

ECAD7004: Professional and Pedagogic Studies: Researching the Learning: what, how and why am I teaching?

Assignment Title: Design, conduct and critically evaluate a close-to-practice research project (lesson study) focusing on the model of the transformative teacher in developing practice that has a positive impact on the learner.

Research Question: Are pupils engaged with the '*dual coding*' input during the '*domain*' lesson within a knowledge-rich curriculum?

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Word Count: 5,025

	Target	What I have done in this assignment.
Target 1	Deeper critical analysis will enhance your cognitive development, when looking at research consider how they support or discredit the argument you are making.	I have further engaged with literature to create links with my points to develop a deeper critical analysis.
Target 2	Consider developing counterarguments further.	I have further engaged with literature which both support and counter my points made

Glossary of Terms:

Dual Coding: A type of information input first developed by Pavio (1971), based upon simultaneous auditory and visual stimulation.

Domain: A lesson drawing on the arts, sciences or humanities, generally cross-curricular learning. The scheme is derived from Core Knowledge (2020).

Read-aloud: The section of the lesson based on dual coding. This consists of the teacher reading above reading level texts whilst simultaneously displaying images. Questions are asked to the pupils throughout the input. This is an extended input lasting a large portion of the lesson.

Retrieval practice: Prior to the read-aloud, retrieval practice occurs. This is consolidation of prior knowledge which may be useful for the up-coming lesson.

Track: A *Teach Like a Champion* (Lemov, 2015) strategy. Children clasp hands together and follow, or look at, what is asked of them.

Knowledge-rich curriculum: Based upon knowledge acquisition and information retention rather than skills based learning.

Introduction:

The issue of which this assignment is based around, originated in idea from a staff in service training day (INSET) delivered by the headteacher. The school in question uses the theory of '*dual coding*' to enhance knowledge of the pupils. This is particularly relevant and important to this school due to their innovation school status and their use of a knowledge-rich curriculum. Following the INSET, it was proposed that the research was to delve into this idea further as both researchers were intrigued by the topic.

Pupil disengagement is a key issue in both behaviour management and teaching and learning (Welsh Assembly Government, 2010; Cowley, 2014). The research will investigate the level of engagement that pupils have in a 'dual coding' input. Dual coding consists of a simultaneous presentation of the combination of visual and auditory stimulation. The combination of different stimuli strengthens the chance of information being committed to long-term memory therefore knowledge being learned (Bear et al., 2015). Theory suggests that dual coding should improve the level of concentration, motivation and engagement (Clark and Paivio, 1991; Caviglioli, 2019). This research would combine the two theories to see if children are effectively engaging with the information required for a knowledge rich curriculum.

Research Aims:

1. To investigate the level of engagement of pupils during a dual coding input
2. To monitor body language and facial expressions to determine the level of engagement of pupils
3. To gather views from pupils to identify their level of engagement, interest and motivation of a dual coding input

Research Objectives:

1. To quantitatively measure levels of engagement through a lesson study observation using a Leuven scale
2. To qualitatively measure levels of engagement from a pupil-point of view through a semi- structured interview and retrospective reflection from colleagues and self-assessment
3. To triangulate a mixed method of data collection to conclude the level of engagement in dual coding inputs

Research Context:

The research took place in a single form entry primary school in an affluent area within South Wales. The school had pioneer status and is now classed as an innovation school, one of six primary schools in Wales (Welsh Government, 2019). Innovation school status requires the school to trial initiatives and theories and report on their findings. Dual coding is one initiative within the knowledge-rich curriculum which this school uses.

Literature Review:

The importance of progression is well known in the pedagogical field and particularly significant for teaching practice in Wales with the publication '*Successful Futures*' highlighting progression as a key aspect of the new '*Curriculum for Wales*' (Donaldson, 2015). Donaldson (2015) proceeds to emphasise the need for learning to be built upon prior knowledge and experience to engage interest in pupils. For a teacher to instil interest, engagement, motivation and sustained concentration in their pupils, they must have a sound understanding of learning theory (Bransford et al., 2006). The learning theory which draws parallels with the need for engagement and to build upon prior knowledge is the constructivist theory.

