



Prifysgol Cymru
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Case Study

ECAD7004

Research Question

“What are the perceptions of students and staff of mini-whiteboards (MWBs) as an engagement strategy within a drama class?”

Targets from the previous assignment:

	The targets from the previous assignment	Applied in this assignment
Target 1	Continue to synthesise your research and find multiple sources who agree on a point.	In this assignment, I have continued to synthesise my research.
Target 2	Think about how you will use research to continue to develop your understanding of the nature of responsibilities within schools and of the contributions that individuals make towards the successful fulfilment of the school's vision to implement a SDP	Throughout this assignment, I have had an opportunity to develop my understanding of responsibilities and undertake further research into how individual contributions impact successful school visions.
Target 3	Ensure that you make the most of your PTE2 experience and engage with any community activities, as you show passion towards it.	I have ensured to engage fully with my PTE2, it has been rewarding to engage them in this assignment and their community projects.

This assignment aims to improve teaching and learning and equip student teachers with the skills to develop a critical research approach. In addition, it will enable student teachers to become ethical researchers through their choice of research methods, ethical considerations, analysis and the highlighting of important research already undertaken within the area of study. This assignment also aims to transform personal practice and promote professional development.

The research addresses the use of MWBs and their effectiveness as an engagement tool within the drama classroom. Do MWBs support or undermine student engagement? This question emerged due to observation of mini whiteboard use, within a drama lesson. At the start of the lesson, students were directed to collect MWBs and sit in a circle so they could start the lesson by answering a key question using their MWBs. During some lessons, it was observed that their use appeared to assist the students' focus and engagement, while at other times, the MWBs appeared to distract students, leading to disengagement.

A MWB is a supported Assessment for Learning (AFL) tool. However, it is used predominantly in science and maths classrooms. With a curiosity as to how students and teachers perceive using MWBs in drama lessons, along with the observation mentioned above, the research question started to emerge. 'What are the perceptions of students and staff of MWBs as an engagement strategy within a drama class?' The research took place in a mixed comprehensive school in South Wales. The school currently has 1684 students on roll (Estyn, 2023, P.1).

Literature Review

Wenning defines a MWB as a dry-erase board of a convenient size, which is written or drawn on by students to present charts, maps, concepts, graphs, diagrams or equations to the teacher and their peers. Using a dry-erase marker on the boards so they can easily be wiped clean is essential to note as part of a definition of use (Wenning et al. 2006, P.3). However, this definition can be elaborated on further by the dictionary definition, which has been included since the early 1990's. This definition highlights the process of using a whiteboard to collaborate with others (Oxford English Dictionary, 1992).

The first published study using MWBs was in 1995, in a research thesis exploring a new modelling method for teaching physics. It identified MWBs as an effective tool for developing student discussion (Wenning et al., 2006, P.63). Further research was needed to see how whiteboards could positively impact other subject lessons. However, the research literature into the use of MWBs, specifically as an educational tool, is currently limited.

Assessment for Learning - AFL

In recent years, MWB use has not been considered independently of AFL pedagogy as, throughout the literature, their use is often accompanied by discussions on how they support classroom assessment and the process of establishing where learners are at and where they need to go. The terms “formative assessment” and “AFL” are used interchangeably, as defined by the Assessment Reform Group (Broadfoot and Daugherty, 2002. P.3).

Black and William have argued that feedback should be regular, specific and relevant so students can be assisted in their learning (Black and Wiliam, 1998, p.8).

This research has cemented AFL into daily practice, such as Rosenshine’s principles encouraging teachers to frequently check if all students have grasped the new concepts (Friis, 2021, P.1). Gardner supports this by stating that when these assessment methods are implemented, it should promote active engagement of students in their learning and motivate students to demonstrate what they understand (Gardner et al., 2008, P.16). MWBs allow all students to share what they have learnt simultaneously. However, there are concerns that when a method receives widespread acceptance and is adopted quickly, the professional learning needed to support this implementation is inadequate. Wales has worked to combat this, introducing initiatives that address this gap (Gardner et al., 2008, P.5).

Embedding AFL strategies can be challenging. However, Fisher and Frey suggest that using MWBs to check for understanding can minimise the teacher's workload in the long term, as the lesson can be adjusted mid-way, making it more time and cost-effective (Fisher and Frey, 2014, P.62).

Facilitating learning with Mini-whiteboards

Aside from AFL, the literature suggests that MWBs can have a positive impact in the following areas: supporting collaboration and discussion in the classroom, higher-order thinking, and increasing the risks students take. These areas will be discussed below.

Collaboration and discussion

Wenning states that the use of whiteboards in the classroom creates a collaborative learning community through engagement with peers in the learning process (Wenning et al., 2006, P.4). This collaboration usually occurs between small groups of students, who brainstorm or record group ideas before presenting them to the class (Forrester et al., 2016, p.3). The collaboration it facilitates could have a lasting impact on classroom culture that surpasses its direct use. However, it is essential to note that further research still needs to be done in this area, though the results do seem optimistic.

Wenning suggests that using whiteboards allows students also to support and teach each other (Wenning et al., 2006, P.4). Research conducted in Wales in 2008 supports this, finding that discussion with peers was valuable, and even more so if ideas were subsequently shared and challenged in discussion with the group orchestrated by the teacher (Beauchamp and Kennewell, 2008, P.309).

