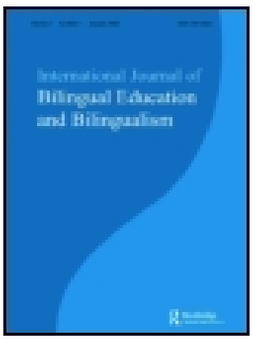

International Journal of Bilingual Education and Bilingualism

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rbeb20

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To cite this article: Ruth Swanwick, Samantha Goodchild & Elisabetta Adami (2022): Problematizing translanguaging as an inclusive pedagogical strategy in deaf education, International Journal of Bilingual Education and Bilingualism, DOI: 10.1080/13670050.2022.2078650

To link to this article: https://doi.org/10.1080/13670050.2022.2078650

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INTERNATIONAL JOURNAL OF BILINGUAL EDUCATION AND BILINGUALISM
https://doi.org/10.1080/13670050.2022.2078650

RESEARCH ARTICLE

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Problematizing translanguaging as an inclusive pedagogical strategy in deaf education

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ABSTRACT

This paper critically analyses the meaning and use of translanguaging as an inclusive pedagogical strategy in the context of a bilingual deaf education classroom where there are asymmetrical sensorial experiences of being deaf and being hearing, and different access to 'codified' (either speech or sign-language) resources. The pedagogical opportunities and constraints of translanguaging are examined through an analysis of the meaning-making resources among deaf and hearing interlocutors in face-to-face interaction. Using two short excerpts from an English class with two deaf pupils, a hearing teacher of the deaf and hearing communication support worker the authors analyse ways in which the modes of image, sound and speech, gesture and signing, gaze, body posture are coordinated in the spatial context for meaning-making. A multimodal and layered analysis of two short turn sequences describes ways in which modes are integrated and coordinated in the spatial layout of the classroom in ways that either facilitate or inhibit inclusive communication. Strategies for the analysis and deployment of multimodal resources that may facilitate the inclusive potential of translanguaging in this interactional context are discussed.

ARTICLE HISTORY
Received 4 January 2021
Accepted 12 May 2022

KEYWORDS
Translanguaging; deaf education; multimodal analysis; sensorial asymmetries; deaf-hearing interaction; classroom interaction

Introduction

Translanguaging and inclusivity in deaf education

The theory and practice of translanguaging has brought to the fore classroom approaches that potentially include, and create a social space for, learners who are deaf with diverse signed, spoken and written language repertoires, and cultural identities (García and Wei 2014; Seltzer and Collins 2016). This paradigm offers possibilities for an accessible and inclusive learning experience where different signed, spoken and written languages are understood and equally valued (Creese and Blackledge 2010); where students are enabled to use their whole linguistic repertoires, and where communication across language asymmetries is facilitated (Mendoza 2020).

Whilst the affordances of translanguaging strategies of deaf lecturers has been richly described (Holmström and Schönström 2018; Lindahl 2015), questions remain about the extent to which translanguaging enables a linguistically equitable and inclusive learning context in deaf education classrooms (De Meulder et al. 2019). We argue that these possibilities need to be carefully examined using methodologies that consider the different sensory orientations of learners who are deaf and the

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sensorial accessibility and sensorial asymmetries (De Meulder et al. 2019) of classroom interaction among deaf and hearing learners and teachers. This requires an approach that embraces the modal complexities of the deaf education classroom where the different possibilities of 'seeing' and 'hearing' need to be effectively coordinated around pedagogical intentions.

In the UK educational context, the majority of teachers of deaf children are hearing. However, as in the setting for this study, many work in bilingual teams with deaf colleagues and are expected to be competent in the use of British Sign Language (BSL). Whilst this situation could be considered suboptimal for some deaf learners, it is nonetheless representative of the current context and, as such, a driver for the study questions around the modal challenges of the classroom, and the consequences of the simultaneous and sequential use of modes for inclusive meaning-making (Lindahl 2015; Snoddon 2017; Tapio 2014).

The communicative context

The communicative challenges of the learning environment for deaf learners in terms of the presentation and availability of information through different modes are well documented (Crandell and Smaldino 2000; Sahlén et al. 2019). However, less is understood of the pedagogical challenges involved in coordinating different modes to deliver information in a meaningful way.

For many deaf pupils the establishment of visual attention is a prerequisite for sharing information (Dye, Hauser, and Bavelier 2008; Matthews and Reich 1993). The cognitive demands involved in watching a teacher or interpreter whilst also attending to other visual stimuli, such as whiteboards, practical experiments or textbooks need to be managed in the classroom (Christensen 2010). For educators, this entails consideration of the shared communication space, and coordination of the simultaneous and sequential presentation of visual information.

