predominantly quantitative research methods. There is very little pedagogic research in relation to the learning of sign languages (Quinto-Pozos 2011), though it has been recently found that sign language learners have difficulties in planning out a scene (Ferrara & Nilsson 2017; Boers-Visker 2020). As Allbutt & Ling (2016) note, learning a sign language as a second language (L2) is no easy task for the adult learner, who is often used to communicating through a first language (L1) that is articulated through speech and hearing. The adult learner is now learning a language based in the 'visual-gestural modality' (Fenlon, Cormier & Brentari 2018), and is therefore acquiring a new language modality, referred to from here on as M2 (second modality). For the advanced level BSL learner, there is a need for the

specific placement of signs in the signing space around the body to indicate the layout of the scenario in a very precise manner.

Alongside the use of topographic space, signers often use role-shifting, an aspect of BSL grammar that learner's often struggle with, and are often concerned about attempting to master. Role-shifting involves placing referents in the signing space and referring back to them by using role-shift to express dialogue between the referents. The difficulty that some BSL learners experience may be due to the different L2 modality. Frederiksen & Mayberry's (2019) study of reference tracking found that "L2 learners face the challenges of switching modalities on top of the 'usual' challenges that comes with learning to use a second language" (2019: 273), and the authors conclude that although the different-modality L2 learners appear to struggle with some of the same issues as same-modality L2 learners, they face additional challenges in acquiring reference tracking in a new modality. The method of teaching topographic space as part of this study, with role-shifting being taught alongside, is an attempt to make the learning of role-shift, a specific feature of the L2 modality, less worrying for the BSL learners with its association with topographic space. This is an important consideration for the teacher, given that, as Rosen (2010:351) informs us, learning and language acquisition are "governed by psychological processes". Mastering the correct use of positioning and dimensionality through topographic space can help the BSL learner to use roleshifting correctly, as the clear layout and positioning of people in the signing space paves the way for the learner to role shift to and from those locations.

This is particularly important in order to comply with the linguistic expectations of the nationally recognised awarding body for sign language qualifications, Signature, which forms the benchmark for the BSL learning in higher education institutions in the UK. Signature's qualification specification at the advanced level (Level 4) states that the learner must accurately: "Use syntactic, topographic and hierarchical space" (Signature 2022a: 5, Level 4, LO2 assessment criteria). This requirement is further detailed in the specification for the learner at proficient level (Level 6), where the requirements are for the learner to accurately use "Syntactic space, including 3–5 referents [...] Topographic space, including 3–5 placements [...] and a Spatial hierarchy, including 3 tiers" (Signature 2022b: 23, Level 6, grammatical features criteria). The teaching of topographic space is therefore an important aspect of the learning process for achieving the required language learning standards and for replicating real world settings (Sutton-Spence and Woll 1999). In the following section, Section 2, I present the research method used for this study of BSL learning, including the classroom task and the courtroom task. The results of these tasks are presented in Section 3 and discussed in Section 4. The conclusions of the study are then conveyed in Section 5.

2. Research method

2.1 Procedure

In order to explore the challenges faced by BSL learners when learning how to use topographic space, this study is based on analyses of video recordings of BSL teaching, and examines the placing of referents in specific positions and at specific dimensions within the signing space around the body in two scenarios: a classroom layout for Task 1 (see Figure 1) and a picture of a courtroom for Task 2 (see Figure 2).

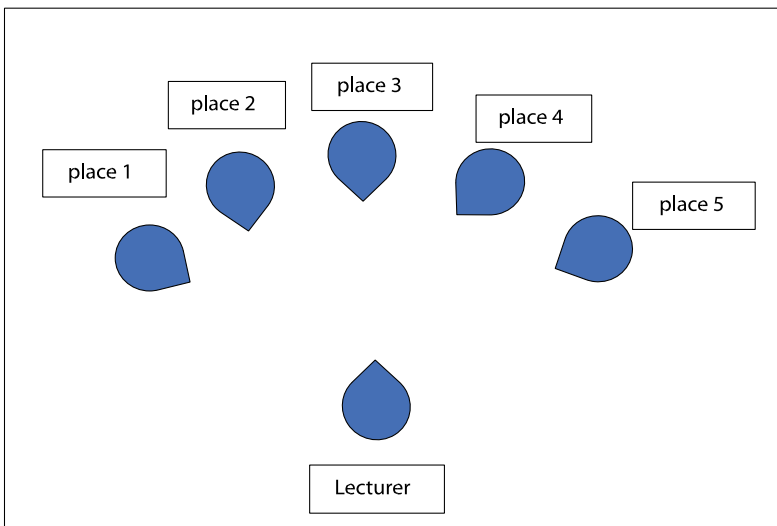


Figure 1. Example of classroom layout for Task 1

Beginning with the classroom scenario invoked a situation that is well-known to the students; we then moved on to the courtroom scenario, which entailed a more abstract or novel situation. The positioning of the classroom and courtroom occupants (referred to as ‘positionality’ for the purposes of this study) is discussed in relation to mentally rotating the signing space, and the dimensions of the courtroom floor levels (referred to as ‘dimensionality’) are discussed in relation to roleshifting, often referred to in the literature as ‘constructed action’ or ‘constructed dialogue’ (Cormier, Smith & Zwets 2013).



Figure 2. Example of courtroom layout for Task 2

The first scenario was chosen for its natural positioning of the occupants, and the latter was chosen for its specificity in locating of its occupants at particular floor levels. The approach is partly quantitative, in order to identify the number and types of errors made, and partly qualitative, to explore the learners' experiences of being taught how to use topographic space correctly. The researcher of this study is also the teacher of the teaching sessions, and this auto-ethnographic approach is discussed further in Section 2.2. The recordings of BSL teaching used as data collection took place in a classroom (see Stage 1 below) and in a language lab (for Stages 2–4) at an institute of higher education in the UK. The recordings are of three BSL teaching sessions comprising three sets of different students who were taught on different days during the same week, resulting in 12 participants for this study.

- Group A – level BSL400: **3 participants** and 2 other students who were in the classroom but did not wish to take part in the study.
- Group B – level BSL350: **6 participants** and 1 other student who was in the classroom but did not wish to take part in the study.
- Group C – level BSL350: **3 participants** and 6 other students who were in the classroom but did not wish to take part in the study.

In line with the Common European Framework of Reference for Languages (2022), BSL400 (Group A) is at proficient C1 level, and BSL350 (Group B and Group C) is a pre-C1 advanced level module.

The research activities comprised the following stages, which will be described in detail in Sections 2.1.1–2.1.4:

- **Stage 1 – the initial group teaching sessions and discussion**
A half hour lecture per group on the use of topographic space in a courtroom setting and strategies that learners might employ in order to develop this aspect of sign language learning.
- **Stage 2 – the classroom task**
The participants signed the positioning of all of the people in the classroom (including themselves). They were invited to sign from their own perspective and from the perspective of anyone else in the room.
- **Stage 3 – the courtroom task**
The participants reproduced the signing of a courtroom layout and its occupants, as shown during the initial teaching session (Stage 1).
- **Stage 4 – self-evaluations of the courtroom task**
The participants recorded individual signed (in BSL) evaluations of their reproducing of the classroom task and/or the courtroom layout task.

2.1.1 *Stage 1 – The initial teaching session*

The initial teaching sessions were group sessions, comprising of a demonstration and discussion of how to use topographic space according to various character perspectives. Each session was recorded onto a Logitech web camera, an effective method for recording sign language data (Savas 2012), and the camera was focused on the teacher only. In order to provide the learners with sufficient background information as to the nature of a legal event held in a courtroom, due to the lack of familiarity with this setting, this also included a short lecture about the court system in England, informing the learners of three different courts: magistrates court, crown court and the supreme court, and explaining that the courtroom could be viewed from the perspective of the onlooker – looking forward into the courtroom from an observer viewpoint, or as an occupant in the courtroom – viewing the room from a character viewpoint. This was an important element of the research activity, as the clearer a visual picture of a setting a learner has in their mind, the more they are able to replicate the setting in the visual language mode. This is difficult at advanced level, bearing in mind the findings of Allbutt & Ling’s (2016:352) study of BSL learners, which found that even at intermediate Level, difficulty occurs because students need to “engage more fully with the complexity of the sign language, such as learning aspects of its unique and “alien” visuospatial grammar”.

The teaching session on how to use topographic space was taught predominantly through what is referred to in this study as a ‘visuo-lingual’ method of teaching, a visual representation of the audio-lingual method that Mukalel (2005) notes is well established in foreign language teaching. A visuo-lingual approach involves providing visual stimuli that encourage learners to activate cognitive processes that involve visual and spatial awareness, and language is expressed through movements of the hands and facial expressions. This complies with the grammatical features of sign languages and particularly the ‘visual-

gestural modality' that is often referred to in the sign language field (Özyürek & Woll 2019). Dye & Thompson (2020) note that this is very different to the audio-lingual method, which relates to oral processes of expressing language through the tongue and other parts of the mouth.