Constructivism proposes that the triangulation between personal experience, the environment and cognitive thought creates the basis for all of an individual's knowledge and meaning (Bodner, 1986; Macblain and Gray, 2015). The theory goes on to suggest that knowledge and meaning cannot be created, only built upon (Alexander and Winne, 2006; Bear et al., 2015). A person is born with a set amount of innate knowledge which will form the basis to all cognition, knowledge and thought throughout their lifetime (Schraw, 2006). The constructivist theory of learning further emphasises the need to create learning experiences that build on both prior knowledge and personal experience to engage learning (Macblain, 2014).

Constructivism was first theorised in the twentieth century and was heavily based on research carried out by Jean Piaget (1954). Piaget's learning theory proposed that an individual possesses schemas in the mind which are used to categorise knowledge. When it is obtained, new knowledge is sorted into these schemas, which contain prior knowledge deemed to be similar to the new knowledge. Piaget specified two possible processes when knowledge is acquired: assimilation and accommodation. If the new knowledge is similar to a pre-existing schema, it can be integrated into that schema – assimilation. If the knowledge differs from all existing schemas however, accommodation occurs. This is where a new schema is created to accommodate this new information, so learning occurs (Piaget, 1954).

Modern research also exists to support constructivism which has a scientific grounding and uses neuroscience. Research has found that learning is initiated in the brain when new information is introduced to the short-term memory (STM). The information is then passed on to the hippocampus where it is processed. This is where the information is assessed for level of value. If deemed to be beneficial, it is moved into the cortex, or long-term memory store (LTM), where it is encoded and remembered (Bear et al., 2015). Multiple factors have an effect

on this assessment of knowledge value. One determinant is whether the information is emotionally significant to the individual. If the information was encoded with high levels of emotional significance, it is a stronger memory and easier to recall (Schraw, 2006). This research reinforces the importance of planning lessons which the pupils will enjoy, therefore encoding memory with a high emotional value. A second factor in the assessment of information value is the level of engagement in coding. If a pupil is actively involved in their learning process, often through cognitive problem-solving or a collaborative development of learning materials, information is more likely to be deemed valuable. This is due to the high proportion of neurons activated in the brain during active involvement, thus creating a more compelling memory of higher value. (Bear et al., 2015) These factors significantly impact upon the previously outlined processes of Piaget's theory, as well as the quality of information retention when asked to recall (Piaget, 1954; Bear et al., 2015).

The theory of dual coding draws upon using more neurons to increase knowledge acquisition and information retention (Paivio, 2014). The theorist behind dual coding is Paivio (1971). Dual coding suggests that the use of imagery (visual) and verbal (auditory) input creates a unique representation of information for the individual. Paivio hypothesised that the use of dual coding creates a mental image upon information recall which can aid information retention as images have more emotive value (Paivio, 1971; Bear et al., 2015). The neural network created through the use of dual coding is more complex than a singular method of knowledge acquisition (Clark and Paivio, 1991). Dual coding creates a more authentic learning experience, as it is not evolutionary natural for a human to learn information through a singular stimuli. Dual coding can refer to any combination of stimuli including: auditory, visual, sensorimotor, articulatory, gustatory, and odorous (Lwin et al., 2010; Sadoski and Paivio, 2013). In education, the most practical application is to combine the visual and auditory.

The Core Knowledge (2020) scheme used in the research school is based around retrieval practice followed by a read-aloud input. Retrieval practice is drawing on prior knowledge which has strong links to Piaget's (1954) theory of schemas. The read-aloud is based on dual coding theory (Paivio, 1971) and always follows the same structure of auditory stimuli from the teacher reading text aloud and visual stimuli from the images on the board. The read-alouds ask questions throughout, creating active engagement (Bear et al., 2015). The triangulation of theories should suggest that the scheme should be highly engaging and create large amounts of information retention and knowledge acquisition.