The classroom also presents specific acoustic problems for learners, with or without state-of-the-art listening technologies, in terms of listening and participation (Wheeler, Gregory, and Archbold 2004). Issues of noise, reverberation, directionality and distance, even for learners with good listening abilities, can inhibit opportunities to initiate or follow group conversations (Ching et al. 2006), and following spoken language delivery over long periods is challenging and tiring (Hornsby et al. 2014). In this context, where shared visual attention is a crucial prerequisite for interaction (Tomasello 2003), educators must manage the sensory demands of the environment. When visual and auditory distractions become too many, learners are likely to withdraw from participation, and communication breakdowns are common (Martin et al. 2011).

To make learning environments and communication more inclusive of learners with different sensorial resources, teachers routinely deploy a range of multimodal resources, including signed, spoken and written languages and 'blended' strategies that enhance the visibility of spoken language (Knoors and Marschark 2012). The use of multiple modes of communication to facilitate learning and optimize language development are endorsed in the specification for Mandatory Qualifications that govern UK teacher of the deaf training (DfE 2018). However, ways in which such resources can be effectively coordinated has not been systematically analysed. Educators, therefore, do not know what works well (or less well) in terms of facilitating inclusive communication and learning.

The research context

The examination of the affordances of translanguaging for creating an inclusive learning environment needs an approach that goes beyond description of the languages and communication strategies in use. Rather, we need to understand more about the quality and efficiency of the interaction and embrace the full multimodality of communication. Such an approach has been exploited in multimodal studies of hearing-hearing interaction that have examined different aspects of classroom interaction such as the teacher's orchestration of different modes and role of eye gaze in the facilitation of classroom discussion (Bourne and Jewitt 2003), as well as the relation between speech and

gesture (Lim 2019); how children use different modalities of gesture, movement and gaze to build action and participate with classroom peers (Flewitt 2006; Kyratzis & Johnson 2017); the role of embodied orientation and posture in the accomplishment of turn-allocation and speaker nomination (Bezemer 2008; Fasel Lauzon and Berger 2015); the significance of pauses and gaps and silences that we might interpret in the deaf education context as the absence of language (Matsumoto 2018); the role of touch (Taylor 2014) and the importance of classroom layout and the positioning of people and materials (Lim 2019).

This work has been increasingly referenced in the translanguaging research signaling the importance of the context of interaction or spatial repertoires as well as the integral role of embodied communication (gesture, eye gaze, nodding, shrugs and smiles) in meaning-making across different biographical and linguistic histories (Creese 2017; Otsuji and Pennycook 2010). However, this research generally focuses on interlocutors who share the sensorial attributes of hearing and sight.

In deaf-hearing interaction the alignment of resources is more complex and precarious (Kusters et al. 2017). Translanguaging research from this perspective has identified ways in which educators integrate different modes in classroom communication. Lindahl (2015), for example, reports ways in which Swedish Sign Language, Signed Swedish (SSS), written Swedish and fingerspelling interact to enable 'cross-linguistic dialogue' (Lindahl 2015, 137). Other scholars have investigated the simultaneous use of modes such as the use of mouthing, eye gaze and body posture while signing (Vermeerbergen, Leeson, and Crasborn 2007) and the use of gesturing while speaking (Kusters 2017); the sequential use of modes (signing, mouthing, fingerspelling and pointing) to support text-related learning activities (Tapio 2014) and the blended use of modes that serve to make visible the structure of English within a sign language utterance. Whilst all of these strategies can be described as examples of translanguaging in action, blended strategies that enhance the visibility of spoken languages are often not accessible or comprehensible for deaf learners and their use should be critically examined (Scott and Henner 2021).

The coordination of embodied multimodal resources (touch, gesture and eye-gaze) is also recognized in interactions between deaf infants and their caregivers (Feldman 2012; Lam and Kitamura 2010) and detailed multimodal analysis of child and parent interaction has examined how these resources facilitate mutual understanding in the presence of sensorial asymmetries (Adami and Swanwick 2019). However, the contingent use of these resources to ensure inclusive communication in the classroom has not been examined. Missing from the research is attention to the learner experience and an examination of the extent to which this is an inclusive experience, that is, how deaf learners access the multimodal content and make 'meaningful sense of what they see and hear' (Mayer 2016, 41).

Methodology

To examine the inclusivity of meaning-making afforded by translanguaging in deaf-hearing classroom interaction we work with a social semiotic conceptualization of communicative acts as inclusive of all modal resources. This approach brings conceptual tools from multimodal analysis to examine the co-occurring and synchronized use of image, sound, gesture, gaze and body posture (Jewitt 2008, 2009; Kress and van Leeuwen 1996; Norris 2004). We undertook a close multimodal analysis of interaction in an educational context among deaf pupils and hearing adults. We observed three sessions of which two were video recorded. We focus here on excerpts from an English class with two deaf pupils (A and B), a hearing qualified teacher of the deaf (T) and a hearing communication support worker (C).