The teaching session also made use of some elements of the drill method, which involves the students continually repeating certain sentences until mastered, and is effective in the sign language classroom (Wilcox & Wilcox 1998). Rosen's (2019) study noted that this historical concept of development of 'drills' is a useful method for active learners and is based on a behaviourist perspective. Rosen notes that behaviourists such as Watson and Skinner proposed that individuals do not act freely but in response to stimuli in a programmed way. They suggested that languages are best learned through modelling, drills and rote memorisation" (p.220). There are numerous studies that discuss the contradiction in teaching methods between more traditional (behaviourist) and more modern (communicative) approaches (such as Alderson, Clapham & Steel 1997; Norris & Ortega 2001; Ellis 2002). Langacker's (1987) constructive approach to grammar is well supported (see Sauvignon 1997; Pica, Young & Dougherty 1987; Harley 1989; Day & Shapson 1991; Lyster 1994; Muranoi 2001). Rosen (2019:221) also notes that empirical studies of L2 and L_n (additional languages) showed that "grammar instruction improves learners' meta linguistic knowledge of the structure and rules of L2/ L_n languages but not their actual use of the languages" and continues by explaining that "those who learn an L2/ L_n by negotiating meanings of utterances during conversation fare better than those who focus on language generation drills", and this also needs to be taken into account by any teacher so that drilling is minimised to practice only and is accompanied by a communicative teaching approach. The emphasis during this part of the lesson was placed on learning the patterns of the language by means of controlled practice in the classroom and the visuo-lingual methods ensures that learners have visual access to the patterns though sign language instruction. There are a range of teaching strategies that can be employed whilst utilising the visuolingual method, and this lesson made use of five main strategies to teach how to use topographic space in BSL. Firstly, the teacher gave a demonstration of how to locate the courtroom occupants, with the aid of a series of pictures of the courtroom via a YouTube clip. At this point, the students were also taught that they could place each occupant in the signing space by producing a name sign and then index pointing to a relevant location in the signing space, or by using a suitable classifier predicate in the actual location of the occupant; the height of the indexes and classifiers in the signing space would indicate the location that the occupant is taking and also the dimensionality (floor level) of the occupant's place, and the use of their palm orientation in the case of classifiers would indicate the direction in which the occupant is facing. The BSL learners were then able to have a group discussion, helping them to understand the linguistic processes involved. The second strategy involved the teacher demonstrating how to avoid mirror-imaging of the signers they had watched, as mirror imaging of signing leads to the incorrect

hand being used as the dominant hand, and learners need to master how to use the opposite hands and not mirror what they see. In the recorded teaching session, the teacher turns her whole body so that her back is to the learners so that they can see which hand is moving and in which direction it moves. Thirdly, a whiteboard was used to illustrate where each of the occupants in this given courtroom picture should be positioned (see Figures 6–9 in Section 2.1.3.1 below). This helps some students who may find it difficult to imagine being within the space and gives them a graphic representation of the 4 main occupants' viewpoints: the judge, the jury, the usher, and the accused. The fourth strategy involved allowing some students who were struggling with the previous strategies to copy the drawings from the board so that they have their own drawings of each occupant's perspective. This enables them to hold the drawing and turn it as required whilst reproducing the information in BSL. An additional strategy that was used for clarification and is a particularly effective strategy for BSL teaching in general, is role-play, in this case setting up the classroom to role-play the courtroom scenario in the picture. With everyone in place in line with the occupants in the picture, the group role-played through each of the character viewpoints to get a feel for how they would later sign each viewpoints in BSL in the lab, making use of a cognitive approach to learning at this point. Rosen (2019:222) describes this as a “mental conceptualisation of objects and their movements across time and space, and an interpretation of meaning of real entities, actions, locations and attributes” and where teachers “modify arrangements of pictures and images for learners to practise lexicon and grammar”.

2.1.2 Stage 2 – *The classroom task (Task 1)*

After the initial teaching sessions, all 12 learners carried out a classroom task related to the seating of their groups, with a view to moving to a more complex (courtroom) scenario if this was successful. The participants of the three groups completed a spatial (positioning) recall task. This involved going into a language lab and recalling the seating positions of the teacher and the learners in the initial teaching session completed earlier. The task began with the learner recalling the seating positions from their own seated perspective by pointing to the mentally reproduced locations and producing the sign names of the people who had been sitting in each position in the classroom. From their own perspective, each learner signed the positions of all of the people in the classroom, beginning with themselves. Learners were then told that they could also attempt to recall the seating positions from the perspective of the teacher or other learners if they were interested so this part of the task was optional. Signing from the vantage point of another person requires the mental rotation but the task to sign from the perspective of someone else was optional so that learners did not feel under any pressure. Only three learners chose not to sign from the perspective of others.

The aim of this task was to explore whether this type of task would be successful before adding the complexity of the raised floor levels in the

subsequent courtroom task, leading to extra dimensions required in the BSL production. The classroom environment was selected so that the initial task would require the learners to focus on the positioning and sign names only, as all places were on the same floor level in the room so there was no dimensionality aspect. This would encourage the learners also to consider how a native BSL signer might indicate the positioning of the people in the room (via reference pointing) and their identification (via the sign names). Learning to use a visual modality also involves understanding and replicating the culture where possible. This cultural consideration is in line with the notion of “language assimilation” (Marsaja 2008:125), achieved through regular language practice. This is typical for the L2/*L_n* or L2-M2, known as ‘non-native signers’, who are learning BSL as part of their degree or other course and as a second or subsequent language. Also known as “cultural interlopers” (Napier & Leeson 2016:96), the learner’s eyes are extracting visually. This is likely to require high concentration, as their eyes attention span is watching not only their teacher’s face, but also their facial expressions, hands and other features and movements in silence, using 3-D visual space, which is vastly different from their customary audio environment. Traxler & Natsukasa (2020:211) suggest that emphasis is more intense and “cognitively taxing and tough on learner’s eyes”. However, encouraging learners to use more of the ‘eyes’ than the ears is part of the essential cross-cultural education related to signed forms of communication. Another crucial difference in this task was that the learners were active in a real environment, rather than reproducing an imagined scenario, as they would have to do in the subsequent courtroom task. The participants were placed as shown in Figures 3 to 5 below, with an upper case ‘L’ and number, indicating the learner’s position:

2.1.3 Stage 3 – The courtroom task (Task 2)

The third stage was also carried out in a language lab, where recordings were made by the 12 BSL learners individually in separate recording booths. Before

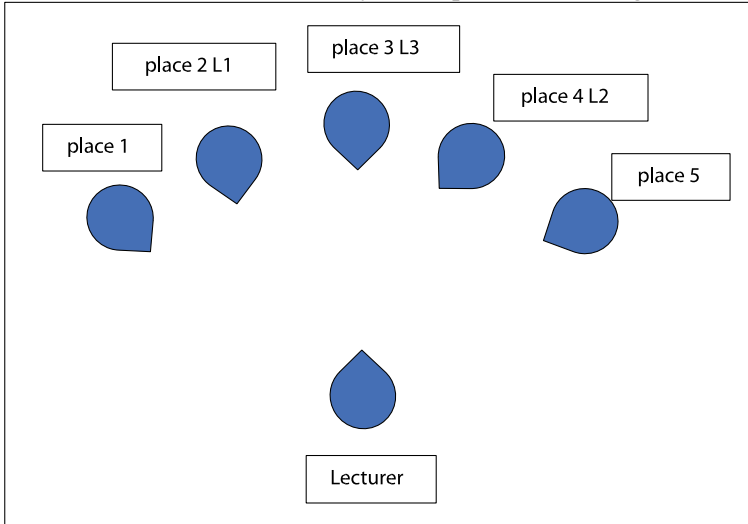


Figure3. Classroom task Group A

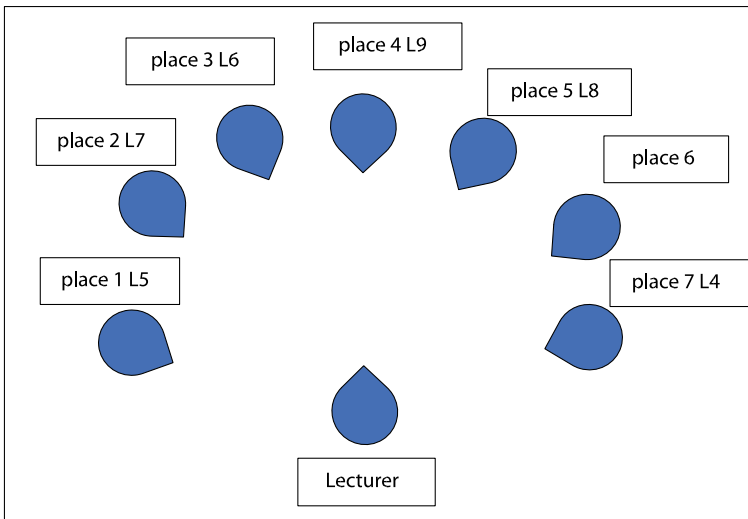


Figure4. Classroom task Group B

beginning this task, the learners were asked to think about the signs that would be used to refer to the people occupying the courtroom. This evoked discussion about the judge and the serious manner in which the judge might sit, with arms folded across the bench; the clerk, who would be busily typing the proceedings and perhaps placed over in the right-hand corner of the room; the prosecutor,

