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A proposed method to analyse visual (pictorial) data that is used to enhance qualitative interviews with people with a learning disability: a case for convergent and holistic data triangulation.

Abstract.

Background

People with learning disabilities often use visual data to support comprehension and expression in their everyday lives and more recently there has been a rise in research methods that include visual data collection. Visual data can be collected when using communication tools such as Talking Mats and Q-sorts.

Aim.

To provide an example of one approach to include visual data that is collected parallel to verbal data in the analysis and interpretation of the data.

Method

A new method is presented where visual and verbal data is analysed, interpreted and disseminated using convergent and holistic triangulation. An example is provided from four Talking Mats that were completed with six participants relating to problems with their sleep.

Results.

The triangulation of visual and verbal data is shown to be feasible and increased shared understanding of the participants responses on the Talking Mats, in comparison to adding up responses in a Likert-type fashion.

Conclusion

This new method provides a systematic process for the inclusion of visual data in the analysis and convergent and holistic triangulation with verbal data, to increase credibility and confirmability of findings and heightened insight into the phenomena under investigation.

Keywords

Intellectual disabilities, learning disabilities, alternative and augmentative communication, talking mats, visual data, multimethod research, triangulation.

Background.

Qualitative inquiry can include words expressed during interviews, observations and videos or pictures of moving or still images (Miles et al 2020). The meaning expressed within these are often contentious and can lead to different interpretations which is influenced by the person who is interpreting them, the culture and context. Given the ambiguous nature of interpreting qualitative data it can be argued that integrating different elements of narrative data in a systematic way to produce a meaningful and coherent whole, that does not favour one element over another, will produce more breadth and depth into the phenomenon of the study.

Visual data are images that prompt dialogue and thinking and can be generated by the researcher or participants. Participant-generated visual data can include drawings, photos, and graffiti walls. In comparison, researcher-generated visual images include symbols, pictures and photos that support shared attention, understanding of questions or concepts. There has been an increasing propensity to include visual data within data collection methods, enabled by an increase in accessibility and use of digital technology, availability of technological advancement and desire to include participants who use visual communication aids (Smith et al 2016). This increased popularity of accessible and inclusive approaches within learning disability research and practice, which often rely on visual data collection, are supported in the literature (Cluley et al 2021; Gjermestad et al 2023). Visual communication aids allow people with learning disabilities to concretize their lived experience thereby translating and communicating their personal perceptions, feelings and issues into tangible representations that can support depth to participants' reflection and can be preserved for data analysis (Chinn and Balota 2023).

Literature review.

The use of visual aids during data collection can reduce communication barriers and support engagement and has therefore been adapted for a range of methods and methodological perspectives. Visual data collection methods include photovoice, talking mats, pictorial Q-sorts/ Q-methodology, photo-story maps, graffiti walls and combinations of participants drawing, artwork and visual cue cards (Smith et al 2016; Martz et al 2020; Gjermestad et al 2022; Nind et al 2021; Darvell and Bradshaw, 2023). Although it is generally agreed that visual research is both credible and trustworthy in gaining insight into the lived experiences of people with learning disabilities (Mitchell 2011), limited methods exist for analysing and presenting the visual data collected for research as part of ethnographic, phenomenological, grounded theory, and participatory action research (Liebenberg et al 2012). Furthermore, a recent literature review of interviews using photo elicitation by Chinn and Balota (2023) failed to address data analysis, instead the review focused on participants and data collection methods. Researchers have either used reflective or inductive thematic analysis, content analysis, or have presented limited information about how and to what extent the visual data was included in the analysis. In addition, a large proportion of researchers excluded the visual data they collected altogether in the analysis of interview data (Smith et

al 2016; Spassiani et al 2019; Nind et al 2021). There is emerging literature which presents more innovative and inclusive analytical examples which include involvement of participants during the analysis (Kor and Lim 2020; Cluley et al 2021) to ensure that it is not only the researcher's perspective that is included and enabling researchers to further explore alternative interpretations of the visual data. This increases validity of inferences that are drawn by the researcher; however, it can create a burden on participants with regards to their time and resources (e.g., travel expenses). Furthermore, information needs to be presented in a format that is easy for participants to understand, and researchers need to ensure that members checking the interpretations of the results feel comfortable and confident in voicing their feelings and opinions. The latter is important given the risk of social acquiescence and power imbalances. Finally, participants may have different views on the data given that this will be perceived through their own lenses, with their own experiences potentially being seen as more impactful to them than data from peers, therefore giving a biased slant towards their own experience rather than viewing data across-participants as equal.