High-order thinking

Through MWBs, higher-order thinking can be promoted in the classroom. They provide an opportunity for a question to be asked and for the whole class to immediately respond. Teachers should implement Bloom's taxonomy when engaging in this practice to ensure they ask questions that engage students in higher-order thinking (McNulty, 2021, P.1). Due to the immediate responses gained. Teachers can follow up with further specific questions to deepen understanding and make sure that all students have the opportunity to develop their higher-order thinking skills (West et al., 2016, P.49). Further research by Wiliam and Leahy 2015 supports this view and agree that MWBs are a useful tool for assessing students' thinking and supporting teachers in modifying their lessons to meet the student's needs (Wiliam and Leahy,

2015, P. 64). Overall, the literature supports the use of MWBs to promote higher-order thinking. However, the effective use of MWBs in this context still relies on a teacher's attention to ask questions that encourage higher-order thinking (Stock, 2017, P1).

Risk-taking

The literature suggests that the non-permanence of writing on a MWB encourages students to take risks and experiment with their responses, which can be easily erased and modified (Swan, 2006, P.173). Liljedahl observed that students using felt pens and flipchart paper took longer to write anything down and their risk-taking decreased compared to students using MWBs (Liljedahl, 2016, P.370).

Further research suggests that a MWB is usually held up in class only for the teacher to see or for another student, they are in pairs with, not the whole class. This is another aspect of using MWBs that will encourage risk-taking and mistake-making, which the research found is essential for effective learning (Kennewell et al., 2009, p.37). The MWB offers a unique opportunity for students to take risks.

The literature explored these areas predominantly in maths and science classrooms. It is clear further research is needed into the impact of MWBs on expressive arts subjects.

Explanation of Case Study

Cohen et al. define a case study as providing a unique example of real people in real-life situations, supporting readers to understand ideas more clearly and simply rather than presenting them with abstract theories or principles (Cohen et al., 2013, p.289). A case study topic is either based on an interest or an unusual aspect the researcher can explore or may develop from an inquiry process (Thomas, 2011, P.514).

Further research conducted by Simon agrees with part of Cohen's definition, acknowledging that the research occurs in a real-life situation and the value this brings. However, Simons argues that each project is not simple but rather complex and that every single case study is unique due to the system and policy it works within; in-depth exploration uncovers multiple perspectives (Simons, 2009, p.2).

Yin states that case studies come under three different types. A Descriptive Case Study, an Explanatory Case Study and an Explorative Study (Yin, 2009, p.21). A case study is the preferred method for developing the description of a social phenomenon due to the real-life context within which it is being researched (Yin, 2009, p.2). The exploratory case study is predominately used when there is no predetermined outcome. They are beneficial due to the 'how' and 'what' questions they answer through research undertaken, and in general, case studies ask 'how' 'what', 'why', and 'who' questions as they approach the area of research (Yin, 2009, p.27).

Hodkinson states that a case study approach helps us understand complex inter-relationships due to the severely restricted focus that a case study demands and that through this depth of focus, the complexity of an area is fully engaged with (Hodkinson and Hodkinson, 2001, P.3). He also notes that they are especially useful as a research method in the educational arena because they can explore experiences while still retaining the noise of real life (Hodkinson and Hodkinson, 2001, P.3). This can provide an opportunity to observe the unexpected that can then be integrated into ongoing research and application (Hodkinson and Hodkinson, 2001,p.3)

However, Hodkinson draws attention to the fact that the complexity can be challenging to represent within educational research. By sharing in linear written form, aspects of the picture can be unintentionally concealed (Hodkinson and Hodkinson, 2001,p.9). This leads to results that are challenging to generalise, as case studies are predominantly non-numerical, rendering case study findings of little value (Hodkinson and Hodkinson, 2001, p.10). However, Yin, through his research, has strived to increase credit given to a case study, noting how it draws from many lines of evidence for triangulating purposes and is aware of prior developments of theoretical propositions to guide the collection of data (Yin, 2002, p.13). Triangulation is a means of cross-checking information to determine whether different methods of research or observations of the same situation generate the same findings. Hodkinson's research concludes that case studies cannot be judged solely on meeting a set of criteria to be viewed as valid or qualitative. Instead, the reader must understand and consider carefully when presenting a case study, considering the specific context and research design (Hodkinson and Hodkinson, 2001, p.11). Yin argues that using a single case study raises concerns about generalising the findings due to the small number of participants involved (Yin, 1984, P.21). Hence, further research would be needed to allow generalisation.

Research methods

The two research methods used are semi-structured interviews and a Likert questionnaire.

Semi-Structured interviews

Interviews have become a widely used data collection method in qualitative research, as they can yield various information, such as facts, opinions, and preferences (Drever, 2003, P.1). A semi-structured interview is more flexible than a structured interview (Alshenqeeti, 2014, P.40). The interview is guided by a list of questions closely linked to key themes. There is no predetermined order or specific interview plan (Dursun, 2023, p.108).

The literature would suggest that a strength of semi-structured interviews is that they allow people to engage in deeper conversations, creating space for new evidence to emerge that may not have been initially considered. They also play an important role in suggesting possible new links and correlations between ideas within their dynamic processes. Having open-ended questions in the interview facilitates open-ended inquiry (Mohajan, 2018, p.39). This research method of interviewing also captures the interviewee's responses to a topic in its natural form and, due to this, can draw upon the person's inner voice through the discussion between the interviewer and interviewee (Kakilla, 2021, p.1). Seidman, from his research, concluded that interviewing, in most cases, is the best avenue of inquiry, especially if the researcher is interested in hearing about classroom experiences and the meaning that is made from them for both students and teachers (Seidman, 2006, p.11).