Methodology:

Lesson study:

Lesson study is a research model based upon collaboration between two or more teaching professionals. It encompasses classroom professional learning and can be used as a tool for continuous professional development (CPD) (Cajkler et al., 2014). Lesson study aims to focus on pupils within their specific school and based upon a teaching or learning issue that is detrimental to their pupil progress within that school or class. The purpose of a lesson study to find appropriate and effective solutions to a real-life problem affecting the school. It is a technique developed to improve learning for the focus pupils. The process of a lesson study adheres to the following cyclical structure: plan, observe, reflect and replan. The plan stage involves deciding upon the initial focus of the study and the initial lesson plan. The lesson is then taught and observed by a fellow teacher. The lesson is then evaluated and its impact on the focus pupil is analysed. The replay is drawn up and then the second lesson is taught.

The use of collaboration for devising strategies for improvements can be an effective way to improve educational standards (Hall, 2014). A further strength of the lesson study model is that it uses pupil voice to improve the quality of teaching and learning in their own school (Lewis and Hurd, 2011; Dudley, 2014). Using an observational method can help reduce bias in reflections of a lesson by having an impartial eye watching over the lesson. This can significantly improve the quality of the teacher reflections (Dudley, 2013; 2014). It has been reported that individuals who have implemented this type of research feel less isolated in their CPD and also regain a focus on the importance of teaching and learning (Cajkler et al., 2014). The foundations of the lesson plan method is based around shared practice (Dudley, 2013)

The use of lesson study methodology in this particular study was not used in full. Lessons were not repeated in the cyclical structure due to constraints put upon researchers by the university; this reduces the reliability of the study as it is not replicable. However, the information gained through the process of developing the action plan and through reflection is vital for the personal development as the researchers as prospective teachers.

Ethics:

Confidentiality has been kept throughout the study – children are named 'Pupil A, B, C, X, Y, Z' rather than their real names to ensure their data is not traceable for a reader. It has not been possible to keep anonymity throughout as all the children are known to the researchers. Data including transcripts, notes, audio recordings and any other personal data have been

kept on a password protected folder to ensure safety. Only information strictly necessary for the study has been collected from individuals. Participants who request to view their data, and how it is used have been able to access and discuss this. This is in line with General Data Protection Regulations (2018). Consent was gained from the school and from parents in the form of informed consent. An 'opt-in' permission/consent form was sent home with the purpose of the study outline, allowing parents to make an informed choice (Appendix 7). As the participants are under the age of 18 they gave assent in line with the United Nations Convention of the Rights of the Child (UNCRC) article 12: to have a say in what happens to them (UNCRC, 1989). Participants were also informed of the purpose of the study and expectations as participants in accessible language (ie. child friendly). The assent was ongoing throughout the study. The right to withdraw was explained to participants and they were informed that the right could be exercised at any stage of the study, including retrospectively. This is in line with the British Educational Research Association (BERA) guidelines of informed and ongoing consent (BERA, 2018).

A risk in the study was the power and balance of the teacher-student relationship, however, both researchers have a working professional relationship with the pupils. The imbalance could create a bias within the study as the participants would potentially give answers to please. To counter this, the participants had it explained, in accessible terms, that there will be no negative implications to any answer they wish to give. There is a potential for harm in the form of stress to the participants through embarrassment and intrusion. However this was be minimised through the right to withdraw and informed consent. This was also be addressed in the form of a debrief for all participants in both the study and and pupils in the lesson who wish to be informed. This was completed as soon as possible after the study in the form of a question and answer session. The ethical considerations have taken into account the rights of the child (UNCRC, 1989); BERA guidelines (2018) and the University of Wales Trinity Saint David (2017) code of conduct.