Participants

At the time of recording A and B were aged 11 and in their first year of secondary school. They both have different communication resources that are influenced by their migration trajectories, home situations, profiles of deafness and use of technologies. A is Romanian and came to the UK via

Spain approximately three years before the recording. He is severely deaf[1] and uses hearing aids. In A's household mainly Romanian is used, with little English. He is learning BSL and English in school and says that he understands and speaks a little Romanian and a little Spanish. B is Czech Roma and came to the UK aged seven months. B reports using Czech and English at home and she is learning BSL and English in school. She is moderately deaf[2] and uses hearing aids. At the time the data were collected, assessments of the pupils' home languages had not been undertaken and although it is likely that both have some form of home-sign, this information is not available. The absence of protocols for gathering this information is an issue for practitioners. Both adults are hearing and speak English. They both have proficiency in BSL and Signature qualifications.[3] T has skills to a level for 'complex language use in all types of social and professional interaction' equivalent to C1 of the Common European Framework of Reference for Languages (CEFR). C has skills to a level for understanding and using varied BSL in a range of work and social situations. The language choices of the adults in this scenario are driven by the diverse signed and spoken language skills and communication preferences of the learners, and the objective to make the lesson content accessible to the full group.

Data collection

The data below were extracted from a small corpus totaling two hours of recorded video from observed classes. There were also interviews conducted with all participants, as well as sessions where T and C watched the recordings and discussed the use of resources in the classes and the excerpts analysed below. The data that we present are taken from an English class held with participants A and B, T and C. The instructions were given to conduct the lesson as normal, despite the researcher and camera being present. Throughout the observation and recording the researcher was seated outside of the layout shown in Figure 1 and taking notes. We identified two excerpts for analysis from the same English lesson that show the density of multimodal resources deployed by the interlocutors in contrasting communicative situations: a case of the smooth unfolding of the interaction and a case in which the flow of interaction is disrupted. In the data, there were many other activities and communicative practices covered in the classes, for example, a memory game with cards, where touch was a crucial communicative resource. However, most of the other activities did not demonstrate such a density of resources, particularly regarding teaching materials used. The excerpts were shared with T and C, whose reflections on the communication practices and contextual background information supported the analysis process.

Data analysis

Our analysis centres on (1) the multimodal resources used in each participant's turn, (2) how resources are used in the spatial context of the communication and (3) how the resources are

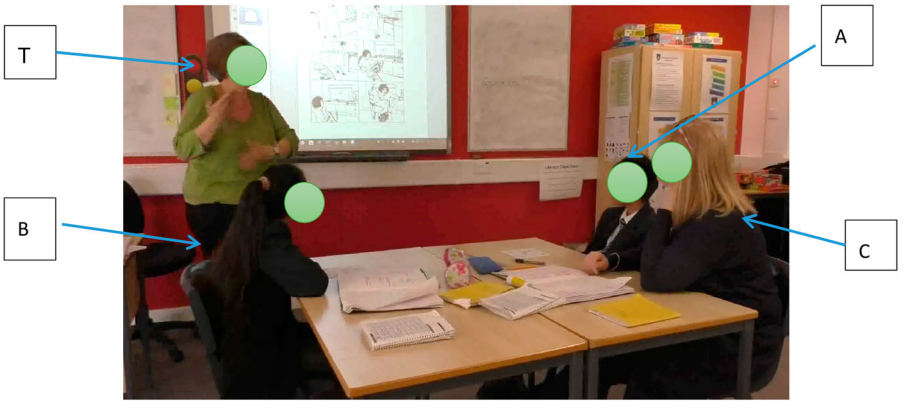


Figure 1. Classroom layout with participant codes.

coordinated in this space which enables (or constrain) inclusive communication. We examine turns in two interaction sequences. These are presented through screen shots and tiered transcription. We used the software program ELAN[4] for annotation as it allows for fine-grained, multi-tiered annotations and analysis. Automatic time-alignment of annotations and video and frame-by-frame viewing permitted the pinpointing of the simultaneous and sequential deployment of modes used in communication. Transcriptions take place in segmented tiers (which the researchers determine), ours included: voice, gesture, turn, sign, body orientation/movement, facial expression and gaze for each participant. During the analysis process, we worked with a hearing registered BSL-English interpreter and a Deaf BSL instructor, trainer and interpreter. They aided us with the segmentation and transcription of tiers and provided additional professional perspectives on the language use, learning context and classroom set-up.