However, the literature clarifies that a semi-structured interview will only be successful if the interviewer has the skills and tools to conduct the interview effectively. There is heavy reliance on the interviewer's skill and pressure on their time to conduct all the required interviews (Mohajan, 2018, p.40). Another weakness of this research method is how it is viewed to have less influence on government policies due to the lack of numerical data that it produces (Mohajan, 2018, p.40). The method can also be limiting if there are language barriers between the participants and the interviewer, as probing can not occur easily (Marshall and While, 1994, P.566). Another weakness of semi-structured interviews is that they are best conducted face-to-face to collect the most impactful results, where the researcher can observe the

participant (Kakilla, 2021, p.1). This pressures the interviewer and interviewee to find the time to meet in person.

Semi-structured interviews were selected as the research method to allow flexibility and the teacher's perspectives to guide the interview, allowing key themes to emerge. As the method suggests, a list of key questions were used to prompt specific discussions around the use of MWBs (Appendices Figure 2); however, in keeping with a semi-structured interview, I made sure that those questions were only a guide and allowed for the teacher to lead the conversation and share their own experiences and perspectives.

Likert scale Questionnaire

The Likert scale was constructed to capture infinite attitudes in an ordinal scale format. It is often misunderstood and misused. So, in its use, it's essential to define that the Likert scale is a summation of a combination of multiple Likert items and should not be analysed if only a single item is utilised (Rinker, 2014, p2).

The participants are asked to rate their level of agreement with multiple questions, typically on a 5-point spectrum from strongly agree to strongly disagree. This will quantify the participant's perspectives and help reveal their beliefs, perceptions and attitudes (Ahmed, 2024a, P.1). The Likert scale is an attitude scale based on the premise that groups of related questions measure a participant's attitude about an issue addressed by the questions asked. Summing the responses results in a valuable and tractable measure of these attitudes (Batterton and Hale, 2017, P.32).

Regarding this method's strengths, I want to acknowledge that the debate goes much further than can be discussed in this section. However, the main points of discussion have been highlighted. A strength of using a Likert scale is that it is simple to construct and is easily understandable for participants. When designing an item to measure, the question should be written in easy-to-understand language to ensure the meaning is unambiguous for participants. (Nemoto and Beglar, 2014, P.3). The generated data provides a straightforward way to quantify subjective data, making it easier to analyse participants' attitudes and opinions towards the discussed variable (T, 2024, p.1). A Likert scale is also easily comparable, which makes it a strong choice when conducting longitudinal studies or comparative research (T, 2024, p.1).

The literature highlights that a limitation of using the Likert scale is that respondents may use a midpoint on the scale as a dumping ground when they are unfamiliar with an item's topic or if the item is ambiguous or socially undesirable (Chyung et al., 2017, P.3). Further research discovered that a Likert scale can be impacted by social desirability bias, which explains that respondents may select an option that they perceive to be more socially acceptable, above answering the question truthfully, this would negatively impact the results collected (Chyung et al., 2017, P.4). Another explicit limitation of this research method is that participants cannot answer in depth. The scale format restricts participants' answers, which can lack detailed and nuanced insight into a participant's thinking (Lindemann, 2023, P.1).

This research method will be used with a group of students to gain their perspective on using MWBs in a drama lesson. Due to the simplicity of the questions posed in this questionnaire, it is appropriate for students in year 7. Another positive aspect of using this method is that the results will be comparable, as clear patterns will emerge. The questionnaire is Appendices 3.

Data Presentation and Analysis Methods

The two research methods used in this study produced two data sets: the semi-structured interview generated qualitative data, and the Likert Scale generated quantitative data. This established triangulation, allowing methods to be cross-referenced, reducing the impact of bias, this was to ensure the trustworthiness and credibility of results (Ahmed, 2024b, P.2).

The semi-structured interview will be reported using thematic analysis. This method identifies the themes present throughout the data collected and analyses the present patterns (Braun and Clarke, 2006, P.79). There has been some contention in the research literature as to whether or not thematic analysis should be considered a method in its own right or simply a process to assist in the analysis of the data (Ryan and Bernard, 2003, P.2) However as discussed in the literature review, utilising this as a method of analysis and interpretation of the data is particularly advantageous when used in learning and teaching research (Maguire and Delahunt, 2017, P.2). The method allows for a better understanding of participants' attitudes and reflections on issues, supporting the researcher to directly develop themes from the data (Alhojailan, 2012, P.42). However, Berge suggests it is essential that when undertaking qualitative research, a reflexive approach is adopted, acknowledging an awareness that the

researcher will never be 100% objective due to their involvement in the research process itself (Berger, 2015, P.2).

The Likert data will be represented by a divergent stacked bar chart. Robbins and Heiberger recommend this visualisation style, as they state this to be the easiest way to compare participant's attitudes due to all the information being presented in one single graph (Robbins and Heiberger, 2011, P.1060)

Laura South et al. have contested that no perceptual research studies have been done to support this visualisation style (South et al., 2022, P.2). However, it is agreed that a visual representation of Likert scale data where clear trends are displayed, support a reader's understanding of the questions (Alabi and Jelili, 2022, P.1).

I have considered the Likert scale ordinal rather than interval so that the data is expressed in its original form. Research, including Sullivan and Artino, supports this, stating that the numbers taken from a Likert scale represent an ordinal response (Sullivan and Artino, 2013, P.542).