The overuse of and overreliance on language-based methods coupled with an underuse of visual methods in social science research (Ciolan and Manasia 2017), could be a result of uncertainty about and lack of methods to analyse visual data (Smith et al 2016). However, insights into perspectives of people with learning disabilities and other groups of people who need support with communication, may remain hidden, when solely relying on a single data format or when depth of analysis and triangulation of the different data sets is missed (Martz et al 2020).

Aim.

The aim of this paper is to position one method to systematically include analysis of visual data alongside the verbal data collected through interviews to strengthen findings and offer possibilities of new insights during interpretation. The paper will report on an empirical study involving interviewing people with learning disabilities as participants as an example and to facilitate further discussion, although the findings of this study are beyond the scope of this paper it is used to support recommendations for the application of triangulation of data in practice. Therefore, the aim of this methodological paper is to offer a method to integrate verbal and pictorial data through triangulation of these data sets rather than report on the findings of the study.

Method.

Multimethod approaches have been used to link diverse qualitative procedures such as visual elicitation methods and verbal data collected during interviews to examine objective and subjective aspects of participants' lives (Hense 2023). Offering the opportunity to combine data collection on emotional responses as well as systemic and processual perspectives can increase insight into the complexity of lived experience in the real world (Ayed and Aoud 2021). The benefit of multimethod approaches is that the strength of one approach can reduce constraints of the other approach, however it should be acknowledged that limitations in the design can impact data collection and analysis across multimethod

studies. Research that includes data collection and data analysis of visual and verbal data therefore needs to be carefully planned and methodological.

Ethics and ethical issues.

All participants were provided with a video and easy read information to help them decide if they wished to participate in the study. In accordance with the ethical approval gained (IRAS reference 22/LO/0154 and University ethics committee approval reference number 40069), prior to commencing the study all participants spoke to the lead researcher about their rights and consented to participate.

Participants.

Participants were recruited from charity organisations and advocacy groups that supported people with learning disabilities in the UK. The inclusion criteria for the study included adults with a learning disability who were residing in the local area, abstract thinking, able to provide consent following accessible information being provided, and self-reported sleep problems. This resulted in six participants (3 male / 3 female with mild to moderate learning disabilities) being interviewed using four Talking Mats related to aspects of sleep problems.

Data collection.

Participants were able to participate either in one session or could decide to split this over multiple days or take breaks between completing each Mat. The questions asked were:

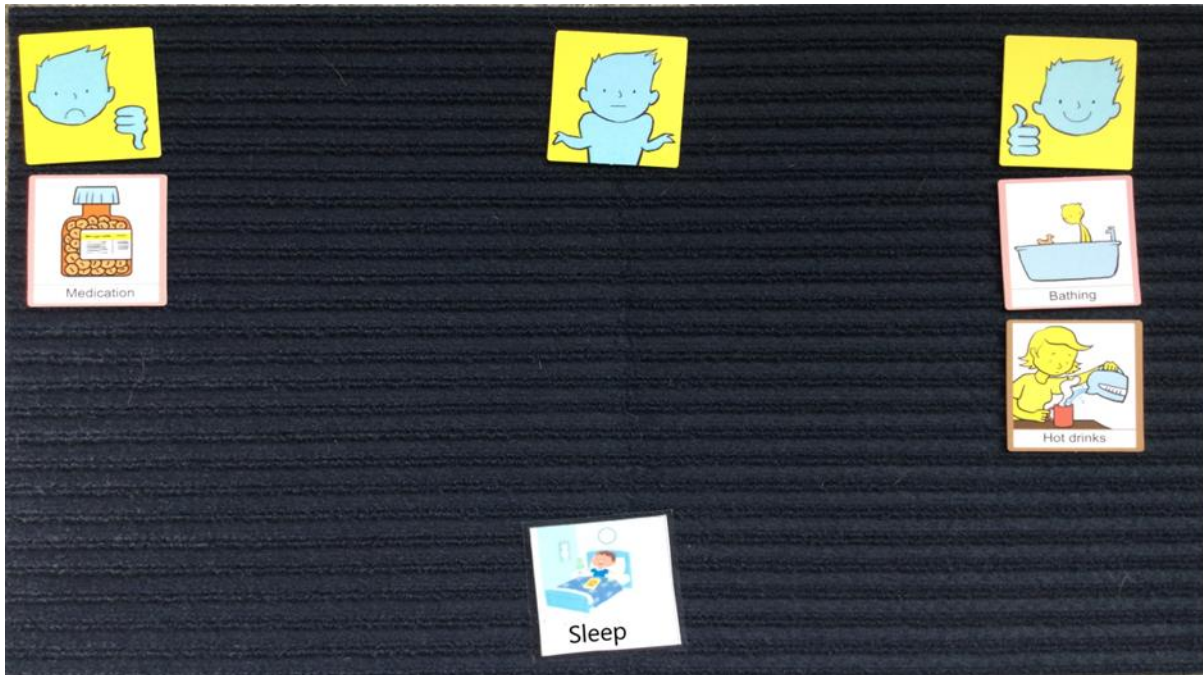
1. What do you feel is a problem with your sleep?
2. How do you feel when you have a bad night sleep?
3. What do you feel helps you to sleep well?
4. How do you feel about trying these strategies to see if they help you to sleep well?

The interviews were video recorded with participants consent and both verbal and nonverbal communications were transcribed (Authors name, in progress). Screenshots of the completed Talking Mats were also taken and used as research data to support triangulation of data.

Equipment.

For the purpose of the study on sleep problems Talking Mats were selected to support data collection. A picture of a talking mat (Figure 1) has been provided as an example to illustrate the discussion below.

Figure 1: Talking Mat relating to sleep.



Talking mats is a low technology augmentative communication system that can provide participants with a symbol-based framework to support interpretation of questions and expression of responses during interviews (Stewart et al 2018). Talking Mats use a three-point closed scale to elicit participants' feelings about concrete phenomena and open-ended questions to obtain insight and expansion on the item represented in the pictorial image. The bottom picture represents the phenomena or domain of study being discussed and the closed scale above, the top scale, represented by a thumbs up, thumb down or arrows facing in opposite directions to represent when it could be good and going well, sometimes okay and not so good or not going well other times. The interviewer explains the dichotomy of thumbs up to thumbs down represents 'going well' or 'like' for the item to 'not going well' and 'dislike'. The middle card is often termed 'so-so' to indicate when it is 'only sometimes going well' or that they 'don't have a particularly strong feeling', 'like' or 'dislike' towards the item represented in the picture. Participants are handed one option card at a time that represents different aspects of the domain to encourage participants to reflect on a wider range of items and to provide a more comprehensive understanding of their perspectives, experiences, and preferences. The benefit of using Talking Mats as a communication tool is that it enables shared attention, breaks larger vague questions into manageable chunks and is not solely reliant on understanding and recall of spoken language to reduce dependency on working memory and distractibility (Darvell and Bradshaw 2022). Despite the use of open-ended questions, participants often respond with short responses or non-verbally (Darvell and Bradshaw 2022), making qualitative data analysis that relies on rich spoken words problematic for researchers. Therefore, inclusion of nonverbal data and positioning of pictorial information has been perceived as a meaningful way to interpret responses and gain insight (Authors name, in progress).

Results,

The paper will now consider how collating responses across participants as quantitative data to support findings alone may reduce depth and thus limit the potential for valid interpretation and insights.