Observation:

The lesson study was conducted using the observation methodology. This method of research gathers data through a researcher directly recording observed behaviour (Kumar, 2019). A lesson study can be described as a non-participant, overt method of observation whereby both the pupils and teacher are fully aware of the research being carried out along with the research aim. The pupils know of the aim of the research what the observer is looking for. This could create a possible weakness of the study whereby the participants display social desirability bias. Social desirability bias arises when participants are fully aware of the research and

therefore modify their behaviours and responses to match their belief of what the researcher is looking for (Cohen et al., 2002; Kaminska and Foulsham, 2013). Despite this weakness, the lesson study can be deemed as an appropriate method as the study is carried out in the natural environment for both the pupils and the teacher. A lesson within a classroom is a normal setting and therefore participants should display normal behaviours. This should counteract the effect of social desirability bias to construct more valid results (Dudley, 2014).

The lesson study methodology is a cross-sectional snapshot observation; the study is a reflection of the behaviours of the participant at that specific point in time. Thus, the data collected through the observation is generalisable to only that specific individual, in that specific lesson on that particular day. It cannot be deemed to be true to a population of pupils (Cohen et al. 2002; Kumar, 2019). However, due to constraints upon the study due to time and factors put in place by the university, a longitudinal study would be inappropriate for this assignment. Therefore, the data and accompanying conclusions drawn from the lesson study must only be hypothetically applied to that particular pupil, at that particular point in time.

The Hawthorne effect (Roethlisberger and Dickson, 1939) is a further limitation of the lesson study observation. This is whereby the participants within the study change their behaviour due to the prior knowledge of the study being undertaken. This would create data of which is not representative of their individual norms (Diaper, 1990; Sedgewick and Greenwood, 2015). This shows parallels with social desirability bias, however, it does not necessarily have to be a 'positive' behaviour change which signifies the aforementioned bias (Kaminska and Foulsham, 2013). The participants in the lesson study will know about the study, as a consent form will be given to the pupils to give to their parents/guardians and the researchers will inform the pupils verbally before the study commences. Furthermore, the researchers are known to the pupils and will be visibly making notes within the lesson, this could act as a continuous visual reminder of the presence of a research. These could be deemed as the contributing factors towards creating the Hawthorne effect.

Interviews:

The interviews conducted were semi-structured focus groups. This data collection method consists of asking open questions to a group of participants to gain qualitative data. The questions asked (Appendix 2) are a guideline to keep the interview responses in focus to the research aim (Kallio et al., 2016). The semi-structured interview lends itself to the benefit of participants having some freedom to discuss the aspects of the study which are important to the individual. However, a limitation of the semi-structured interview process is limited validity. It would be inappropriate to conclude that answers given in a repeated study, even with the

same participants would be identical. This is partly due to the qualitative opinion-based responses to the questions (Merriam, 1988; Kumar 2019). The focus group method lends itself to further social desirability bias between the participants of the group. This minimises the reliability of responses. However, the use of a focus group can provoke confidence to express true feelings to the researcher through 'safety in numbers' (Cohen et al., 2002; Newby, 2014).

Data Collection:

The study used mixed methods of data collection. The observation schedules (Appendix 1) produced numerical, quantitative data which was analysed. The analysed data was then triangulated with the qualitative reflections and observations from both researchers. All data collected was open to the subjectivity of the researchers. Upon analysis qualitative data was subject to interpretation and bias from the researchers. The limitations of each data method was minimised through both triangulation of data and mixed methods. The use of two researchers further reduces the chance of bias of the individual researcher. The data collected was from three focus pupils which is a small sample size. This is a limitation, as it is a particularly small sample, this reduces the generalisability. It would be appropriate to deduce that it is not representative of the population of the class. However, the benefit of this is the depth of data which can be gathered. The depth in qualitative data allows for detailed conclusions to be drawn about the particular individuals participating in the study.