[Ethical considerations](#)

The British Educational Research Association (BERA, 2018, P.iii) has established ethical guidelines for undertaking educational research, which have been adhered to (Appendices- Figure 4).

The guidelines state that an ethic of respect should be the foundation of educational research (BERA, 2018, P.6). The EWC agrees, expressing the importance of extending this respect to data handling (EWC, 2019, P.4). This sentiment is carried through in UWTSD's Research Ethics & Integrity Code of Practice, where anonymity is foundational (UWTSD, 2015, P.17).

Confidentiality was ensured during research. All data was collected and stored safely and correctly.

To ensure the research was conducted ethically, consent was obtained from parents/guardians via a consent form (Appendices- Figure 1) as the participants were under 18. This process follows the BERA guidelines 2018, as the consent form includes a letter that explains the research, the process, and how the results will be published. Also, it stated the questionnaire would be anonymous, with the child's name kept confidential. As noted on the consent form,

participants' assent was gained before completing the Likert scale questionnaire, and it was made clear when gaining consent and assent that the participant could choose to withdraw at any time, in line with BERA guidelines (BERA, 2018, P.9).

Education research debates the best way to gain assent from students. It is agreed that a heightened awareness of non-verbal and verbal expressions is required (Bourke and Loveridge, 2013, P.154). This is due to the school context's pressure to conform (Kirby, 2020, p.1). David agrees and furthers the argument by highlighting the pressure to receive a teacher's approval for cooperation (David et al., 2001, P.325). This discussion around assent needs further development. However, these ethical implications were considered, and observations were made when conducting the research.

[Results / Analysis of Results / Discussion](#)

This case study asked, 'What are the perceptions of students and staff of mini-whiteboards as an engagement strategy within a drama class?'

Three drama teachers were interviewed to understand their perspectives on using MWBs in their lessons. The interviews were analysed thematically, with the teachers referred to as teachers A, B and C. The analysis revealed three key subheadings under which the benefits and challenges of using MWBs were discussed: AFL, literacy, risk-taking and higher-order thinking. However, the analysis also highlighted the potential challenges when MWBs are used in drama.

The benefits of a Mini-Whiteboard.

AFL

All teachers identified AFL:

Teacher B agrees with this, stating: *'Even though it is erased, it is an opportunity to circulate the classroom so that we can identify who is able to use the correct vocabulary, who is stretching and challenging their literacy, who uses it accurately but also so we can identify any key misconceptions or develop an individual understanding.'*

Teacher A stated: *'It does help them feel confident in their answers because they have gotten it written down. I pick on people I know who have answers on their boards. Rather than frightening people, it's about getting those answers out. My natural instinct is to pick on people I know are not doing the work, and I fight against that, so that stops that visually.'*

From the participants' interviews, it became clear that the whiteboard was important for teachers because it allowed students to share their pre-prepared answers more confidently.

Risk-taking

All teachers agreed with risk-taking:

Teacher A stated: *'Students may write more and are not scared about getting things right or wrong. If they make a mistake, it's gone, and they can start afresh. And that's a nice feeling. I have never had anyone refuse to write on a whiteboard.'*

Similarly, Teacher C commented: *'I have never had anyone say no to writing on a whiteboard.'*

From the participants' interviews, it was clear their perspective was that students approach the MWB with lower stakes, allowing them to take more risks when answering and having less fear overall when engaging with them.

Literacy

Teacher A made the following comment on her perception of engagement and enjoyment.

'The starting task had to be written to improve literacy, ensure consistency across the school and provide an opportunity for writing. When I use it, I like it. And I think they do like to write things down.'

From the interviews, it was clear that expecting students to write in drama aligned with the school ethos, supporting consistency in lessons and continuing to support developing students literacy skills.

High-order thinking

Teacher A specifically comments on how MWBs can support students as they progress toward GCSEs, as KS3 students are encouraged to answer key questions.

Teacher A stated: *When I use the whiteboard at key stage 3, it is usually based on drama vocabulary, so it recalls drama vocabulary and contextualises semiotics. So, it is a mini-exam question.*

The participants expressed that the questions prompt higher-order thinking, allowing students to progress in literacy and exam technique. It could be suggested that MWBs could be a key element for facilitating this in drama lessons.

Challenges of using Mini-Whiteboards

Practical considerations

However, all teachers agreed that the boards can be a distraction for students in the classroom if not managed correctly.

Teacher A made a specific note: *'When the starter task first came in, it could be practical so that students could walk around and get into the space, all done in silence. That worked for my classes, and I liked the start of them coming in, putting their bags and shoes away, finding a space, and moving around the space. It was like a strong start. All*