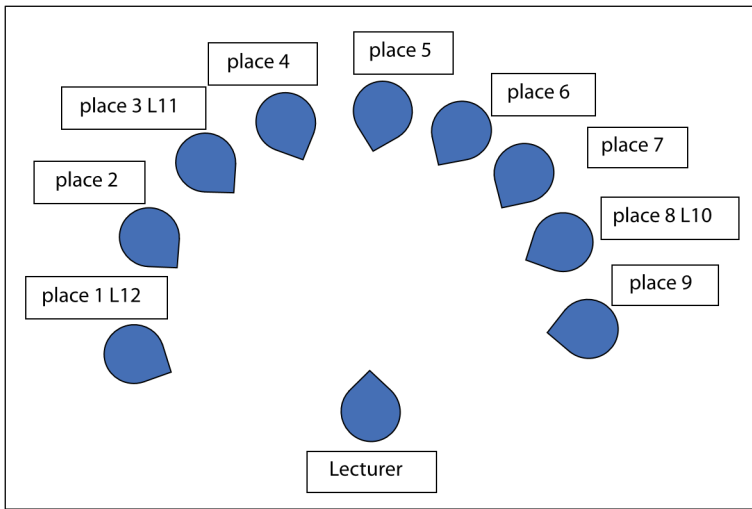


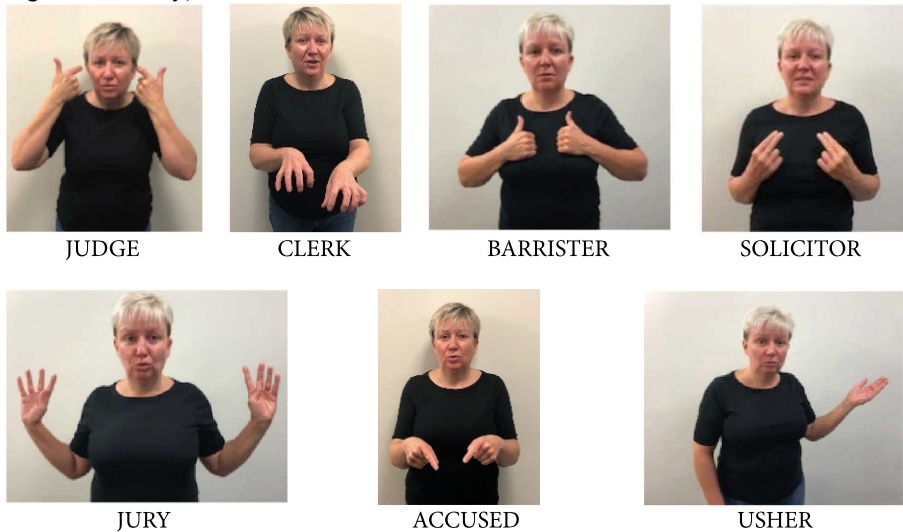
Figure 5. Classroom task Group C

who is often depicted as clutching their robes and also appearing very serious using as the character perspective. Depicting the attitude, as well as the physical appearance, of the members of the courtroom and the accused was considered in depth and gave the students a good level of insight into the world of the courtroom as observer perspective and the arrangement of its participants. The following table shows the signs that were taught to the students prior to the task, which students could place into the space.

During this stage, each student produced one recording of attempting to use topographic space to describe the layout of the courtroom that had been presented in the courtroom picture during the initial teaching session (see Stage 1 above). The students produced a short clip each, signing the layout of the courtroom from 4 different perspectives: the judge, the accused, the jury then the usher. The learners were informed that they could take a picture of the courtroom or their own drawing or notes, into the lab; some chose to remember the scene. This was a more complex task than the previous classroom task, as the learners needed to consider the positioning of the occupants (in relation to each of the four perspectives), and the dimensionality of the occupants (the level of the occupants in the signing space due to the tiered flooring in the courtroom), as detailed below:

2.1.3.1 Positioning

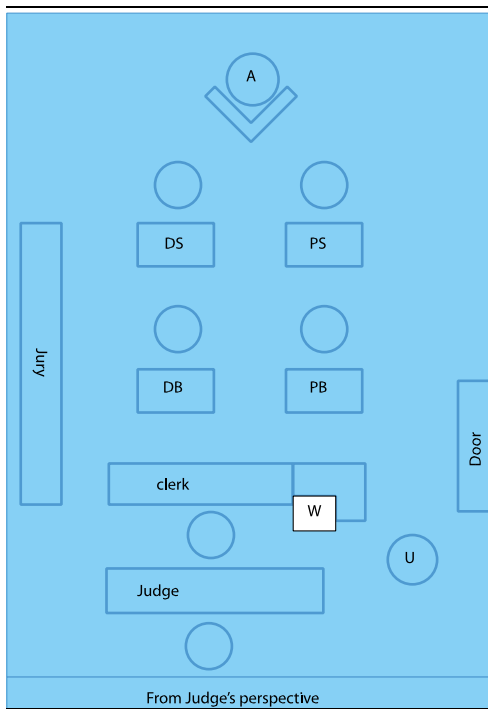
The number of people expected in each of the different courts, and the placing of the jury in the higher-level courts, formed an interesting discussion for the learners during the teaching session (Stage 1), and they considered how they may use the signing space in a topographic way to portray the setting and its particulars

Table 1. Expected formation of signs (handshapes adapted from Brien's (1992) BSL/English dictionary)

as visually as possible, following the given scenario (see Figure 2 in Section 2.1). In order to study the accuracy with which advanced level learners of BSL are able to use topographic space, the 12 students were shown the following picture of a courtroom setting and asked to describe the scenario from four different perspectives: the judge, the accused, the jury and the usher (described in Figures 6 to 9), after which they signed a short sequence of role-shift between any two of the courtroom occupants, and recorded a brief discussion of any difficulties that they experienced in articulating this type of event.

In order to visually describe the layout of the courtroom and its occupants, it was important for the BSL learners to consider the order in which they would present the referents. The teacher taught this in the order beginning with the placing of the judge, in their position at the head of the room and in the centre, and then to proceed forwards. Following this order would require the signer to next use a 'referencing point' (the index finger of the dominant hand extended in a pointing gesture) to place the clerk immediately in front of the judge and slightly lower down. Following the teacher's instructions, the signer should next refer to the right-hand side of the signing space, placing the prosecution barrister and then moving the index point to the left-hand side in order to place the defence barrister alongside. However, it would also be reasonable for the learner to start with positioning the occupants on the left-hand side first, and them moving to the right, or use both hands to position the right and left side occupants simultaneously. Whichever beginning position is chosen, this would then lead to the signer repeating this placing of referents further back in the signing space for the subsequent two occupants, the prosecution solicitor and the defence solicitor, again indicating the slightly lower level of the four court occupants. The final referencing point, in the case of the scenario in the picture above, would involve

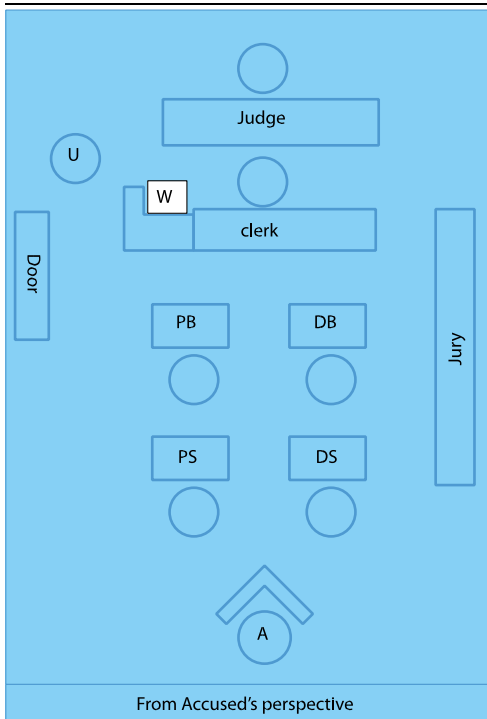
the signer pointing to the near right-hand side of the signing space in order to place the usher to the judge's right. If the accused and the jury were present, or the signer wanted to indicate where they would be seated, extra reference points to the far middle for the placement of the accused, and the mid left for the placing of the jury. The students were taught how to use 'mentally rotated space' (Janzen 2004) in order to change the perspective to that of any of the occupants in the room. The witness box (labelled with a white box in each diagram) was excluded due to its positioning being too complex for this study to explore. The correct positioning of the courtroom occupants is illustrated in the following four diagrams, and is referred to as 'positionality' in the remainder of the article.



From the judge's perspective:

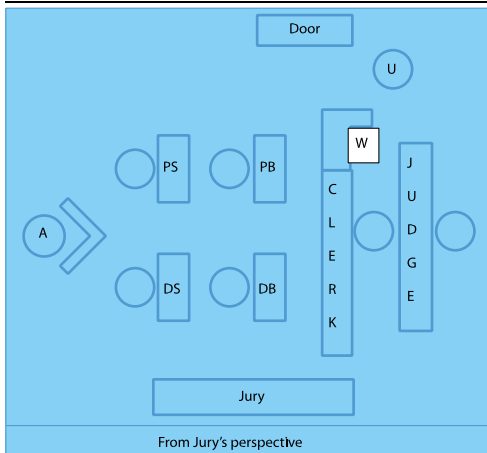
- The judge is looking slightly downwards on the other occupants of the room, due to the higher level of his chair and desk. In front of him, the clerk has a slightly lower positioning but is still slightly elevated in comparison to the other occupants (excepting the judge).
- The defence occupants are always to the left-hand side and the prosecution occupants are always to the right-hand side.
- The accused is far across the vertical level of the room and central.
- The usher is slightly in front and to the right.
- The jury extends along the far left-hand side of the room.