Reflection:

The reflection pro-forma (Appendix 6)- was based upon Gibbs' Reflective Cycle (1989). The rationale behind using this method of reflection was the parallels between lesson study methodology and the reflective cycle. Both methods use data gathered to form an action plan to take forwards into the next stage of planning and, in the case of lesson study, teaching. Gibbs' reflective cycle is based and built upon Kolb's reflective cycle (1976). The limitation of this particular reflection is the questions asked are based upon whether a method works well or not, rather than how to effectively change practice for the future (Zeichner and Liston, 1996). However, this is a core principle of lesson study, particularly when used for CPD purposes (Hall, 2014). This method of reflection was deemed the most appropriate for the given study despite the limitation.

Results and Analysis

For the analysis and reporting of results, the pupils have been named as follows:

- Year 2:
 - Pupil A – working above learner
 - Pupil B – middle learner
 - Pupil C – working below learner
- Year 4:
 - Pupil X – working above learner
 - Pupil Y – middle learner
 - Pupil Z – working below learner

The graphical analysis is colour coded on ability with green, blue, yellow as working above, middle and working below respectively. The analysis of results is based upon quantitative data collected from the observation, and qualitative data collected through the focus group interview. Larger images of the graphical analysis along with individual analysis can be found in Appendix 4,5 and the interview notes found in Appendix 2.

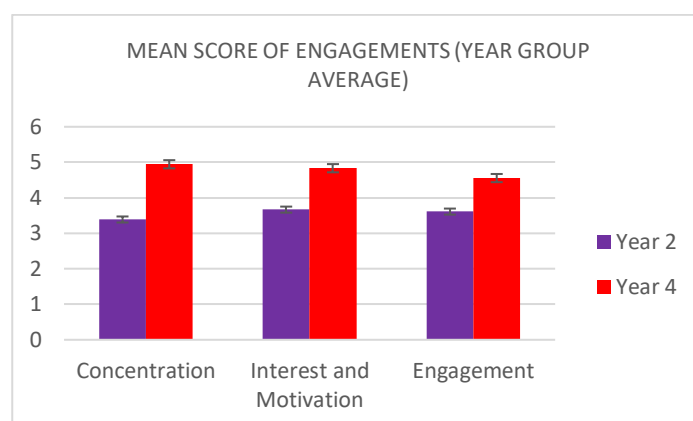


Figure 1: A graph to show the comparative analysis between year groups including standard error bars

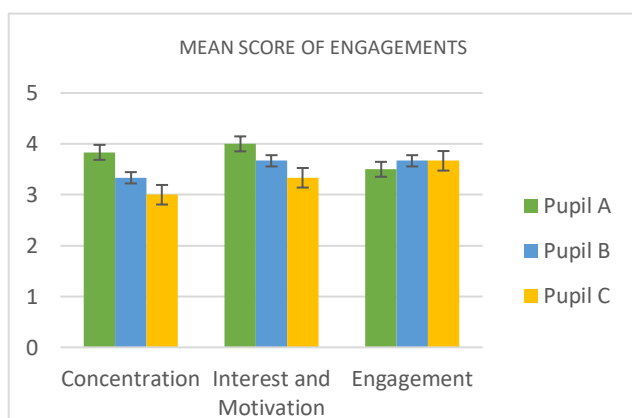


Figure 2: A graph to show the mean engagement scores for year 2 including standard error bars

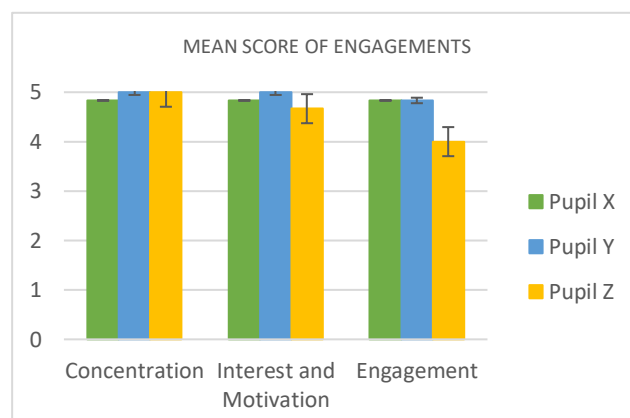


Figure 3: A graph to show the mean engagement scores for year 4 including standard error bars