The spatial context: classroom layout and positions

The participants were situated as shown in Figure 1: T is standing at the board, while A, B and C are sitting along the sides of a table facing each other. As a starting point for this analysis, we identify the communicative opportunities and challenges of this layout and highlight the significance of embodied resources (turning, movement and eye gaze) for inclusivity. B and C can see each other without turning, but both have to look away from each other and sideways to see T and the smartboard. A has to turn away from the board and T to see C. T will need to deploy a range of auditory and visual resources to render her explanations accessible to both pupils. With her back to the board she has sight of A, B and C but will have to turn away from them to refer to the board. Signed interactions will not reach her when she is turned away and her spoken commentary may not reach the pupils when she is facing the board. The placement of T in front of the smartboard means that the pupils can follow her multimodal delivery and refer to the smartboard, when the timing allows, but they cannot look at the materials in front of them, or at each other or at C, and capture the visual aspects of T's delivery at the same time.

Excerpt 1 analysis: 'smooth interaction flow'

Excerpt 1 is approximately 40 seconds in length and occurs 16 minutes after recording started and 10 minutes before excerpt 2. Pupils take turns to read aloud written English sentences from the board and suggest the missing words for the gaps. The activity makes use of the smartboard; the pupils do not need to refer to any of the books or papers on the desks in front of them. The character of the exchange requires interaction between pupil and teacher rather than among each other. In this excerpt, A is asked to read 'I will meet you in _____ an hour' with 'half' being the required word for the gap.

Figure 2a: T invites A to begin reading word-by-word by extending her right arm to point at A, whilst pointing with her left hand to the word on the board. She begins with 'will' and then corrects leftward to 'I' at the beginning of the sentence. A follows T's hand movement along with the board. He simultaneously reads aloud the written English whilst signing and/or fingerspelling the word in question.

Figure 2b: T is pointing at the word 'meet'. A hesitates and starts with an extended 'm' sound (the lengthened sound is represented by ':' in the transcription below). T brings her lips together to confirm that the word begins with lips together making an 'm' sound, but furrows her eyebrows in a questioning expression, inviting A to continue the attempt at the word.

Figure 2c: A fingerspells M-E-E-T whilst simultaneously saying 'make'. The incongruence of the first attempt by A prompts T to question 'what's that' using speech, whilst retaining a questioning facial expression with eyebrows furrowed and left hand remaining pointing to 'meet' on the board. A responds to T's question by repeating 'make' in speech and clarifying by simultaneously signing MAKE.

a: 00:00:01 b: 00:00:07

		Figure 2a			Figure 2b
T	SPEECH		Sorry		
	GESTURE	Right arm extended pointing at A. Left pointing at 'will' on board	Left point to 'I'	Left point to 'will'	Left point to 'meet'
	GAZE	To A	To board	To A then to board	To A
	FACIAL EXPRESSION				Lips together in 'm'; eyebrows furrowed in questioning expression
	BODY	To A			
A	SPEECH	Will	I	Will	m:
	SIGNING	WILL	I	WILL	
	FINGERSPELLING				M
	GAZE	To T and board			
	BODY	Next to desk and turned to board			

Figure 2. (a): 00:00:01, (b): 00:00:07, (c): 00:00:09 (d): 00:00:12, (e): 00:00:13, (f): 00:00:14, (g): 00:00:14 and (h): 00:00:20.

Figure 2d: T opens up the activity for B to contribute. She does this by slightly orienting her body towards B and by changing her gaze to look at B, whilst using her voice to ask B if she knows the word. A moves his gaze from T towards B as well. B responds by nodding an affirmation that she knows the word.

Figure 2e: C begins to move her body towards A and moves her gaze to him. She then moves her right hand within A's peripheral vision and waves it horizontally to attract his attention. T asks B to provide the answer using speech 'what's it'. B then provides the answer 'meet' using speech.

Figure 2f: A responds to C's hand wave by turning to look at C who then signs MEET. T's visual attention is attracted by C signing. She slightly turns her body rightwards towards A and C and gaze towards C and uses speech to reinforce the answer 'meet'.

Over a 2 second period, the elicitation of the word 'meet' is taken up by all the participants using different modes.