Figure 6. Expected layout: Judge's perspective



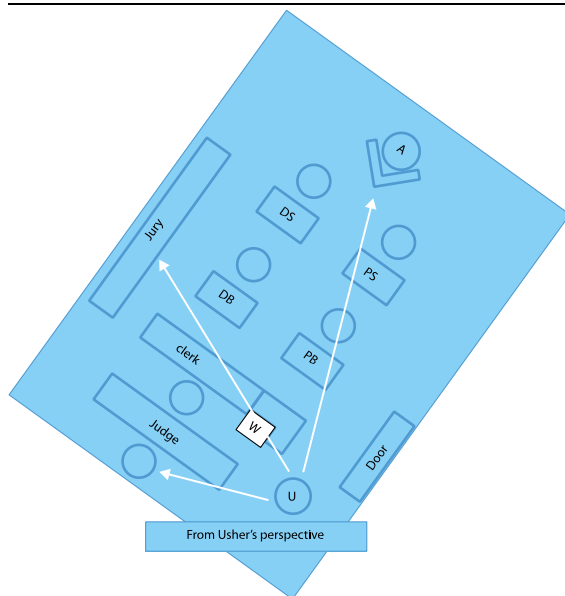
- From the accused's perspective:
- The accused is looking slightly upwards in relation to the clerk and the judge straight ahead, due to their higher level.
 - The defence occupants are always to the right-hand side and the prosecution occupants are always to the left-hand side.
 - The judge is far across the vertical level of the room and central.
 - The usher is far across the vertical level of the room and to the left.
 - The jury extends along the far right-hand side of the room.

Figure 7. Expected layout: Accused's perspective



- From the jury's perspective:
- The jury is looking slightly upwards in relation to the clerk and the judge on their right, due to their higher level.
 - The defence occupants are always to the near side and the prosecution occupants are always to the far side.
 - The judge is to the right.
 - The usher is further right than the judge.
 - The accused is to the left.

Figure 8. Expected layout: Jury's perspective



From the usher's perspective:

- The usher is looking slightly upwards in relation to the clerk and upwards and back to the judge on their left.
- The defence occupants are always to the far left-hand side and the prosecution occupants are always to the near left side.
- The judge is to the left and slightly upwards.
- The jury extends along the far left-hand side of the room.
- The accused is far across the room and slightly to the right.

Figure 9. Expected layout: Usher's perspective

2.1.3.2 Dimensionality

As well as placing the referents in the correct locations according to the principles of topographic space, the BSL learner also needs to take into account the level of dimensionality required, in this case – three-dimensional placing of referents. During earlier levels of learning (i.e., BSL Levels 1 and 2), students will often make use of the signing space in a two-dimensional manner, placing referents at various points in the signing space but always on the same level of horizontal plane either length or width-wise. At this advanced level, learners must master the ability to use various levels and role-shift between people at the various levels. Role-shifting, and shifting of character viewpoint, are specific features of sign languages, described clearly in relation to American Sign Language (ASL) by Goldberg (2015:11):

In ASL, role shifting is a part of the sign space and is when a signer shifts his/her body in order to further set up spatial information...Role shifting can be used as a means to compare and contrast or set up dialogue when sharing an anecdote, among many other things. Another aspect of ASL that falls under the category of visual-spatial processing and is unique to the language is the signer's perspective.

When using ASL, the individual perceiving a message must adopt the perspective of the individual who is signing. For example, if a signer were to

tell someone that the closest bathroom is down the hall and to the left, the individual watching the signs must envision himself from the signer's point of reference.

The purpose of the courtroom exercise was to encourage learners to use the third dimension of the signing space – the depth. This dimension is illustrated in the courtroom scenario by the arrows in Figure 10.



Figure 10. Dimensions of courtroom levels

2.1.4 Stage 4 – Self-evaluations of the courtroom task

The final stage of the research activities involved the learners' recording a signed self-evaluation, also conducted by each individual student, explaining how they felt about learning how to use topographic space. The learners were asked to produce the recordings of their evaluations in BSL and they were allowed to watch their own video (their sign production of Tasks 1 and 2) whilst they recorded comments on their own production. Whilst evaluating their performance in their second language might have caused some of the learners to avoid mentioning anything for which they lacked the required language level, therefore influencing the findings, the learners are accustomed to doing this, as it forms part of the learning activities from beginner level upwards.

2.2 Participants: Sampling and consent

This study is based on analysis of recordings of 12 sign language learners' attempts at using topographic space effectively (see Table 2). The recordings of BSL learning were identified from three lessons from two undergraduate modules as described in the previous section. Students on both modules were in their third year of an undergraduate programme and the scheduled learning activity for the module included 3 hours per week taught class contact. BSL 350 aims to develop students' competence in complex and in-depth signed interactions, to the extent that they can communicate successfully in most native-level BSL-using work and social environments. It also aims to enable students to comprehend native-level BSL fully, and to produce their own BSL fluently and accurately in complex

interactions involving the exchange of diverse ideas and opinions. The BSL 400 module aims to fully develop students' BSL proficiency, with particular emphasis on enhancing their ability to participate fully in high-level signed discussions, to deliver formal, prepared, signed reports, and to contribute effectively to group and one-to-one signed interactions with native sign language users.

Table 2. Sample stratification: Undergraduate study participants

Module code	Learner number	Age range	Gender	Deaf/hearing/hardof-hearing	Hearing status mother/father/sister
BSL 400	L1	18–30	F	D	H/H
BSL 400	L2	18–30	F	H	D/D
BSL 400	L3	18–30	F	H	H/H
BSL 350 A	L4	18–30	F	HOH	H/H/D
BSL 350 A	L5	18–30	F	H	H/H
BSL 350 A	L6	18–30	F	H	H/H
BSL 350 A	L7	18–30	F	H	H/H
BSL 350 A	L8	18–30	F	H	H/H
BSL 350 A	L9	30–40	F	H	H/H
BSL 350 B	L10	18–30	F	H	H/H
BSL 350 B	L11	18–30	F	H	H/H
BSL 350 B	L12	18–30	F	HOH	H/H

This research makes use of convenience sampling, as the researcher is also the lecturer for both modules. The purpose of this is to reflect on my own practices as lecturer and a native sign language user teaching BSL to L2 students. This provides a forum for studying the practical teaching and also for gaining insight by analysing my teaching skills in a reflexive manner. Reflexive practice can move a teacher through experience to improvement for further development and “can develop strategies for intervention or change” (Richards & Lockhart 1996: 6). I have always had an interest in enhancing student motivation and the pedagogic issues associated with the learning of advanced level features of BSL. To reflect on this enables me to value reflexivity as a learning professional and to note with reflective thoughts on my actions. This auto-ethnographic approach allows me to also reflect on my skills and positively change my teaching for the better, as Richard & Nunan (1989) advise. Brookfield (2017: 19) suggests that the journey of teaching is through a process of critical reflection:

[...] a process of intentional and continual scrutiny of the assumptions that inform your teaching practice. These assumptions are scrutinized by viewing them through the four lenses available to any teacher: students' eyes, colleagues' perceptions, personal experience, and theory.

This convenience sampling is also justified by the impact that it has on the participants' continuing language development, and the lecturer's own commitment to continual reflection and development in teaching this complex grammatical feature in depth for the benefit of current and future BSL teachers. The students received feedback as a natural aspect of the course and will also receive a copy of any publications that result from this study. As the data were previously recorded and the students had graduated before the research commenced, an email was sent to the relevant students seeking permission after graduation to use the prerecordings made during the module for research purposes. Waiting until the students had completed the course before deciding to analyse the recordings ensured that the research could not have any kind of influence on the students' learning, hence the risk of influence or coercion was reduced. As the module marking and moderation had already been completed, it could also have no influence on their continued progression through the course. An information sheet was attached to the email to provide the BSL learners with a clear picture of the aims of the study and the implications of the use of their recordings. This also provided the learners with an opportunity to refuse permission for their recordings to be used, if preferred, and they were informed in the email that this would have no influence on the teaching, assessment or results for the module.

The primary ethical considerations for this research project were confidentiality and anonymity. These issues were considered as part of the application for ethics approval and full research ethics approval was secured from the research ethics committee at the University of Central Lancashire to undertake the study. As the participants were using sign language, not speech, it was necessary to record the research activities onto video camera, which resulted in the participants being fully identifiable from the raw data. In order to maintain good ethics, the participants were allocated alternative names – Learner 1, Learner 2, etc. – and the recordings will not be used in any publications. Permission was obtained for quotations from the transcribed data to be selected and used for further analysis and for publication purposes.

2.3 Data coding and analysis

All signed video recordings were translated into English text for purposes of discussion of examples in any resulting publications. As the author of this study is a first language BSL signer, all of the recorded data were transcribed into written English by a qualified BSL/English interpreter. This would serve the purpose of enabling relevant points to be correlated with the signed data easily, and would provide the data samples required for presentation in text. In order to begin the process of data exploration, the second step in the data analysis process, the transcribed data were translated back to the researcher in BSL in order to aid the matching of the signed data with the text, and to enable the researcher to examine the data in BSL. The back-translation process is effective in sign language

research and is relatively new for the field in the UK (Nunn 2018). Rogers, Evans, Campbell, Young & Lovell (2014) found that this process enabled verification of the data and added to the validation process (also Rogers, Young, Lovell, Campbell, Scott & Kendal 2013). In the case of this study, this made the data more visual and helped the researcher to remember the signed version more vividly, and proceed in a culturally appropriate way.

Alongside the rest of the data, the contents of the recordings were analysed manually through observation of the videos to identify difficulties in learning how to use topographic space and whether the learning was successful. This observation was carried out privately, in a language laboratory. This involved (i) preparing the data for analysis and (ii) data exploration. In order to prepare the data for analysis, the recorded data were viewed several times and notes were taken to aid memory. All initial research notes were made on paper in note form, whilst viewing the data; this manual technique was considered an appropriate method for this study to make use of, a method which Mertens (2015) discusses as having immediate benefits despite being the “old-fashioned way” (p.438). Following this, the data analysis continued by counting the number of errors and developing a list of the types of errors. This was also carried out manually, using paper to create charts and drawings of the correct perspectives, which would serve as a comparison when viewing the learners’ videos and deciding whether they had made a mistake or not. For purposes of ensuring credibility, a colleague who is also a BSL teacher was brought in to check that the identification of errors was being conducted effectively and accurately, and the teacher agreed with the analytical method being used and the subsequent findings. The outcomes were coded in terms of positioning errors for the classroom task (see Classroom Task Key below) and the positioning errors and dimensionality errors for the courtroom task.