Concentration:

The data collected within the lesson study showed that year 4 pupils had consistently high levels of concentration throughout the lesson (Figure 5). Whereas pupils in year 2 showed growing concentration as the lesson went on – the exception being Pupil C, who showed a lapse in concentration before continuing with a negative trend (Figure 4). When comparing the mean score of each class (Figure 1), year 4 had significantly higher concentration levels than year 2. Year 4 scored $4.94 (\pm 0.23)$ whilst year 2 scored $3.38 (\pm 0.90)$. The standard deviation on results highlights the higher level of consistency between pupils in year 4.

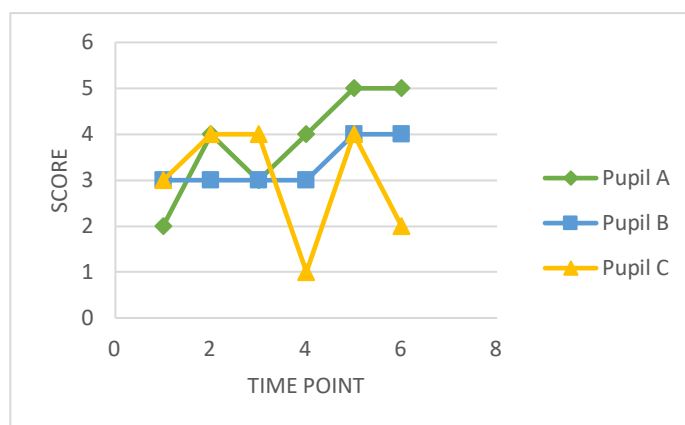


Figure 4: A graph to show concentration over time in year 2

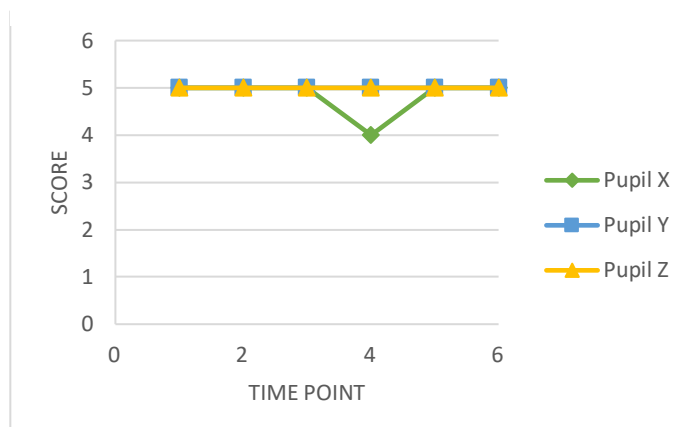


Figure 5: A graph to show concentration over time in year 4

Interest and Motivation:

The pupils in year 4 showed a consistently high level of interest and motivation throughout the lesson (Figure 7). Whereas pupils in year 2 showed growing interest and motivation as the lesson went on – the exception being Pupil C, who showed a lapse in interest and motivation before continuing with a negative trend (Figure 6). When comparing the mean score of each class (Figure 1), year 4 had significantly higher levels of interest and motivation than year 2. Year 4 scored $4.83 (\pm 0.38)$ whilst year 2 scored $3.66 (\pm 0.91)$. The standard deviation on results highlights the higher level of consistency between pupils in year 4. This shows strong parallel trends with the data collected for concentration.