There is a dearth of guidance available in the literature on how to analyse visual data obtained by Talking Mats (as depicted in Hayden et al 2023 overview of available publications). Researchers using Talking Mats to support data collection have relied on the transcribed verbal commentary to support the findings and use of tables to convert responses to numerical data using ordinal scales such as Likert-type scales and/or tabular descriptions of percentages for descriptive or statistical analysis (Darvell and Bradshaw 2022; Samuelsson et al 2023). However, the simplicity of converting visual representation into Likert-type scales without further analysis of the agreement (convergence) or difference (divergence) with the spoken word or non-verbal communications should be acknowledged. Plowright's (2011) framework for integrated methodology posits that narrative data, including verbal and non-verbal communication and pictures collected during interviews, are nominal and ordinal, thereby, labelling the variables and identifying individual elements under study and classifying and categorizing this information to place it in some type of order. Likert-type scales are generally considered to be ordinal data. However, by using an ordinal scale we are assuming that there is an interpretive difference between 'thumbs up' and 'thumbs down' and that these lie on the polar extremes with 'so-so' being in the centre of this continuum. However, participants expressed different interpretations of what the columns represented and that my 'thumbs up' was not seen as the same as their 'thumbs up'. It was therefore, felt valid to maintain the lowest level of measurement of categorising attributes that arguably have the least amount of quantitative meaning, thereby making data enlargement to provide ordinal data redundant (Polit and Beck 2006). Reducing data from higher levels such as ordinal levels to nominal levels is generally accepted (Plowright 2011) and reduces inaccurate interpretations that one response on a dichotomy is higher ranking and thus better than an opposing response on the dichotomous variable. Nominal labelling and identification of elements from verbal dialogue, non-verbal communications and placement of pictorial representations could then be compared at one categorical level.

Studies that have collected visual and verbal data look at validity of the data analysis through considering if the communication was effective (did the participant understand what was being asked, engagement, confidence, satisfaction and the interviewers' understanding of the participants' views) and if there was identification of social acquiescence in the responses (Bunning et al 2016; Darvell and Bradshaw 2022). However, we advocate a more nuanced analysis using convergent and holistic triangulation as it allows for a structured approach to uncover further insights and new knowledge. Triangulation in social science research refers to using multiple approaches to understand a phenomenon through converging the data and/or enriching understanding by increasing breadth and depth of knowledge (Turner et al 2017). Therefore, convergent and holistic triangulation identifies where the data converges to show agreement across research methods but also for divergence in the data to develop further insight. The analysis including the triangulation

should therefore be sufficiently thorough to identify issues with effective communication, misinterpretation of responses and possible social acquiescence as well as identify unique issues to the data set for further considerations for validity and reliability of data analysis and interpretation.

Visual data can complement or add new perspectives to the verbal data, especially when participants find it difficult to express themselves verbally. Therefore, one source of knowledge should not be privileged over other sources but triangulated to uncover meaning and depth from all available data. Triangulation involves incorporating data from different sources, methods, or timeframes to strengthen the credibility and validity of research findings (Yuniar et al 2023). Methodological triangulation of data has been found to strengthen rigor of qualitative research using photovoice and visual data (Oleinik 2014; Girang et al 2022).

Brannen (2005) argues that triangulation can result in corroboration, elaboration, complementarity (highlighting different aspects of the phenomenon) and contradiction. However, given that the researcher was also interested in how visual data could add new knowledge and insight, classification developed by Onwuegbuzie and Denham (2013) was preferred. This enabled the researcher to code if visual and verbal data were interpreted under the headings of corroborate, discover (incorporating contradictions), capture (to incorporate complementarity and elaboration of the spoken word) and finally broaden (to highlight where visual images expanded or developed new direction of thought or insight).

To triangulate verbal, nonverbal communication and visual data, the triangulation process is conducted in 4 stages. Stage one is immersing in the data, stage 2 is presenting the data in a format that allows cross case comparison. Stage three involves triangulation of verbal and visual data and finally stage 4 is reporting of the data.

In the research study on experiences of sleep problems the researcher (LH) initially immersed herself in the verbal and nonverbal responses to the open questions to gain insight into the participants' subjective feelings. Following from this the placement on the Mat was tabularised to facilitate cross-case comparisons. Finally, the symbolic representation of 'thumbs up', 'so-so' (indicated by arrows going in opposing directions) and 'thumbs down' was triangulated with the verbal and non-verbal communication to support an iterative approach. Finally, in stage 4 the data is reported to participants and disseminated wider. The triangulation of the data has been illustrated in an example below (table 1) which shows how colour coding was used to maintain the information in the visual realm. This provided a simple and quick overview of the vast amount of data which facilitated further comparisons and uncover what was previously hidden.