Classroom task key

[✓=*correct positioning*, indicating the correct positioning of an occupant]

[PP=*placing problem*, indicating an error in the placing of an occupant]

[SP=*spacing problem*, indicating an error in the spacing between occupants]

[Om=*omission*, indicating an occupant was missing completely; these are considered as errors and included in the analysis]

3. Results

3.1 Classroom task results and observations

It is a fundamental aspect of scholarly research that the study is improved by the use of several research activities, with each activity serving a specific purpose. The results of the classroom task are indicated in Tables 3, 4 and 5 below and show the place at which each learner was sat and the number of perspectives from

which they signed. At the end of each set of results tables, a summary table (Table 6) is provided to give a snapshot of the results overall. A selection of the results for the learners was checked and verified by an independent academic, who is also a sign language user.

Table 3. Classroom task results: Task 1, Group A

	Perspective	Place 1	Place 2	Place 3	Place 4	Place 5	Place 6 Teacher
Learner 1	place 2						Learner signed all places correctly
Learner 2	place 4						Learner signed all places correctly
	place 5						
Learner 3	place 3						
	place 1						Learner signed all places correctly but with some hesitation with positions 4, 5 and 6 from place 1 perspective

Table 3 shows that Learners 1, 2 and 3 signed all places correctly from their own perspective, and additionally, Learners 2 and 3 also signed all places correctly from another’s perspective. Whilst Learner 3 signed all places correctly from her own perspective, there was some hesitation with respect to positions 4, 5 and 6 when she signed from place 1 perspective.

4. Classroom task results: Task 1, Group B

Perspective	Place 1	Place 2	Place 3	Place 4	Place 5	Place 6	Place 7	Place 8	Teacher
Learner 4	place 7								Om
	place 3								Om
	place 5								Om
	place 1								Om
Type of mistake									Learner omitted place 8 (teacher) in each perspective
Learner 5	place 8								Om
	place 5								SP SP SP
Type of mistake									Positions 5, 6 and 7 too squashed in the same location, and omitted place 8 (teacher)
Learner 6	place 3								PP PP
Type of mistake									Positions 7 and 8 are too close together
Learner 7	place 2								Learner signed all places correctly
8 Learner 8	place 5								Learner signed all places correctly
	place 8								Learner signed all places correctly
Learner 9	place 4								Learner signed all places correctly
	place 8								Learner signed all places correctly

Table 5. Classroom task results: Task 1, Group C

Perspective	Place 1	Place 2	Place 3	Place 4	Place 5	Place 6	Place 7	Place 8	Place 9	Teacher
Learner 10	place 8	PP								PP
	place 5									
Type of mistake										Place 10 should be centred but is too far to the left (next to place 9); Place 1 should be to the left (next to place 2) but is too far, near to place 10
Learner 11	place 3									PP PP PP
	place 7	PP	PP	PP						PP
Type of mistake										Places 4, 5 and 6 should be next to each other but are all placed in the same position, place 4 Places 1, 2 and 3 should be next to each other but are all placed in the same position, place 3 Place 10 should be out to the right but is positioned too central
Learner 12	place 1	PP	PP							PP PP
Type of mistake										Places 1 and 2 are positioned in the same spot, at place 1; Places 7 and 8 are positioned in the same spot, at place 8

Table 6. Classroom task – Summary table

Learner	Group	Placing problem (PP)	Spacing problem (SP)	Omission (Om)	Total mistakes
1–3	A	0	0	0	0
4–9	B	2	5	5	12
10–12	C	13	0	0	13
Grand Totals		15	5	5	25

As illustrated in Table 7 below, it is evident that the more ‘places’ in the exercise, the more mistakes were made, hence there are more errors in the classroom task for Group C. It appears, then, that the more places there are, the closer the positioning points are, and the more careful a learner has to be to articulate these separately (i.e., the exercise demands a higher level of spatial differentiation).

Table 7. Results of own and alternate perspectives

Learners	Group	Mistake		Total
		Own perspective	Other perspectives	
1–3	A	0	0	0
4–9	B	1	9	10
10–12	C	3	10	13
Grand Totals		4	19	23

The most common type of error was a lack of differentiation between places – for example, Learner 12 located places 7 and 8 in the same spot (at place 8). In addition, learners often located a place correctly from one perspective, but incorrectly from another. For example, Learner 11 (shown in Table 8) only got both perspectives correct for three places; for the remaining places, this learner only located one perspective correctly – however, they located at least one place correctly (from one perspective, or another or both), which suggests that correct placement is inconsistent, but not unattainable. A further observation is that regardless of whether the learner chose to articulate the positioning from a clockwise or anti-clockwise order according to which felt more physically comfortable, there were still errors.

As a final observation of the classroom task, errors almost always occur successively – that is, learners tend to locate successive places incorrectly rather than, for example, making just one-off mistakes. As can be seen from Table 8 above, Learner 11 gets places 1–3 and 7–10 correct from the learner’s own perspective, and

Table 8. Learner 11 results

Perspective	Place									
Learner 11	1	2	3	4	5	6	7	8	9	10
Place 3				PP	PP	PP				
Place 7	PP	PP	PP							PP

places 4–9 correct from the perspective of Place 7. This pattern occurs for other learners, too, e.g., Learner 10 (places 2–9 are correct for both perspectives) and Learner 12 (mistakes places 1–2 and 7–8).

3.2 Courtroom task results and observations

Analysis of the learners' signing of the positioning of the courtroom occupants from the four different perspectives, and their signed feedback, enabled this study to gain a clear understanding of the BSL learners' experiences of attempting to use topographic space during advanced level BSL learning and provide descriptive measures that are essential in sign language research (Tyrone 2015). The learners' descriptions of the courtroom from the four perspectives and the results are presented in the points below, followed by a general discussion of the learners' experiences in the next section.

3.2.1 Positioning

Each of the learners replicated the positioning of the courtroom occupants from the four requested perspectives in their signing space. Most of the learners signed from the perspective of the judge, then the accused, then the jury, and then the usher (as requested); only two learners (Learner 2 and Learner 3) did not follow this ordering. Analysis of the positioning of the courtroom occupants by each learner led to the following results, presented in Table 9 below, with a description of the positioning error noted in the first column. Note that Learners 2, 3 and 5 represented all positions correctly from all perspectives, with no errors, so they are omitted from the table.

3.2.2 Dimensionality

Analysis of the dimensionality of the courtroom occupants reveals that most errors occurred by participants placing occupants incorrectly by one level, either one level up or one level down from the correct level. For example, Learner 7 placed 6 occupants at one level lower and 3 occupants at one level higher than they should be placed. In addition, some errors occurred in placing occupants at

Table 9. Courtroom task results: Positioning

Description of positionality error	Learners											
	1	4	6	7	8	9	10	11	12	Total		
Spacing of occupants (e.g., too far apart or too close)	2	4										6
Wrong area of the sign space (e.g., front instead of LH side)	6	4	3			5			1			19
Axis flipped over (e.g., RH side instead of LH side)		1							1	2		4
Lack of differentiation between occupants (e.g., jury and clerk signed along the same side-line)			1	1	2	1	1			2		8
Occupants aligned at the wrong angle (e.g., diagonally instead of perpendicular)				3			3	3				9
Total	8	5	8	4	2	6	4	4	4	5		46

two, three and four levels higher or lower than the correct positioning. For example, Learners 1 and 2 placed occupants, that should be at level 1, too high up (on level 3), raising the dimensionality by two levels. The dimensionality analysis led to the following results:

Table 10. Courtroom task results: Dimensionality

Difference between target and actual dimension	Learners												
	1	2	3	4	5	6	7	8	9	10	11	12	Total
1 level (e.g., should be level 2, but was level 1)	1	4	2	3	2	8	9	3	5	5	5	7	54
2 levels		1	2	1	3	3					4	2	16
3 levels						1					2		3
4 levels						2							2
Total	2	6	2	4	5	14	9	3	5	5	11	9	75

In summary, more errors occurred in the area of dimensionality than positionality. This appears to be due to learners often stretching the arm too far out.

3.2.3 Observations of the self-evaluations

Analysis of the students' self-evaluations indicate that the BSL learners in the group analysed for this study were aware of the difficulties in some aspects of the positioning and the dimensions they needed to use in their production. Many

Table 11. Courtroom task summary table

Learner	Task	Mistake		Total
		Positioning error	Dimensionality error	
1-3	A	8	10	18
4-9	B	25	40	65
10-12	C	13	25	38
	Total	46	75	

of the learners expressed some difficulty in knowing where about in the signing space to place the occupants of the courtroom, and difficulty in indicating their location in relation to each other. Learner 2, for example, states:

I kept changing palm orientation to place figures in the scene. I need to practise this more and remember that the palm orientation indicates the direction the person is facing. [...] I did not realise that so much information can be contained within such slight changes of handshape etc. Now I understand that you can pack lots of information into just a few signs.

This difficulty, overall, appears to stem from the complexity in replicating the layout according to the real-world setting, and in difficulty in making full use of visually motivated, iconic features for referencing objects and people. BSL learners expressed difficulty in knowing whether to place the jury on the left-hand side of the signing space or the right, particularly when signing from the usher's perspective, as Learner 6 mentioned:

I got very confused especially when changing character in the scenario, for example becoming the usher.