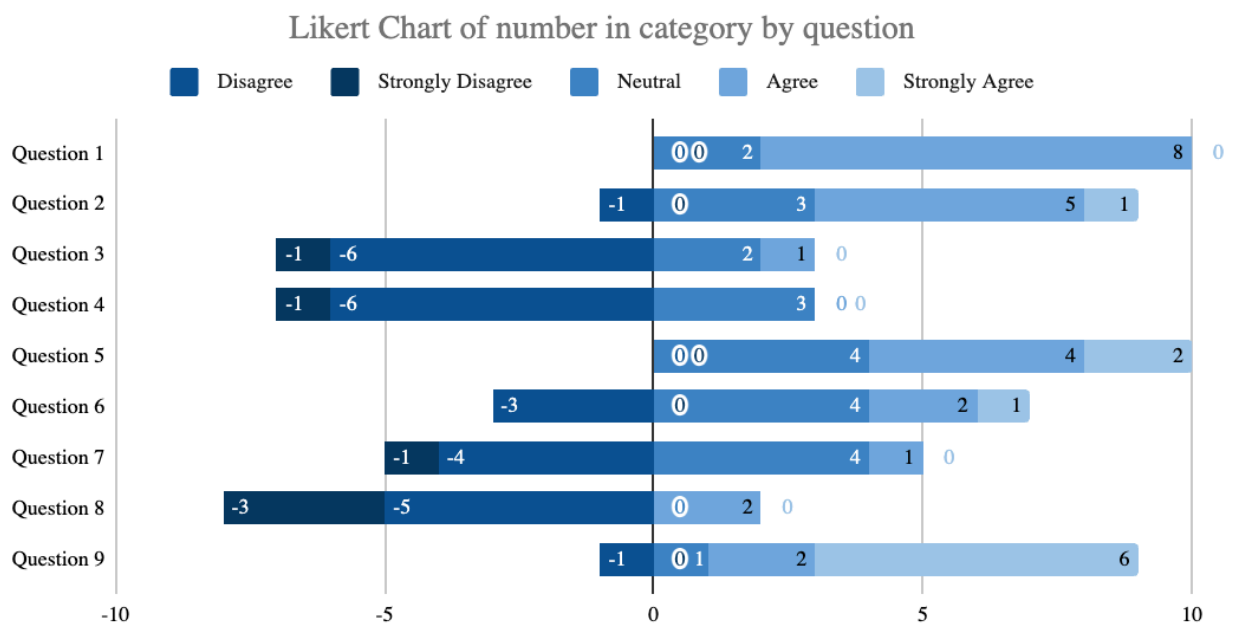
holding hands, or whatever we did, the students engaged. However, it was clarified that the task now had to be written.'

Later in the conversation, Teacher A: *'It is a stronger start, but can whiteboards only do that? In drama, could a game not be as engaging?'*

All participants noted that the whiteboards can distract students in the drama space. This asks, 'Are mini-whiteboards the best method for engaging students at the start of a drama lesson?' This question prompted my decision to undertake this case study, as there is a lack of specific research into MWB use in drama.

Likert questionnaire

Ten students responded to the questionnaire. Results are shown in a divergent stacked bar chart.



Question 1:	<i>Using a mini-whiteboard helps my understanding of the lesson</i>
Question 2:	<i>Using a mini-whiteboard helps me to work well with my classmates</i>
Question 3:	<i>Mini-whiteboards do not help my comprehension and understanding of the lesson</i>
Question 4:	<i>I do not think the use of a mini whiteboard helps me to work better with my classmates</i>
Question 5:	<i>When I use a mini-whiteboard, I feel more able to share my answers with the class</i>
Question 6:	<i>Using a Mini whiteboard at the start of the lesson helps my focus and concentration</i>
Question 7:	<i>I am less likely to share my answers with the class when I am using a mini whiteboard</i>
Question 8:	<i>I find it harder to focus and concentrate at the start of the lesson when I am using a mini whiteboard</i>
Question 9:	<i>I enjoy using mini whiteboards in Drama</i>

The question with the most positive response was question 9, which indicated that the use of MWBs is enjoyable for the majority of students. The question with the strongest negative response was question 8, which indicated that using MWBs does not make it harder to focus in class.

Responses to questions 1 and 5 indicate that the use of MWBs supports a student's understanding of the lesson and further helps them to share what they have understood with the class.

Responses to question 7 were mixed between students, showing a variation in opinion on how using MWBs will impact them sharing their answers with the class. This suggests that there may be other factors at play when deciding to share their answers.

The questions phrased toward positive views of MWBs (Questions 1,2,5,6, and 9) have a balance on the agree side, while questions phrased towards negative views of MWBs (Questions 3,4,7 and 8) have a balance toward disagreement responses. This confirms that students view MWBs positively.

These results support the drama department's decision to complete written tasks on MWBs; overall, students and teachers perceive them positively. The outcome of this limited research has supported the broader findings in the literature.

Conclusions

In conclusion, the methods used in the research will now be critiqued.

The style of questions used in a Likert scale is debated. I used the reversed questions method. This method combats potential response set bias (Chyung et al., 2018, P.2). However, it has been argued that this method has the potential to confuse participants (Suárez-Álvarez et al., 2018, P.150)

The phrasing of the questions could be argued to be not simple enough. As Likert states, each question must be a clear, concise statement (Likert, 1932, P.90). More time was needed to consider the phrasing of questions.

A further critique is the limited number of students who completed the questionnaire. 60 students were invited to complete the questionnaire. Unfortunately, only 10 responded, agreeing to be part of the study. This small cohort reduces confidence in the results. Time constraints did not allow for further follow-up or opportunity to engage with additional students. Similarly, the thematic analysis is limited due to the low number of interviews undertaken.

Due to these criticisms, the findings need to be taken with caution, and further research would be needed to validate these results.

Regarding links to professional standards, this research project directly supports my professional learning development, as it influences my ongoing critical reflection and learning and is fundamental in prompting further professional growth.

Recommendations

This limited case study revealed that students use MWBs and perceive using them as a positive part of their drama lessons. However, the study showed that teachers find them to be a distraction in lessons when not managed effectively. However, they acknowledged the benefits of their use for AFL purposes.