Figure 2g: Almost as soon as A sees C beginning the sign for MEET, he also starts signing MEET whilst turning rightwards and directing his gaze back to T. A and C are nearly simultaneous in their timings of signing MEET. A also uses speech, begun a fraction of a second after he starts the sign MEET, to say 'meet'. T directs her gaze back to A and confirms his answer of 'meet' using speech, and then turns towards the board and moves her hand along to the next word which A continues to read aloud. The excerpt continues (represented by the gray section in the table below) with A reading the remainder of the sentence and simultaneously signing or fingerspelling word-by-word.

c: 00:00:09 d: 00:00:12

			Figure 2c		Figure 2d	
T	SPEECH		what's that	not make	do you know this one B	
	GAZE	To A			To B	
	BODY	To A			Slight right to B	
	GESTURE	Left hand point to 'meet'				
A	SPEECH	make	make			
	SIGNING		MAKE			
	FINGERSPELLING	M-E-E-T				
	GAZE	To T and board			To B	
	BODY	To board			Left to B	
B	GAZE	Forward looking at own hands			To T	To board
	GESTURE	Rubs hands together				Nods head
	BODY	Next to desk elbows on desk			To T	

Figure 2 *Continued*

Figure 2h: A continues the end of the sentence 'in half'. Whilst he is doing this, B turns her body and gaze towards C and A and signs MEET, which resolves the 4-way elicitation of the word that has involved the use of signs, speech, fingerspelling, eye gaze, body movement and gesture.

Resources in meaning-making

In this episode spoken language becomes dominant, especially in relation to the focus on A's pronunciation. In seeking to work inclusively T makes use of a range of semiotic resources both simultaneously and in sequence, offering her interlocutors a wide range of audio-visual inputs. She combines the use of pointing, gaze and body orientation to direct attention and questions to individuals, simultaneously using speech and signs. When she is pointing towards the text on the board she also adds mouth movement (pursing of lips) to give phonetic cues and she uses facial expression to offer feedback (2a).

C's contribution is mediated through gestures in A's eye line to attract his visual attention (2e). The pupils use the resources available to them to contribute to the activity. A combines speech with signs and fingerspelling and B uses speech and signs; through gaze they both signal their focus of attention. Among all of the interlocutors signs, speech, fingerspelling, eye gaze, body movement and gesture are combined as they all differently express MEET (2g).

Spatial context

This layout allows T to manage the interactions using eye gaze and to give multimodal input without losing attention to the board (2a–2d). In this configuration, T can use eye gaze, body movement and

e: 00:00:13 f: 00:00:14

		Figure 2e		Figure 2f	
T	SPEECH	what's it			meet
	GAZE	To B		To C	
	BODY	Head to B		Head to C	
	GESTURE	Left hand point to'meet'			
A	GAZE	To B	To C	To C	
	BODY		Turn left over shoulder to face C		
B	SPEECH	meet			
	GAZE	To T			
C	GESTURE	Right hand wave			
	SIGNING			MEET	
	GAZE	To A			
	BODY	To space between A and T			

Figure 2 *Continued*

pointing to manage the pupil's attention, select her addressee, provide input in both speech and sign and respond to pupils' contributions. T's positioning in this space allows her to involve B by shifting body movement and eye gaze but not lose A's visual attention. This coordination of resources is potentially challenged in this space when shared attention among the full group is lost as the pupils look away from T in order to attend to each other's and/or C's contribution, such as when B offers 'MEET' and when C intervenes to support A.

Coordination

The synchronized coordination of resources among the interlocutors facilitates an inclusive outcome. By virtue of the layout, T can see pupils and vise versa and can monitor attention to the text on the board and responses: interactions are synchronized between T and A. When B contributes, this is seen by T and timing is allowed for A to turn for B's contribution. Further, C's intervention could have disrupted A's attention from T, but this is seen by T (again because of the layout and T's positioning at that specific moment), and so she waits for A to see the sign and turn back before confirming with spoken 'MEET' and pointing to text. A resolves this with T, and at the same time, B responds to C, also confirming with the sign 'MEET'.

Excerpt 2 analysis: 'disrupted interaction flow'

Excerpt 2 begins 25 minutes after recording started. This took place half-way through the lesson, and the exchange that we analyze is just over 1 minute in length. Pupils are given a picture sequence story that shows a person cooking and then burning her breakfast. The teacher uses the picture

g: 00:00:14 h: 00:00:20

		Figure 2g			Figure 2h		
T	SPEECH		Meet				
	GAZE	To C	To A		To A		
	BODY	To A			To A		
A	SPEECH	meet			in		half
	SIGNING	MEET					HALF
	FINGERSPELLING				I-N		
	GAZE	To T			To T		
	BODY	To T			To T		
B	GAZE	To T			To C and A		
	SIGNING					MEET	
	BODY	To T			To C and A		

Figure 2 *Continued*

story to elicit vocabulary items related to cooking in preparation for a planned writing task. The character of the exchange and task requires A and B to pay attention to and interact with T. Their gaze needs to be turned sideways towards T as well as looking at the picture story that each pupil has on the table in front of them to retrieve elicited information by T.

The excerpt starts as T is explaining the meaning of the term 'frying pan' (which is shown in the picture story) and how this differs from other sorts of pans.