Learners need to take into account which side of the courtroom the jury is on, given the particular court room, and replicate this in the signing space either to the left or the right of the judge. Learner 7 and Learner 12 both mention this difficulty:

Learner 7: I feel that the conversational part could be improved a little, this could be achieved through more accurate use of eye gaze an example would

be as the judge, I would look to my left to address the jury. [...] I could have traced the shape of the room and described the formation of the people sitting within it. I think this would have helped when I went on to describe the individuals within the scene.

Learner 12: I made a mistake when describing the court room from the perspective of the judge. I got the jury and the usher on the wrong side of the court, I got confused. [...] From the other perspectives, it was fine, and I got all the placements right.

It is important for a learner to realise that this may mean placing the jury on the left from the judge's perspective but would be mentally rotated and placed on the right-hand side of the signing space when referring to the jury from the perspective of the occupants facing the judge. The degree that the space needs to be rotated to is noted as an issue by Learner 1:

I found that rotating the scene through 180 degrees is simple, however it becomes much more difficult when rotating through any other angle.

This topographic placement may switch from left to right and the space may need to be mentally rotated any number of times during a signed sequence. The correct positioning of the occupants with the hands should also be accompanied by correct direction of eye gaze to mark the positions. Learner 3 and Learner 4 show awareness of this requirement:

Learner 3: Because I spent too much time considering where to place people and which way they were facing, which impacted on the flow of my signing. [...] I need to remember to add details such as the eye gaze of the person from whose perspective you are describing the scene.

Learner 4: I learned a lot about eye gaze and how to describe a scenario, placing people within it from alternate perspectives, understanding how to describe accurately who sat next to who and on which side of them. [...] It became more difficult when describing the court scene because you had to remember the scene, where people were sat in the room and in relation to other people.

4. Discussion

The discussion in this section covers how teachers shape and adapt tasks in order to encourage learners to consider aspects of positionality and dimensionality during the BSL learning process. This begins with a consideration of the use of

mentally rotated space (Section 4.1), which offers suggestions for why some learners find this task difficult from certain perspectives and with an increasing number of positions to express. Section 4.2 explores the use of space in terms of replicating the different levels of dimensionality that learners must strive to achieve as their BSL skills progress. One of the common positioning of usher's perspective misconception area of the sign space instead of front instead left-hand side as reflect in learners' self-evaluation scenario. In the final section, I discuss teaching methods that can aid the learning of topographic space use.

4.1 Mentally rotated space

With regards to mentally rotating the signing space, the BSL learners who took part in this study showed more success with positioning the courtroom occupants from the judge's or the accused's perspective, i.e., rotating the space 180° on the sagittal plane. There is a generally high level of ability among the learners to 'flip' the positioning of the occupants 180° with a good level of accuracy along this plane (see results in Section 3.2.1), and this is shown in Figure 11 below.

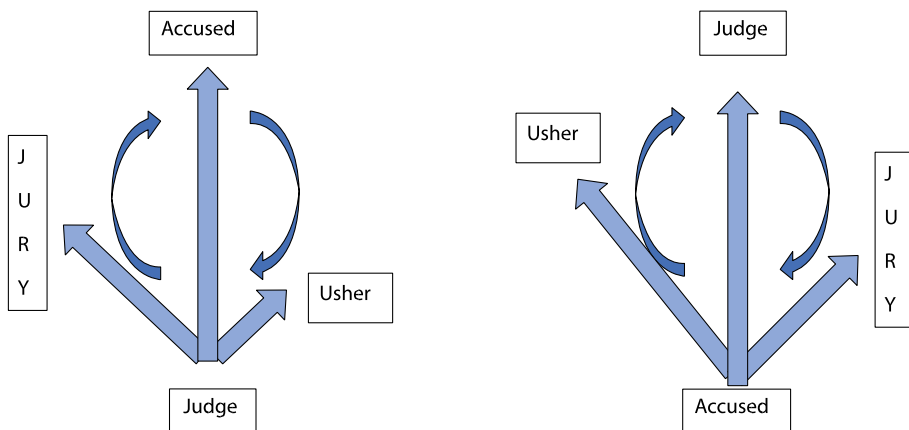


Figure 11. Flipping from judge to accused's position

From the judge's perspective, the jurors' box in this picture would be placed at the far left-hand side of the signing space. The learners showed awareness that when they took on the role the accused, they needed to mentally rotate the space so as to sign from the accused's perspective, in which case the jurors' box would be on the far right-hand side. This was successful in the study and the learners appeared to use the sagittal plane (one of the three central body planes – see Figure 12), from the body outwards with ease.

To this extent, the majority of the learners were confident in setting-up the occupants' positions when the rotation was along the sagittal plane (i.e., they were

placing the occupants from the judge and the accused's perspectives), although there were some errors when positioning the barristers and solicitors from the jury's perspective.

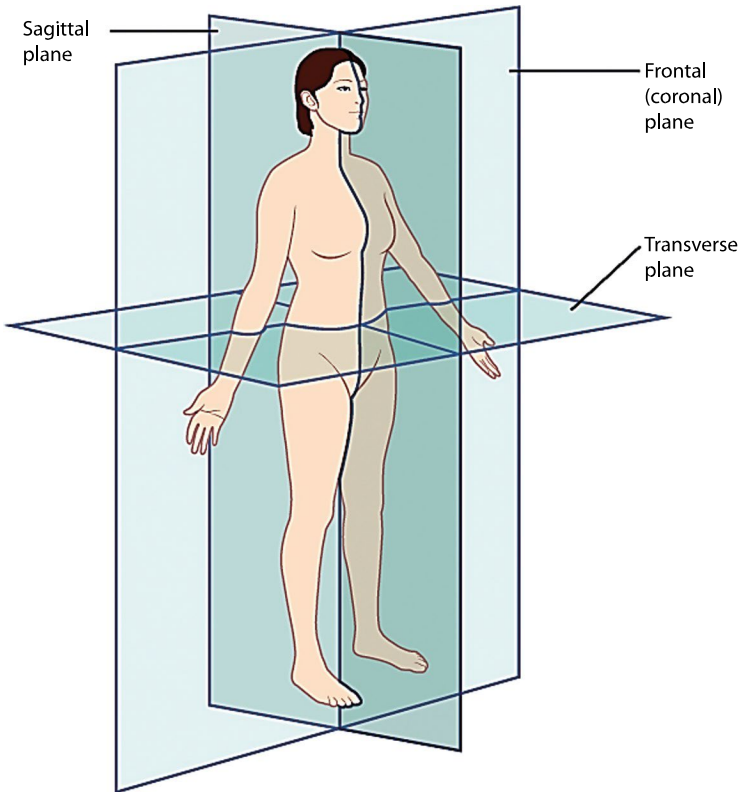
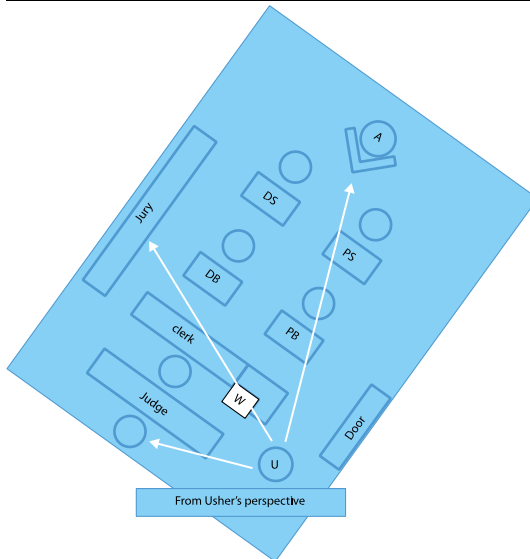


Figure 12. Three central body planes (OpenStax College 2013)

This appears to be due to the angle, and some learners placed the accused too far to the right, or the solicitors (who should be positioned centrally) too far out to the left. Another error occurred by positioning the barristers, solicitors and the accused (who should be positioned horizontally) but were placed diagonally out to the right in the transverse plane space. Interestingly, positioning occupants correctly along the sagittal plane (forwards or backwards) also led to successful positioning of the remaining, centrally located occupants for the learners, i.e., the clerk, the barristers and the solicitors. Positioning occupants along the transverse plane (the positioning of the jury and the usher), however, led not only to difficulty in placing the occupants to the far left and the far right, but also resulted in difficulty placing the remaining, centrally located, occupants. If an occupant was

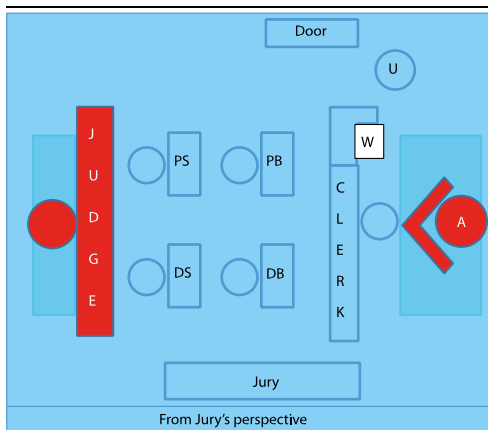
placed at the wrong end of the transverse plane, subsequently, all occupants were placed incorrectly in order to fall in line with the first incorrect placing. An example of a topographically correct positioning of the occupants from the usher's perspective is provided in Figure 13 below to exemplify the correct positioning:



The usher is looking slightly upwards in relation to the clerk and upwards and back to the judge on their left. The judge is placed to the left and slightly upwards and the clerk also to the left but slightly further in. The defence occupants are always to the far left-hand side and the prosecution occupants are always to the near left side. The jury extends along the far left-hand side of the room. The accused is far across the room and slightly to the right.