It is interesting to note that another benefit not mentioned in the literature has emerged through the process of this study and that is that the teachers believe MWBs assist in the support of literacy skills. This demonstrates how effective structured interviews can be for exploring a question to a greater degree where new opinions, facts and ideas organically emerge. If I conduct another case study, I plan to have a larger sample of students and interview more drama teachers. I would then further develop the research by including questions about how literacy is explicitly supported and would plan to compare the written exam responses of KS4 students who used MWBs throughout KS3 AND KS4, with those of students who did not.

The research has made me reflect on their benefits in terms of my practice and how I might utilise them in the future. As highlighted from interviews with the teachers, MWBs provide an opportunity for students to write without fear of getting it wrong, which can encourage all students to engage with the task. I will bring this knowledge into my future lessons. I have also reflected on the teacher discussion and considered where MWBs might fit best into the timing within a lesson and how this may impact overall engagement. In light of this, I may consider using them later in the lesson, not at the beginning. In this way, the benefits will still be gained; however, some distraction elements for students may be mitigated. These preliminary indications would suggest that the benefits to students of using MWBs, as a tool for encouraging risk-taking and collaborative working, supports their continued use. Overall I feel the MWB is a positive tool to use in the classroom and will endeavour to incorporate it into my future practice.

Reference List

- Ahmed, K. (2024a) *Understanding Likert Scales: a Guide for Student Researchers*. Available at: <https://tgmresearch.com/understanding-likert-scales.html> (Accessed: 12 May 2024).
- Ahmed, S.K. (2024b) 'The Pillars of Trustworthiness in Qualitative Research'. *Journal of Medicine, Surgery, and Public Health* 2(1), p. 100051. Available at: <https://www.sciencedirect.com/science/article/pii/S2949916X24000045> (Accessed: 11 May 2024).
- Alabi, A.T. and Jelili, M.O. (2022) 'Clarifying Likert Scale Misconceptions for Improved Application in Urban Studies'. *Quality & Quantity* 57. Available at: https://www.researchgate.net/publication/360553982_Clarifying_likert_scale_misconceptions_for_improved_application_in_urban_studies (Accessed: 12 May 2024).
- Alhojailan, M. (2012) 'THEMATIC ANALYSIS: a CRITICAL REVIEW OF ITS PROCESS AND EVALUATION'. *West East Journal of Social Sciences-December* 1(1). Available at: https://faculty.ksu.edu.sa/sites/default/files/ta_thematic_analysis_dr_mohammed_alhojailan.pdf (Accessed: 12 May 2024).
- Alshenqeeti, H. (2014) 'Interviewing as a Data Collection Method: a Critical Review'. *English Linguistics Research* 3(1), pp. 39–45. Available at: https://web.archive.org/web/20190218193515id_/http://pdfs.semanticscholar.org/1006/b754452c54f83d26a361ec152d3fdbfe70c0.pdf (Accessed: 12 May 2024).
- Batterton, K.A. and Hale, K.N. (2017) 'The Likert Scale What It Is and How to Use It'. *Phalanx* 50(2), pp. 32–39. Available at: <http://www.jstor.org/stable/26296382> (Accessed: 12 May 2024).
- Beauchamp, G. and Kennewell, S. (2008) 'The Influence of ICT on the Interactivity of Teaching'. *Education and Information Technologies* 13(4), pp. 305–315. Available at: <https://link.springer.com/article/10.1007%2Fs10639-008-9071-y> (Accessed: 11 May 2024).
- BERA (2018) *ETHICAL GUIDELINES FOR EDUCATIONAL RESEARCH*. UK: BERA. Available at:

<https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018>

(Accessed: 12 May 2024).

Berger, R. (2015) 'Now I See It, Now I Don't: Researcher's Position and Reflexivity in Qualitative Research'. *Qualitative Research* 15(2), pp. 219–234. doi: <https://doi.org/10.1177/1468794112468475>.

Black, P. and Wiliam, D. (1998) 'Assessment and Classroom Learning'. *Assessment in Education: Principles, Policy & Practice* 5(1). Available at: <https://www.tandfonline.com/doi/abs/10.1080/0969595980050102> (Accessed: 11 May 2024).

Bourke, R. and Loveridge, J. (2013) 'Exploring Informed Consent and Dissent through children's Participation in Educational Research'. *International Journal of Research & Method in Education* 37(2), pp. 151–165. doi: <https://doi.org/10.1080/1743727x.2013.817551>.

Braun, V. and Clarke, V. (2006) 'Using Thematic Analysis in Psychology'. *Qualitative Research in Psychology* 3(2), pp. 77–101. Available at: <https://www.tandfonline.com/doi/abs/10.1191/1478088706qp063oa> (Accessed: 12 May 2024).

Broadfoot, P. and Daugherty, R. (2002) *Assessment for Learning: 10 Principles. Research-based principles to guide classroom practice* Assessment for Learning.

Chyung, S.Y., Roberts, K., Swanson, I. and Hankinson, A. (2017) 'Evidence-Based Survey design: the Use of a Midpoint on the Likert Scale'. *Performance Improvement* 56(10), pp. 15–23. doi: <https://doi.org/10.1002/pfi.21727>.

Chyung, S.Y.Y., Barkin, J.R. and Shamsy, J.A. (2018) 'Evidence-Based Survey Design: the Use of Negatively Worded Items in Surveys'. *Performance Improvement* 57(3), pp. 16–25. Available at: <https://core.ac.uk/download/pdf/199374863.pdf>.