Talking Mat four considered the perceived value and feasibility of sleep strategies. Table 1 presents the participants responses to the visual scale through use of a 'thumbs up' or 'thumbs down' and shading to indicate where this was in corroboration and consistent with the transcribed data (green horizontal shading), where it contradicted or refuted the transcribed data (red shading) and where it captured or clarified additional information (yellow chequered shading). Finally, blue diagonal shading indicated the broader code which

highlights new insight. At times, there is overlap where an item might be perceived as both, capturing something new as well as corroborating or refuting the verbal communication. However, a decision to code this under one category does not limit the opportunity to discuss in more depth within the narrative how it was also viewed within a second category. Therefore, annotations to the visual were used to support this process. No code (no colour) was given where verbal or nonverbal data was not available to support or refute the visual data. To enable comparison with using a Likert-type scale a score column is also included, this calculation is based on a 'thumbs up' receiving 2 points, a 'so-so' receiving 1 point and a thumbs down being given no points.

Table 1: Triangulation of visual and verbal data relating to participants feelings towards strategies that are used to support sleep.}

Strategy	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Score
Praise		Said no		More for kids		Not enough to code	8
Alarm clock	Husband's alarm goes off	Don't have problem waking up					8
No caffeine					Don't do		7

Legend: Thumbs up indicates willing to try, thumbs down not willing to try and arrows is unsure or maybe willing to try. Cell background is white for not enough information to code, green horizontal if coded as corroborate, yellow chequered indicates capture code, red for refuted and blue diagonal shading indicates the broaden code.

The capture code was used when participants did not feel the need to elaborate on the decision of the placement of the picture and therefore did not corroborate speech but expressed their feeling towards the strategy. For example, the comment "it is more for kids" neither clarifies an intent to try or not to try the strategy in the future and therefore the card could have been placed under any column. Placement of the card under the 'so-so' column, can be interpreted that the participant might want to try 'praise' but there were more preferred strategies as they felt 'praise' was 'childlike'. As depicted in the example, the capture code frequently followed participants providing a rationale about the decision and therefore there was little need to clarify or corroborate the position in words as this was

done by placement of the card while giving their rationale. The rationale included talking about the strategy, how they had tried it before but it didn't work, or how a husband has an alarm, as so forth.

In comparison, the blue code highlighting further insight, was used when participants verbally discussed their experience or preferences, and insight into interpretation of the prompt and insight into their response was gained. Therefore, insight could relate to the research process, cognitions and interpretation or insight into participants' perspectives that are not simply clarifying information about the experiences and perspectives of the phenomena being discussed. For example, participant five spoke about how he does not drink caffeine but drinks decaffeinated tea and coffee as an alternative. However, from their discussion and reassurance sought from staff, it remained unclear if he would choose caffeinated beverages if he had the opportunity without feeling that he would displease others. The placement on the Mat and their nonverbal communication therefore provided greater insight and it was interpreted that the participant felt that it would be undesirable to have caffeine (negative response) and was therefore unable to give it up (negative response) and thus gave a 'thumbs down', despite not drinking caffeine and being happy not to drink it, potentially resulting in a 'thumbs up'. Therefore, depth of insight often related to how visual data gave insight into the participants' interpretation of the questions and was supported by the researcher (LH) switching from an etic to an emic approach during data analysis and interpretation (Beals et al 2020). This enabled the researcher to consider the understanding and response to the question from the participants' point of view (insider, emic approach) as well as the objective observation (outsider, etic approach).

Table 1 highlights how simply adding the scores, which is possible with a Likert-type scale, indicates that 'praise' would be a preferred strategy. However, from further analysis and triangulation of the data it is evident that 'praise' received more negative than positive verbal feedback. Furthermore, if 'no caffeinated drinks' were interpreted as 'happy not to as already not doing' then this would have scored the highest. What this illustrates is that simply adding up results numerically or as percentages can result in invalid interpretations and conclusions. This is particularly evident when sample sizes are small, resulting in likelihood of false positives and errors.

Caution should also be taken with regards to the 'refute code', especially given that the participants were informed that there was no right or wrong answer. Therefore, 'red' does not necessarily indicate an incorrect response or incorrect placement on the Mat; instead, it represents poor understanding by the researchers of the response provided by the participant. In addition, a 'red' may indicate an indecision on behalf of the participant or an error (e.g., accidentally placed in the wrong column).