Figure 13. Topographically correct positioning of occupants from usher's perspective

An example of incorrect positioning is shown in Learner 1's incorrect positioning of occupants from the jury's perspective in Figure 14 below:



Translation of Learner 1's description:

The usher is looking slightly upwards in relation to the judge and the clerk. The judge is incorrectly placed in the far left-hand corner of the signing space. Due to this, the clerk, the defence occupants and the prosecution occupants are incorrectly placed along the transverse plane, instead of the frontal plane. The jury extends along the far right-hand side of the room instead of the left and the accused is placed too far across the room in the right-hand corner.

Figure 14. Topographically incorrect positioning of occupants from jury's perspective (Learner 1; with red highlight showing errors)

Moving from right to left of the transverse plane, the learner has incorrectly positioned the accused into the judge's location (right), and from there, all occupants are placed incorrectly (Figure 14 above), as if to flip the positioning a half circle, i.e., 180° on the transverse plane. This flipping of the layout occurred several times in the study and appears to reflect a learner's tendency to mirror-image: the positioning is identical but with the structure reversed.

Signing from the usher's perspective caused most of the anomalies in the BSL learners' positioning of occupants. This rotation involves turning the space at a 90° angle through the transverse plane, and this caused difficulty for many of the learners. From this perspective, the other occupants need to be positioned according to Figure 15a below, but many of the learners struggled to work out the positionings, and this resulted in the incorrect rotation shown in Figure 15b.

So, shifting of the transverse plane seems to cause BSL learners a significant level of difficulty. This is illustrated in Table 12 below, which shows that only 2/12 learners made errors flipping 180° (from judge to accused); only 4/12 learners made errors rotating 90° (from judge to jury) but 9/12 learners made errors when rotating 90° , from judge to the usher's perspective. When signing from this perspective, as well as the peripheral occupants (judge, accused, jury and usher) being incorrectly positioned, this had an effect on the positioning of the central occupants in the room (i.e., the clerk, the barristers and the solicitors). This rotation involves leaving the centre and forwards section of the signing space empty (see Figure 15 above) and shifting all of the occupants to the left-hand side of the signing space on the sagittal plane. A lot of the learners failed to do this, and incorrectly placed all of the occupants along the transverse plane, from left to right of the signing space instead, as Table 12 below shows:

Table 12. Errors in positioning from usher's perspective

	Judge	Accused	Jury	Usher
<i>Learner 1</i>		X	X	
<i>Learner 2</i>				
<i>Learner 3</i>				
<i>Learner 4</i>				X
<i>Learner 5</i>				
<i>Learner 6</i>	X	X		X
<i>Learner 7</i>				X
<i>Learner 8</i>				X

<i>Learner 9</i>	X	X	X
<i>Learner 10</i>		X	X
<i>Learner 11</i>			X
<i>Learner 12</i>	X	X	X

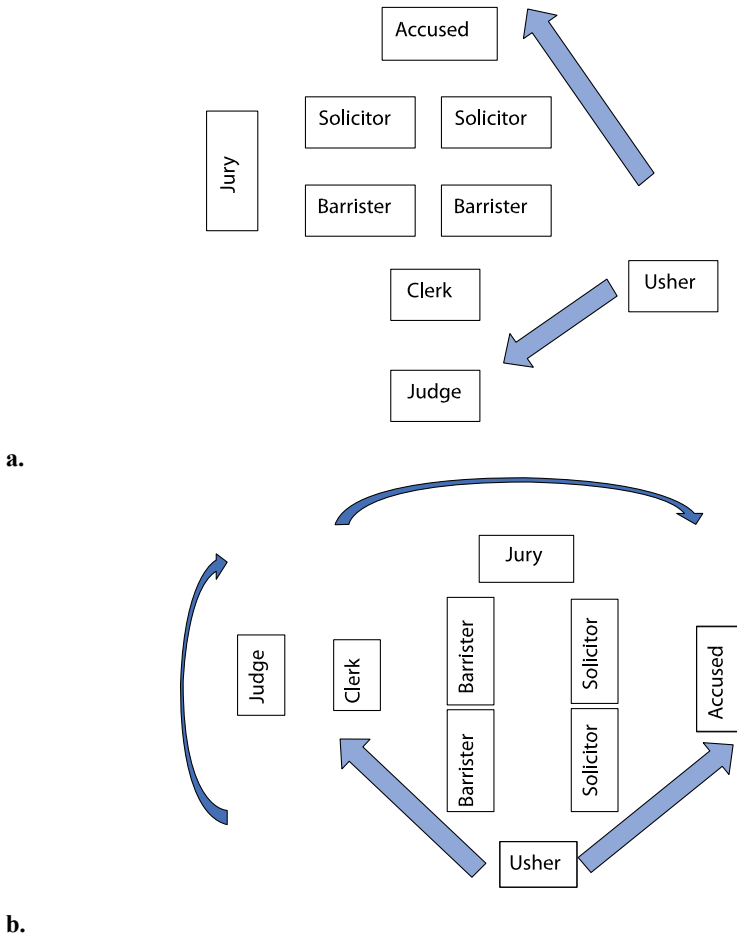


Figure 15. (a) Correct positioning of occupants from usher's perspective; (b) Incorrect positioning of occupants from usher's perspective

4.2 Role-shifting

In this study, the BSL learners attempted to make effective use of placing people at different levels, referred to as 'dimensionality' in this study. This is an important feature of BSL grammar, as it affects the learner's ability to produce effective

roleshifting. A significant finding is that the learners made most mistakes when signing from the usher's perspective (11 errors) and this is different to the common mistakes made in relation to the positioning of other occupants, where the least errors were made from the judge and the accused perspectives (see previous section). In relation to the placing of occupants in the signing space at the correct level, most mistakes were made when signing from the judge and the accused perspective, especially the placing of the solicitors and the accused from these perspectives. The three levels are shown in Figure 16, as a reminder:

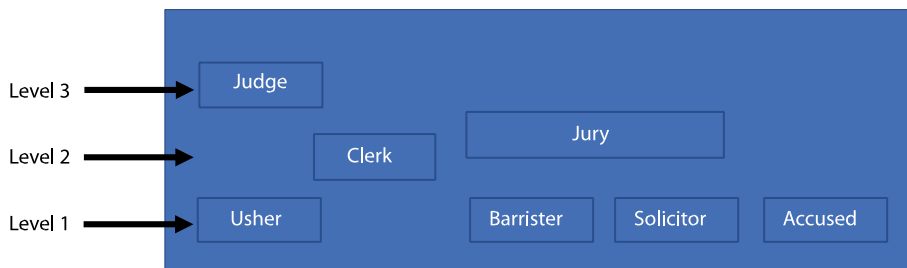


Figure 16. Levels of dimensionality

From the judge's perspective, the learners needed to point lower down on the frontal plane in order to place the clerk and the jury at a lower level (at level 2) in relation to the judge (positioned at level 3). In the same manner, the reference points for the barristers needed to be lower again, but a lot of errors occurred in placing them at level 1. Another common error from the judge's perspective was the placing of the accused, who is situated at Level 1. A lot of the learners placed the accused at a higher level, and this appears to be due to the reaching out of the arm to use the furthest point of the sagittal plane. Stretching the right arm out naturally causes the arm to elevate slightly and this has caused the placing of the accused to move up to a higher level. From the accused's perspective, the usher and the solicitors were often also placed at the third level, resulting in errors when reflecting the levels of dimensionality in the topographic depiction of the real courtroom in the picture. The difficulties in placing the barristers and solicitors correctly are expressed by Learners 1 and 10, who described the difficulties in the self-evaluation:

Learner 1: I also need to add height to the description to show the height at which the people were located within the scene...In this clip I placed the barristers and solicitors in my signing space slightly to my left. I should have set the scene out directly in front of me using height too.

Learner 10: I placed the barristers at an angle so it looked like they were further in front of the usher than they were...Also, when I was describing the scene from the judge's perspective, I should have considered the height and power difference so he would have been looking down upon the rest of the court.

When signing from all four perspectives, the clerk (level 2) and the jury (level 3) were almost always placed correctly, perhaps because it is easy to move from placing the judge to placing the clerk (immediately in front) and the jury (immediately to the left). There were common difficulties in placing the usher correctly, many learners placing the usher at level 3 instead of level 1, perhaps due to psychologically perceiving a level of power in the usher's role in the courtroom or perhaps the fact that the usher is the only occupant standing has had an effect. The errors are shown on Table 13.

Table 13. Errors in dimensionality (J=judge, C=clerk, B=barristers, S=solicitors, U=usher, A=accused, Jur=jury)

	Judge perspective	Accused perspective	Jury perspective	Usher perspective	No of errors
<i>L1</i>	SA				2
<i>L2</i>	BS	UA	UA		6
<i>L3</i>		U	U		2
<i>L4</i>		CU	UA		4
<i>L5</i>	SU	UA	U		5
<i>L6</i>	BSA	BSUA	BSU	BSAJur	14
<i>L7</i>	BSA	BSA	C	CJur	9
<i>L8</i>		S	S	U	3
<i>L9</i>	UA	UA	U		5
<i>L10</i>	UA	U	U	A	5
<i>L11</i>	BSUA	BS	UA	BSA	11
<i>L12</i>	BSA	BSU	BSU		9
Totals	23	23	18	11	75

The use of topographic space for portraying real world events/discourses is important in BSL because it sets the scene in preparation for role-shift to be articulated, largely in the form of constructed action (Cormier, Fenlon & Schembri

2016) and visually constructed dialogue (Mather 1996). The BSL learners that took part in this study recorded a brief role-shifting sequence and a lot of the roleshifting was correct. This included establishing the relevant setting and occupants in preparation for the dialogue. A crucial aspect of role-shifting is eye gaze, which must move towards the locations of the people during the constructed dialogue.