Cohen, L., Manion, L. and Morrison, K. (2013) *Research Methods in Education*. Routledge.

David, M., Edwards, R. and Alldred, P. (2001) 'Children and School-based Research: "informed consent" or "educated consent"?' *British Educational Research Journal* 27(3), pp. 347–365. doi: <https://doi.org/10.1080/01411920120048340>.

Drever, E. (2003) *Using semi-structured Interviews in small-scale Research : a teacher's Guide*. Glasgow: The Scrc Centre.

DURSUN, B. (2023) 'A QUALITATIVE RESEARCH TECHNIQUE: INTERVIEW'. *Disiplinlerarası Eğitim Araştırmaları Dergisi* 7(14). Available at: <https://dergipark.org.tr/tr/download/article-file/2928651> (Accessed: 12 May 2024).

Estyn (2023) *A report on School*
Date of inspection: February by Estyn, His Majesty's
Inspectorate for Education and Training in Wales. Cardiff: Estyn. Available at: https://www.estyn.gov.wales/system/files/School%202023_0.pdf (Accessed: 11 May 2024).

EWC (2019) *Code of Professional Conduct and Practice for Registrants with the Education Workforce Council (EWC)*. Available at: <https://www.ewc.wales/site/index.php/en/documents-eng/fitness-to-practise/code-of-professional-conduct-and-practice/37-j16540-ewc-code-of-professional-conduct-e-web-1-1/file> (Accessed: 12 May 2024).

Fisher, D. and Frey, N. (2014) *Checking for Understanding : Formative Assessment Techniques for Your Classroom*. 2nd edn. Alexandria, Virginia: ASCD.

Forrester, T., Sandison, C.E. and Denny, S. (2016) 'Vertical whiteboarding: Riding the Wave of Student Activity in a Mathematics Classroom'. *Australian Association of Mathematics Teachers Inc* 73(4), p. pp. 3–8. Available at: <https://search.informit.org/doi/10.3316/informit.298120298166662>. (Accessed: 11 May 2024).

Friis, D. (2021) *The Use of Mini Whiteboards in the Classrom*. Available at: <https://researchschool.org.uk/durrington/news/the-use-of-mini-whiteboards-in-the-classroom> (Accessed: 11 May 2024).

Gardner, J., Harlen, W., Hayward, L. and Stobart, G. (2008) *Changing Assessment Practice Process, Principles and Standards*. Available at:

<https://www.nuffieldfoundation.org/wp-content/uploads/2019/11/JG20Changing20Assment20Practice20Final20Final1.pdf> (Accessed: 11 May 2024).

Hodkinson, P. and Hodkinson, H. (2001) *The Strengths and Limitations of Case Study Research*. University of Leeds. Available at:

https://www.academia.edu/31677978/The_Strengths_and_Limitations_of_Case_Study_Research?email_work_card=view-paper (Accessed: 11 May 2024).

Kakilla, C. (2021) 'Strengths and Weaknesses of Semi-Structured Interviews in Qualitative Research: a Critical Essay'. *Strengths and Weaknesses of Semi-Structured Interviews in Qualitative Research: a Critical Essay* 1(1). Available at:

https://www.researchgate.net/publication/352565661_Strengths_and_Weaknesses_of_Semi-Structured_Interviews_in_Qualitative_Research_A_Critical_Essay (Accessed: 11 May 2024).

Kennewell, S. et al. (2009) 'Interactive Teaching and ICT'. *Welsh Journal of Education* 14(2)

Kirby, P. (2020) "'It's Never Okay to Say No to teachers": Children's Research Consent and Dissent in Conforming Schools Contexts'. *British Educational Research Journal* 46(4), pp. 811–828. doi: <https://doi.org/10.1002/berj.3638>.

Likert, R. (1932) 'The Method of Constructing an Attitude Scale'. *Archives of Psychology* 140, pp. 44–53. Available at:

<https://www.sfu.ca/~palys/Likert-1933-TheMethodOfConstructingAnAttitudeScale.pdf> (Accessed: 12 May 2024).

Liljedahl, P. (2016) 'Building Thinking Classrooms: Conditions for Problem-Solving'. in *Posing and Solving Mathematical Problems*. Simon Fraser University, pp. 361–386. Available at:

<http://peterliljedahl.com/wp-content/uploads/Building-Thinking-Classrooms-Feb-14-20151.pdf> (Accessed: 11 May 2024).

Lindemann, N. (2023) '12 Advantages and Disadvantages of Questionnaires'. *Pointerpro* 7 June. Available at: <https://pointerpro.com/blog/questionnaire-pros-and-cons/> (Accessed: 12 May 2024).

Maguire, M. and Delahunt, B. (2017) 'Doing a Thematic Analysis: a Practical, Step-by-step Guide for Learning and Teaching Scholars.' *AISHE-J: the All Ireland Journal of Teaching and Learning in Higher Education* 9(3)

Marshall, S.L. and While, A.E. (1994) 'Interviewing Respondents Who Have English as a Second language: Challenges Encountered and Suggestions for Other Researchers'. *Journal of Advanced Nursing* 19(3), pp. 566–571. Available at: <https://onlinelibrary-wiley-com.ezproxy.uwtsd.ac.uk/doi/pdf/10.1111/j.1365-2648.1994.tb01122.x> (Accessed: 12 May 2024).