Discussion

There is an increase in the use of alternative and augmentative communication systems when working with people who have learning disabilities (Elsahar et al 2019). This increased use in practice is mirrored by an increase in researchers working in the field applying these

techniques to collect data from participants with barriers to communication. However, this increase in using alternative and augmentative communication systems that obtain a vast array of pictorial and visual data needs to be supported by rigorous and valid approaches to systematically include this data within the analysis that support the researchers' interpretations and conclusions. This paper proposes one method and an applied example that is unique in its approach to amalgamate both visual and verbal data. Data analysis needs to appropriately address the research question, in accordance with the data collection method and participants included in the study and thus is positioned as an example for researchers to consider in the future. However, Smith et al (2016) argue that when analysing qualitative visual data the approach may not be relevant to other disciplines due to the unique way that visual data is used in the field. On the contrary, approaches may support advancements in other areas using similar alternative and augmentative communication systems to support individuals with communication barriers to be included and involved in research activities.

Inclusion of visual and verbal data in the analysis is not only of benefit to the researcher aiming to increase depth to their insight but also to people with learning disabilities who are involved in the analysis and verification of research findings. During triangulation, the coding of verbal data into easily identifiable colour codes enables large data sets to be presented and thus viewed more easily than written texts from transcriptions of verbal data. Chinn and Balota (2023) recently suggested that people with learning disabilities should be involved in the analysis and therefore, the visual data incorporating participants' responses and coding from triangulation can be presented in a more accessible format to enable further discussion with patient and participant involvement groups to enhance validity of the inferences to be drawn.

In practice settings visual data are often used to support comprehension and expression. Visual data communication aids to support people to express their needs, wishes and feelings include use of emotion cards and boards as well as Wong-Baker faces, Talking Mats and more customised tools. It is reasoned that service users indicating choice by selecting particular visual data or categorising visual data into sets such as those that are liked and disliked should not be considered in isolation but alongside the verbal explanations that are provided to support their choice. Thereby, when documenting outcomes of these interactions indicating a person's selection alongside a brief narrative of their response offers a more informative and holistic approach. This combined information from the visual and the verbal realms provide a wealth of knowledge about the person that can support person centred care planning in the future.

Limitations.

The method was used in one study relating to a specific phenomenon and with a small sample. Therefore, due to the unique way that visual data is used as part of research involving participants with learning disabilities and that the example provided only used Talking Mats could be seen as a limitation. However, the authors propose that photographs of real-world images could be analysed and presented following the same process as the photos of the placement of pictures in Q-sorts and Talking Mats, whereby elements of the

photographs are categorised and triangulated with the verbal word to identify where data corroborates, diverges, captures and broadens understanding. Furthermore, these communication tools are being used with heterogeneous samples including participants living with dementia and people who have had a stroke (Dalemans et al 2009; Nocivelli et al 2023), creating opportunity to explore the benefit of triangulation in practice and in research projects in these areas.

Recommendations.

Visual and verbal data used in conjunction, can support researchers to create depth, explore complementary perspectives and with interpretation of findings. Further research is needed that applies this technique to other methods of data collection that involves pictorial data sets. Further research should look at how triangulation can support researchers using different methodological approaches, different communication tools and with different subsets of the population. Further research is also needed that considers the iterative nature of data analysis and ability of novice researchers to adapt an emic and etic approach which strengthens the act of visual and verbal data triangulation.

Conclusion

In conclusion, this paper offers an innovative method to data analysis and reporting following concurrent multimethod data collection aimed at obtaining visual and verbal data. Giving both data equal status enables greater depth than either data set would glean in isolation. Therefore, the extended reflection and information perceived through different senses compensates for the reduced elaboration in verbal responses often found when interviewing people with learning disabilities (Hollomotz 2018).

Implications for practice

- Communication aids that use visual data aids can support people with learning disabilities to express their views, preferences, needs and wishes.
- Focussing on only one form of expression such as visual data can lose depth of understanding.
- Consideration of both the verbal and visual data generated from interactions can support insight into people with learning disabilities preferences, needs and wishes to inform care planning.

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