There were some errors amongst the learners in relation to the use of eye gaze, such as Learner 1's role-shifting sequence, where the eye gaze from the judge to the accused was not far ahead enough along the sagittal plane, and it appeared that the judge was addressing one of the barristers, who was situated much closer to him. Eye gaze along the transverse plane also caused some errors, such as Learner 3's incorrect eye gaze between the judge and the barrister, where the eye gaze moves too far left and right instead of being a slight move to the left and right to reflect the close positioning of the interlocutors. A further feature of role-shifting is characterisation, a strategy where the signer imitates the distinctive nature or features of someone, and this was articulated effectively by all learners in this study.

4.3 Methods for teaching topographic space

In this study, after the comprehensive explanation and nearing the end of the research activity, when the learners were asked to position the people in the courtroom from four different perspectives (the judge, the accused, the jury, and the usher, sequentially), the learners were mostly able to rotate the space and follow topographic positioning, albeit still with some hesitation and some error. The importance of repetition of how to mentally rotate the space, and how to use role-shift to sign from a particular occupant's perspective, became apparent during the teaching session. On reflection, it is clear that the teacher sitting opposite the students when teaching BSL may cause the learners to mirror image the teacher's signing, and this results in errors. Learners of BSL need to be explicitly taught how to mentally rotate themselves in order to replicate the signing accurately. Likewise, the teacher should rotate him/herself at times to remind the learners of the perspective from which they should be signing. As explained in Section 2.1.1, methods of teaching BSL are varied and range from grammar drill methods to methods in line with communicative language teaching approaches (Larsen-Freeman 2008). For teaching how to use topographic space effectively, the teacher involved in this study made use of visual adaptation of the audiolingual method, also referred to as the Michigan Method, described by LarsenFreeman (2008:35) as an approach that enabled the teacher to "drill students in the use of grammatical sentence patterns". This encouraged the learners to "mimic the teacher's model as accurately as possible" (2008:37). This drilling method, directed mainly by the teacher, is effective for learning a complex grammatical feature such as

topographic space, and allowed the teacher to demonstrate examples of the use of topographic space many times before encouraging the students to repeat the examples over and over again. The method of teaching is so-called in line with spoken languages (i.e., audio) and would be best understood and referred to in this study as visuo-lingual to account for the visual modality of the language being learnt.

Wilcox (2000:412) emphasises the dramatic change from the ‘vocal-auditory’ to the ‘visual-spatial modality’ as a metamorphosis, and notes the importance of the “size and visibility of the articulators used for language production”. As an example, the teacher articulates the production of the structuring and localisation of the court layout and referents, clearly explaining the positioning through the phonological parameters of BSL to provide the students with a clear picture of how such topographical information is presented in a visual language. With the controlled practice in the classroom, the teacher will model the layout of the courtroom by placing each of the actors in the proscribed place. As discussed in previous sections, in this case, the judge is placed at the front of the court, the clerk is then placed immediately in front of the judge and would be lower down in height, and so on. While the visuo-lingual method is largely directed by the teacher, student interaction is still encouraged and the relationship between teacher and student, in this study, was deliberately relaxed and positive. The teacher made use of humour in order to maintain student motivation – an important aspect whilst mastering complex grammatical aspects of L2. High and sustained levels of student motivation can lead to a higher level of learning and, in turn, of language fluency. Dörnyei & Ushioda (2001:36) note:

[...] that cumulative results from several studies indicate that teachers’ verbal and non-verbal immediacy behaviours that reduce the distance between teacher and students (e.g. addressing student by name, using humour, moving around in class, including personal topics and examples) may impact levels of learning by modifying student classroom motivation.

This cognitive view of motivation is described clearly by Williams & Burden (2004:119):

People have a choice over the way in which they behave and, therefore, have control over their actions...from a cognitive perspective, motivation is concerned with such issues as why people decide to act in certain ways and what factors influence the choices they make. It also involves decisions as to the amount of effort people are prepared to expend in attempting to achieve their goals. The role of the teacher thus becomes one of helping and enabling learners to make suitable decisions.

This teaching strategy was important during this teaching session, as learners were encouraged to make the decision to keep repeating the examples given until they

were able to make effective use of topographic space in their signing. Some of the results could be skewed by the students being distracted by another student or they may have a limited memory capacity which affects performance. It is clear that some positions were much more difficult for the students to occupy to describe the layout. Again, memory might have played a factor here. It is also of interest that some participants produced errors when signing from their own perspective, even at this advanced level of learning. Throughout the session the teacher repeated signs and locations to the students and encouraged them to produce both accurately. This repetition was a useful tool in helping the students to recall the information. It is important to correct the students in an encouraging and supportive way to maintain a relaxed atmosphere within which the students can perform more effectively. It was important to present this information in different ways so that students could access it in a way that was suitable for their learning styles and needs. As Sheldon, Fenerci & Gurguryan (2019) note, students recall things differently because the act of retrieval is approached differently according to the individual brain.

5. Conclusion

This study of 12 advanced-level learners of British Sign Language has shown that a visuo-lingual method of teaching learners topographical use of the signing space is effective and allows the learners the opportunity to repeat the positioning of referents within the space until the appropriate placing of locations and dimensions is mastered. The use of the visual picture was good and supplemented the controlled practice in the classroom, along with additional visual information on the Smartboard, and the use of the video recordings, an effective tool in sign language learning (Padden 2015). The learners who took part in this study have a tendency to mirror image signs, rather than processing where they should be correctly located in the signing space. Interestingly, the learners who repeated the sequence as taught – signing from the character viewpoints of judge, accused, jury then usher, made less mistakes than the learners who did not follow this taught sequence, i.e., Learner 2, who signed in the order of judge, usher, accused then jury, and Learner 3, who signed as judge, jury, accused then usher. However, even when the taught order was followed, there were still some errors due to mirror imaging effects, where the learners would, without realization, flip the layout in some cases. This study has also found that the BSL learners' use of topographic space for positioning occupants in a courtroom was more successful when using the sagittal and frontal planes (for positioning from the body outwards and at various vertical levels, respectively). Positioning referents along the transverse plane caused difficulty for most of the learners and led to higher amounts of mirror imaging. A teacher would benefit from moving to alongside the learner (rather

than opposite) to allow the learner to view the positioning of referents from the original perspective before being expected to reverse mirror-image the positionings once opposite the teacher again. This finding indicates that learning correct usage of topographic space benefits the learner's receptive skills, as well as their productive competency.

There are several limitations to this study, the most noticeable being that less choice and flexibility for the learners in relation to which places to sign from (in the classroom task) and which perspectives to articulate (in the courtroom task) so that all learners were completing the same number and type of activities would have made the data more comparable and highlighted further problem areas. The recording of the individual self-evaluations in BSL may have restricted some learners from fully expressing their experiences and allowing them to use their first language for this aspect of the study may have reduced any inhibitions in expressing themselves in L2, rather than the natural expression of their experience in L1. During this stage and during the courtroom task, some of the learners relied on the picture, their own drawing or on written notes, rather than raw memory and this use of two-dimensional materials could have affected their ability to evaluate their experiences in their L2, a three-dimensional language. At this stage of the research activities, the process could also have been skewed by the fact that the learners could see other learners in their peripheral vision, at the next computer station, and this could have caused some distraction during the activity and memory might have played a factor here. Finally, there is also a limitation in the fact that learners received a pre-research activity lecture and it would have been beneficial to allow them to only watch the online clip of the courtroom scene once then ask the learners to try out the use of topographic space themselves, without the initial lecture. It would also have been beneficial to supplement the research with a group of native BSL users to act as a benchmark of L1 users who were unaware of the purpose of the study and asked to perform the same task. This would have provided a further avenue for comparison and helped to further establish whether learner errors are actually errors. Future research would benefit from expanding the range of topographic materials used in the study, such as sports scenarios, e.g., football and rugby stadia layouts to study the effects of various floor levels on the dimensionality aspect of the signing space. It would also be of interest to compare language learning across other modern foreign languages within the home and external institutions to the challenges and occurrences they have come across as well.

In sum, the adult learner of a sign language as a second language must understand and master the grammatical features of a language that is different to their L1 (Napier and Leeson 2016) and, in this study, learning to use topographic space correctly has revealed that this can be of benefit to the learning of other grammatical features, such as role-shifting. Establishing the locations and dimensions of the occupants in a scene enables the BSL learner to gain a clear

perspective of their physical relationship to each other. This physical relationship then forms the basis of the eye gaze and upper body movements during role-shifting to produce constructive dialogue. These are crucial aspects of spatial grammar that advanced BSL learners will need to master. BSL learners benefit from being introduced gradually to topographic aspects of spatial grammar during beginner levels, rather than waiting until the advanced levels before teaching this feature. Learners also benefit from teaching materials that are designed with the teaching of topographic use of space explicitly in mind.

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Address for correspondence

Nicola Nunn
University of Central Lancashire
Livesey House (LH219)
Heatley Street
Preston PR1 2HE
United Kingdom
njnunn@uclan.ac.uk

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