Figure 3a: T uses a combination of signing, fingerspelling, and speech to explain the use of a frying pan. (As T's turn is long, it is represented in two transcription tables, one directly beneath the other.) During her turn, she uses the terms 'oil' in speech and OIL signed simultaneously. She then repeats with speech 'frying pan' and signs FRYING PAN twice with her body orientation and her gaze directed towards B. On the second instance she simultaneously turns back towards the board in preparation for writing 'frying pan'. A's gaze is held on the paper from the moment when T fingerspells F-R-Y-I-N-G until nearly the end of T's turn.

Figure 3b: A moves his gaze up towards T and the board area and moves his body to sit back in his chair. While T is turning towards the board, A begins to sign OIL with the aim of contributing 'oil' as a vocabulary item to be written up on the board.

Figure 3c: T turns quickly from the board towards A and B and then back towards the board while she attempts to elicit the word 'saucepan' and by signing WHAT whilst saying 'what's it called'. At the same time A is repeatedly signing OIL.

Figure 3d: T then uses speech 'if it's like this like a big pan' whilst drawing a picture of a saucepan on the board. As she is turned away from the main communication space, due to drawing on the fixed smartboard, it cannot be assumed that either pupil is able to follow her speech. A continues to sign OIL until T completes her drawing of a saucepan on the smartboard. At this point A stops, perhaps realizing that the timing of the interaction is out of sync and that he does not have joint attention with T to achieve his aim.

Figure 3e: During his turn, A signs SAUCEPAN and simultaneously says 'hey that one'. Yet, he does this whilst T is writing the word 'saucepan' on the board so again, because of the layout of the space, her gaze is necessarily to the board. A switches his gaze and body position towards B who initiates an exchange with C. However, A is not involved in their exchange. In this instance, T's use of multiple modes has succeeded in the aim of eliciting the vocabulary item, however, due to spatial orientation, the answer is not picked up on. T subsequently expands on her explanation of 'saucepan'. This segment is not transcribed below and is represented by the gray box.

Figure 3f: Then T's gaze goes back to A, who signs OIL again and says once 'oil'. T and A now have established joint attention. T sees A signing OIL. She then states 'for oil you'd use this one', simultaneously signing OIL when she says 'oil', and subsequently points to the words 'frying pan' which she previously wrote on the board.

T then explains the differences between a frying pan and saucepan and completes a drawing of a frying pan on the board, which takes nearly 20 seconds and is represented by the second gray block in the above table.

Figure 3g: The other participants pick up on the out of sync nature of the interaction. C intervenes towards T by saying 'A was saying [inaudible] that she [the woman in the picture] will have some oil'. C simultaneously signs A when saying A and then uses her right index finger to point to the woman on the piece of paper in front of A. She thus clarifies the aim of A's signing OIL. When C says 'she'll have some oil', A takes one more turn signing OIL again whilst gazing at T, then down at the paper, and then back at T again.

Figure 3h: The excerpt finishes with T writing 'oil' on the board and with T, C and A laughing, acknowledging the miscommunication occurred and subsequently resolved. Only B and C have gaze lines in Figure 3 h below as A and T's eyes are closed whilst laughing.

Resources in meaning-making

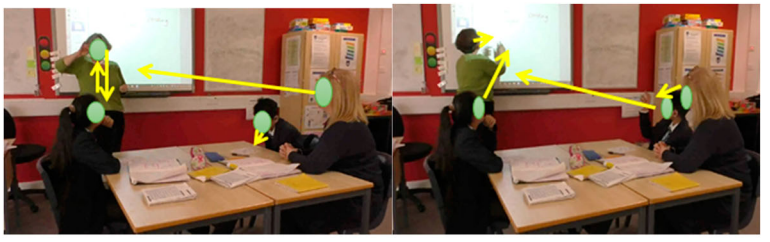
T makes use of a range of semiotic resources, both simultaneously and in sequence, to pursue her pedagogical aims; these include gaze, pointing, face expression and body orientation, combined with speech, signing, fingerspelling, writing and drawing. However, in this case, the inclusivity is disrupted when the coordination of modes within the visual space breaks down.

Spatial context

Although the spatial layout is similar with excerpt 1 the character of this activity requires the pupils to refer to the picture in front of each of them on the table as well as to T and the vocabulary list on the board to their side (3a). T is actively writing on the board as the pupils contribute (3b). This serves a pedagogical purpose but necessitates frequent shifts in body orientation (particularly for T) and gaze (for all participants). This compromises T's ability to visually monitor the pupils' attention and, when she is turned away, the pupils' signed contributions do not reach her (3d) and her simultaneous spoken expression does not reach them (3d).