McNulty, N. (2021) *Simplify your teaching now, using Bloom's Taxonomy Question Stems | A comprehensive list*. Available at: <https://www.niallmcnulty.com/2021/06/blooms-taxonomy-question-stems/>.

Mohajan, H.K. (2018) 'Qualitative Research Methodology in Social Sciences and Related Subjects'. *Journal of Economic Development, Environment and People* 7(1), pp. 23–48. Available at: https://mpira.ub.uni-muenchen.de/85654/1/MPRA_paper_85654.pdf (Accessed: 12 May 2024).

Nemoto, T. and Beglar, D. (2014) *Developing Likert-Scale Questionnaires Campus Reference Data*. Available at: https://jalt-publications.org/files/pdf-article/jalt2013_001.pdf (Accessed: 12 May 2024).

Oxford English Dictionary (1992) 'Whiteboarding'. *Oxford English Dictionary*. Available at: <https://www.oed.com/search/dictionary/?scope=Entries&q=whiteboarding> (Accessed: 12 May 2024).

Rinker, T. (2014) *The Treatment of Likert Data*. Available at: https://www.researchgate.net/publication/262011454_Likert/link/0a85e5365b64e2ff5d000000/download?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19 (Accessed: 12 May 2024).

Robbins, N. and Heiberger, R. (2011) *Plotting Likert and Other Rating Scales*. Available at: http://www.asasrms.org/Proceedings/y2011/Files/300784_64164.pdf (Accessed: 12 May 2024).

Ryan, G.W. and Bernard, H.R. (2003) 'Techniques to Identify Themes'. *Field Methods* 15(1), pp. 85–109.

Seidman, I. (2006) *Interviewing as Qualitative Research*. 3rd edn. S.L.: Teachers College Press.

Simons, H. (2009) *Case Study Research in Practice*. SAGE.

South, L., Saffo, D., Vitek, O., Dunne, C. and Borkin, M. (2022) 'Effective Use of Likert Scales in Visualization Evaluations: a Systematic Review'. *Northeastern University* 41(3). Available at: https://www.researchgate.net/publication/360056875_Effective_Use_of_Likert_Scales_in_Visualization_Evaluations_A_Systematic_Review (Accessed: 12 May 2024).

Stock, P. (2017) *Show Me: Maximising the Use of Mini Whiteboards in Lessons*. Available at: <https://joeybagstock.wordpress.com/2017/10/21/show-me-maximising-the-use-of-mini-whiteboards-in-lessons/> (Accessed: 11 May 2024).

Suárez-Álvarez, J., Pedrosa, I., Lozano, L.M., García-Cueto, E., Cuesta, M. and Muñiz, J. (2018) 'Using Reversed Items in Likert scales: a Questionable Practice'. *Psicothema* 30(2), pp. 149–158. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/29694314> (Accessed: 12 May 2024).

Sullivan, G.M. and Artino, A.R. (2013) 'Analyzing and Interpreting Data from Likert-Type Scales'. *Journal of Graduate Medical Education* 5(4), pp. 541–542. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3886444/> (Accessed: 12 May 2024).

Swan, M. (2006) *Collaborative Learning in Mathematics*. England: University of Nottingham. Available at: <https://numeracy4schools.wordpress.com/wp-content/uploads/2015/03/collaborative-learning-in-mathematics.pdf> (Accessed: 11 May 2024).

T, J. (2024) *Likert Scales Explained - a Comprehensive Guide*. Available at:
<https://www.cognitoforms.com/blog/570/likert-scales-explained--a-comprehensive-guide>
(Accessed: 12 May 2024).

Thomas, G. (2011) 'A Typology for the Case Study in Social Science following a Review of Definition, Discourse, and Structure'. *Qualitative Inquiry* 17(6), pp. 511–521. Available at:
<https://journals.sagepub.com/doi/epdf/10.1177/1077800411409884> (Accessed: 11 May 2024).

UWTSD (2022) *Research Ethics & Integrity Code of Practice*. Wales: UWTSD.

Wells, M., Hestenes, D. and Swackhamer, G. (1995) 'A modeling method for high school physics instruction'. *American Journal of Physics* 63(7), pp. 606–619. Available at:
https://www.researchgate.net/publication/216743210_A_modeling_method_for_high_school_physics (Accessed: 23 January 2021).

Wenning, C.J., Holbrook, T.W. and Stankevitz, J. (2006) 'Engaging Students in Conducting Socratic dialogues: Suggestions for Science Teachers'. *Junior Physics Teachers Education* 3(1). Available at:
https://www.phy.ilstu.edu/ptefiles/publications/whiteboard_dialogues.pdf (Accessed: 11 May 2024).

West, A., Sullivan, K. and Kirchner, J. (2016) 'How about Teaching Literacy with Science?' *Science and Children* 053(08). Available at:
<https://www.proquest.com/docview/1780962086?pq-origsite=gscholar&fromopenview=true&sourcetype=Scholarly%20Journals> (Accessed: 13 May 2024).

William, D. and Leahy, S. (2015) *Embedding Formative Assessment : Practical Techniques for K-12 Classrooms*. West Palm Beach, Fla.: Learning Sciences.

Yin, R.K. (1984) *Case Study Research : Design and Methods*. Beverly Hills, Ca: Sage Publications.

Yin, R.K. (2009) *Case Study Research: Design and Methods*. 4th edn. Los Angeles: Sage Publications.