Coordination

These spatial challenges, combined with the sensorial asymmetries and conflicting demands on the interlocutors, lead to 'dis-synchrony' in the interaction and turn-taking. We see this when A gazes down at the paper (3a) and misses out on much of T's multimodal rendering of 'frying pan', including her simultaneous use of 'oil' (spoken) and OIL (signed). This results in A being out of sync with the new vocabulary item ('frying pan') and its explanation. He assumes that the lesson is still following the format of contribution and writing on the board and seeks to have OIL 'oil' written up. Only later does A realize that his contribution is out of sync with T's actions. Later in the sequence, a similar glitch in synchronization reoccurs when A's response and contribution of SAUCEPAN and 'hey



a: 00:09.6” b: 00:13.3”

T	SPEECH	right a pan	this one	when we’re	frying	right means	not in the cooker
	SIGNING	PAN	FRYING PAN				COOKER
	FINGERSPELLING				F-R-Y-I-N-G		
	GESTURE						head shake
	GAZE	To B					
	BODY	To B					
A	GAZE	To T				Looks at picture on desk	
	BODY	To board				Bends forward to desk	

					Figure 3a			Figure 3b
T	SPEECH		not a deep pan		but just with oil	we call it	a frying pan	a frying pan ok
	SIGNING	LARGE	DEEP	FRYING PAN / COOKING	OIL	NAME / WE CALL IT	FRYING PAN / COOKING	FRYING PAN / COOKING
	GAZE	To B						To board
	BODY	To B						To board
A	GAZE	[Continuation of above] looks at picture on desk				To board and T		
	SIGNING							OIL
	BODY	Bends forward to desk				Sit back in chair		

Figure 3. (a): 00:09.6”, (b): 00:13.3”, (c): 00:19.4”, (d): 00:23.5”, (e): 00:26.8”, (f): 00:36.0”, (g): 00:57.0” and (h): 01:01.0”.

that one’ does not reach T as she turns to write on the board. The actions are eventually brought back into sync by the intervention of C who has had a more comprehensive view, and hearing, of the whole interaction and uses speech, sign and gesture to capture T’s attention and reinforce A’s contribution. This enables the communication between A and T to be reestablished as T writes ‘oil’ on the board. A and T recognize the un-synching of turns, and T re-syncs the interaction to move forward.

Discussion and conclusions

These findings reveal the complexities of orchestrating the linguistic and embodied components of translanguaging in action, and what is involved in the context of a mixed group of interlocutors where there are sensory asymmetries and different languaging preferences among learners. The educational setting of this interaction espouses a bilingual approach that includes the use of BSL and spoken/written English according to individual pupil repertoire but a bilingual classroom pedagogy – that is inclusive of all learners – presents specific modal challenges and opportunities.

c: 00:19.4" d: 00:23.5"

			Figure 3c			Figure 3d
T	SPEECH	Right	what's it	called	If it's	like this
	SIGNING		WHAT NAME / WHAT'S IT CALLED			
	GAZE	To B			To board	
	BODY	Turn right from board to A then B			Turn left to board	
	DRAWING					draws saucepan
A	GAZE	To T and board				
	SIGNING	OIL (repeated) →				
	BODY	Move R arm upwards and out towards H				

Figure 3 *Continued*

The range of semiotic resources used by T, including the use of signed and spoken languages, are intentionally inclusive of the two deaf learners and their different communication preferences. Signed language and spoken language are used in conjunction with written and visual resources and embodied strategies to convey meaning, and to take and offer turns in the interaction.

However, for all interlocutors to be able to visually follow the unfolding of the interaction, the use of space has to be coordinated with the simultaneous and sequential use of multimodal resources. These intersemiotic correspondences (Lim 2019) are intrinsic to inclusive communication where the character of the activity requires shared attention. This is achieved when the interaction is teacher-centered, that is, when T can orchestrate and maintain the pupil's visual attention. However, the inclusive possibilities of the use of different resources by T are not optimized where the multiple demands on the pupil's visual attention are not synchronized.

Because of the different modalities of production, all participants are capable of simultaneous production of signs (in the semiotic sense) normally associated with two different languages, that is, spoken English and BSL. These possibilities for simultaneity, especially in the presence of writing activity, on the one hand, provide multiple opportunities for deaf learners to access the target content but equally provide multiple representations of meaning that need to be attended to and be connected.

Inclusivity breaks down when the use of modes is not sufficiently coordinated according to the possibilities and constraints of the space, and the sensory needs of participants. Reasons for these glitches can, in part, be explained by the different sensorial orientations of the hearing and deaf interlocutors. The alignment or synching of modes may be generally less intuitive for hearing than for deaf teachers. This difference has been found in the early development literature in comparisons between deaf and hearing caregivers (Traci and Koester 2010) but has not been systematically compared in the classroom context. The power relations among the deaf and hearing interlocutors (Poza 2017) may also contribute to misfires where teacher communication decisions,

e: 00:26.8" f: 00:36.0"

		Figure 3e				Figure 3f	
T	SPEECH	a saucepan				for oil you'd use this one	
	SIGNING					OIL	
	GAZE	To board		To C		To A	To board
	BODY	To board				To A	To board
	WRITING		saucepan				
	GESTURE						Left hand point to 'frying pan' on board
A	GAZE	Continuation to T and board				To T	
	BODY	To B				To T	
	SIGNING	SAUCEPAN	SAUCEPAN	SAUCEPAN		OIL	
	SPEECH	hey that one				oil	
	FACIAL EXPRESSION					Eyebrows raised	

Figure 3 *Continued*

dominated by a reliance on spoken language, are less than contingent on pupil-initiated contributions (De Meulder et al. 2019).

If we understand translanguaging to be a natural component of bilingual classroom pedagogy that is hospitable to the full communicative repertoires of learners, meaning-making practices associated with this framework that include the integration of different modes in classroom communication need to be problematized in the context of deaf education. Translanguaging in this context does not guarantee an inclusive experience for learners, and indeed can give rise to confusion and a fragmented language experience if the semiotic resources are not sufficiently coordinated in both space and time around the sensorial asymmetries of the interlocutors. At best, translanguaging can provide the 'understructure' (Prada 2019) for inclusive practices that then need to be enacted with an understanding of the sensory conditions of the interaction.

This work underlines the insights into meaning-making and communication that a multimodal analysis can deliver. However, extending this work to encompass interaction that presents sensory and communication asymmetries, brings conceptual and methodological challenges in terms of annotation, accessible reporting and the representation of signed languages, positioning and objects, alongside transcription of spoken language. We echo the need for software programs

g: 00:57.0" h: 01:01.0"

		Figure 3g				Figure 3h
T	SPEECH			Oil you'll ha you're saying oil sorry		[Laughter]
	GAZE	To C	Down to paper	To A	To board	Eyes closed
	BODY	To C		To C	To board	To A head back
	WRITING				oil	
	GESTURE			Right hand raised open palm		
A	GAZE	To T				Eyes closed
	BODY	To T			Central in chair	Head shake
	SIGNING	OIL				
	SPEECH					[laughter]
	FACIAL EXPRESSION	questioning				[laughter]
C	SPEECH	A said [inaudible] she'll have some oil				
	SIGNING	A				
	GESTURE		Right hand point to paper on desk			
	GAZE	To T	Down to paper			
	BODY	To T			Head nod	To A

Figure 3 *Continued*

that can support the complexity of analysis and forms of presentation of data deploying across multiple dimensions and parameters (Adami and Swanwick 2019; Lim 2019; Swanwick 2016).

In practice, whilst we do not anticipate teaching professionals engaging in a similarly detailed process, a lot could be learnt from the close observation of even short interactional episodes to map out the classroom layout, positions and resources of the participants, analyse the auditory and visual attention demands of the setting and the coordination possibilities of these intersecting resources. In particular, the three analytical dimensions we have identified, that is, (1) resources used in meaning-making, (2) spatial context and (3) coordination through time, could provide a navigational aid also for teaching professionals' observation of and reflection on their own practices in the classroom.

The conceptualization and implementation of translanguaging opens up inclusive communication possibilities for deaf education classroom interaction but at the same time exposes

complex challenges in terms of the coordination of multiple modes. The layout of the communicative space combines with the participants' sensory asymmetries to determine in complex ways which multimodal configurations at every given moment include or exclude participation in the interaction. By moving away from a focus on linguistic behavior to embrace the multimodal and multisensorial aspects of communication, this work highlights the impact of sensory asymmetries on inclusivity and how we might fine tune the quality and efficiency of interaction to bring this about.

Notes

1. A person with a severe hearing loss will not be able to hear the speech of others without hearing technology.
2. A person with a moderate hearing loss will find it difficult to hear soft sounds and quiet speech without hearing technology.
3. Signature is an awarding body for deaf communication qualifications in the UK.
4. ELAN is a computer programme created by the Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, The Netherlands. More information and the programme itself can be downloaded here: https://tla.mpi.nl/tools/tla-tools/elan/. (Wittenburg et al. 2006).

Acknowledgements

We would like to thank all of the participants, as well as the deaf and hearing BSL interpreters who worked with us during the analysis stage. We gratefully acknowledge the funding received from Leeds Arts and Humanities Research Institute and the School of Education, University of Leeds in supporting the Signs beyond Borders Project, during which this research was carried out.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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