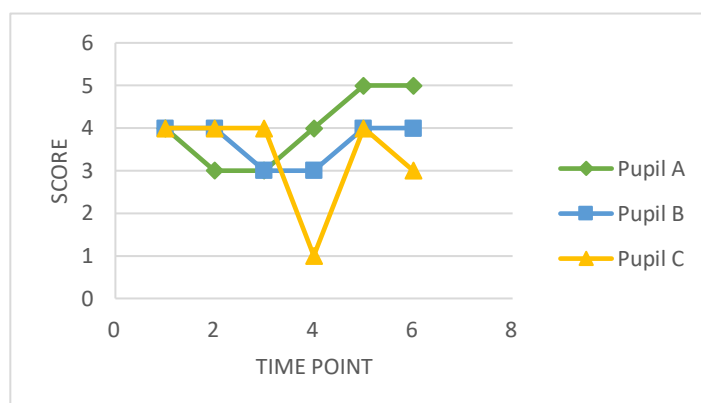


Figure 6: A graph to show interest and motivation over time in year 2

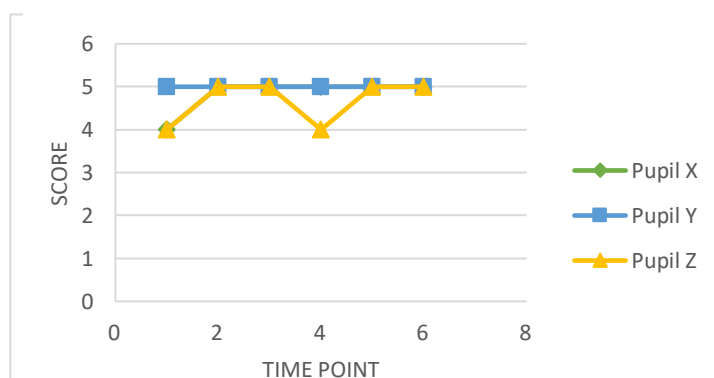


Figure 7: A graph to show interest and motivation over time in year 4

Engagement:

The data collected on engagement show conflicting trends between year 4 and year 2. Year 4 show a lapse in engagement after 10-15 minutes and then climb back to the original state of engagement (Figure 9). In contrast, year 2 generally showed a positive correlation between time and engagement (Figure 8). However, as with all engagement measures observed, Pupil C proved an outlier to the trend with a significant lapse in engagement. When comparing the mean score of each class (Figure 1), year 4 had significantly higher levels of engagement than year 2. Year 4 scored 4.55 (± 0.70) whilst year 2 scored 3.61 (± 1.14). The standard deviation on the results show that engagement was the least consistent score for the pupils in both years.

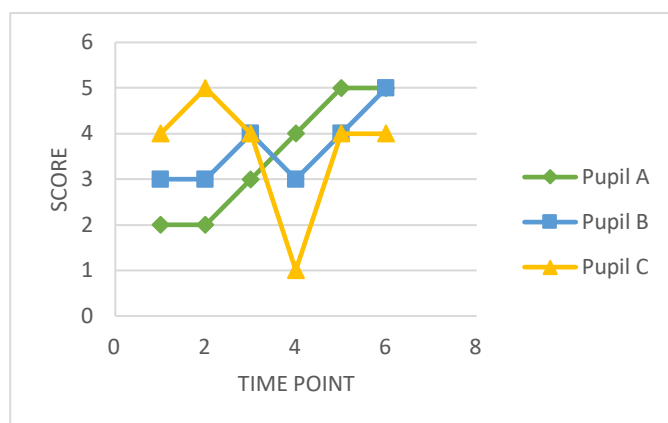


Figure 8: A graph to show engagement over time in year 2

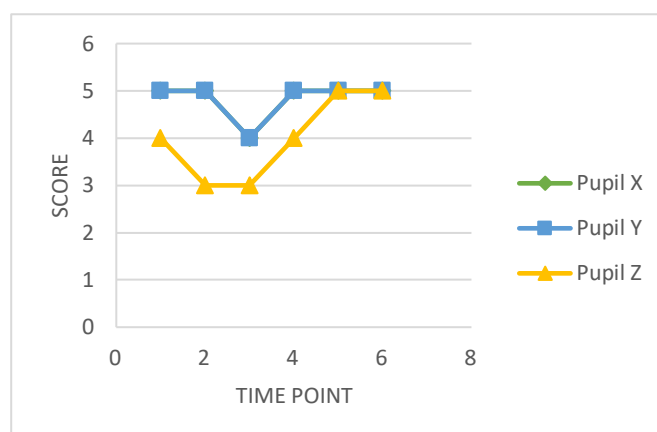


Figure 9: A graph to show engagement over time in year 4

Qualitative data:

A thematic analysis of the focus group interviews presented the following themes:

Year 2	Year 4
Fun, enjoyment	Gives confidence
Distractions	Learn facts
Interesting	Interesting
Happiness, excitement	Not enough questions
Cannot listen	Aids imagination
Helpful pictures	Helpful pictures and words
Concentration	Concentration

The majority of all answers given by the pupils were positive. Parallels can be seen in the themes presented – both year groups expressed that read-alouds make it easier to concentrate, more interesting and that the pictures aid their learning. The pupils displayed a lot of positive emotive language in their responses and expressed their enjoyment of the read-

alouds. Year 4 pupils found that the read-alouds can give them confidence and a useful aid to their classwork as well as help their imagination of the particular topic. Year 2 pupils expressed how the read-alouds give them the feelings of happiness and excitement. Year 2 also reported conflicting answers about distractions in particular how the pictures can stop them getting distracted during the read-aloud, but other pupils being distracted would in turn distract them. This was evidenced in the observation of the inconsistency of year 2 across concentration, interest and motivation and engagement. Year 4 pupils reported that they would prefer more active engagement during the read-aloud and that more questioning would improve the read-aloud.

Discussion

Disengagement along with low-level disruptions can arise from boredom (Welsh Assembly Government, 2010; Cowley, 2014). The level of stimulation a child receives in everyday life is increasing through technological developments. Recreational activities mostly involve technology giving auditory and visual stimulation along with active engagement in the activity. This can contribute to the sense of relatively 'boring' or 'dull' tasks given in school – reading and writing does not generate as much neural stimulation (Canter, 2010; Bear et al., 2015). The use of the read-aloud seems to combat this issue. The auditory and visual stimulation is addressed with the format alongside the active engagement from the questions given throughout. However, as Pupil Z suggested, more active engagement through the use of further questioning throughout could aid further engagement in children.

Motivation was consistently high for year 4, and a positive trend over time was shown for year 2 (Figure 6,7). There are two examples of motivation: *intrinsic* and *extrinsic*. Intrinsic motivation is generated within the individual, their own cognitive thought. This is their personal internal drive to succeed. Extrinsic motivation uses the environment and external stimuli to generate this drive to succeed. During the read-alouds, there was minimal input from the teacher in regards to behaviour management. This would suggest that the pupils were intrinsically motivated to learn and were potentially using their own strategies, and internal drive to regain focus after a lapse (Scott et al., 2012).

The data suggests that for both age groups tested, that the middle ability child is, overall, the most engaged in the lesson. This suggests that the read-aloud is academically aimed at the average child. Vygotsky's Theory of Proximal Development (1987) can be used to assist this conclusion. Vygotsky proposed that a learner has a '*zone of proximal development*' (ZPD) at which the individual can engage with, or complete, a cognitive task. If a learning activity is not within the individual's ZPD, learning is not at optimal levels. As the nature of a read-aloud does not allow for differentiation, it could be argued that the content is as optimal as possible, as most children can access this part of the lesson within their ZPD.

An 'outlier' to all trends shown was given in the observation of Pupil C. At time point 4, behaviours were observed at the score 1 on the Leuven Scale (*No concentration: staring, daydreaming etc.; No signs of motivation or interest in the given topic; Not taking anything in, no engagement with teacher/activity*). This does not even correlate with Pupil C's own trendline. The observed behaviour at this particular time point does not represent the overall

engagement observed. It should be noted that the child is 6-7 years old, and behaviours such as the displayed daydreaming and disengagement is common (Welsh Assembly Government, 2010).

Limitations of the method:

In addition to the limitations discussed in the methodology, further limitations were identified during the research process. One limitation of the method is that the time points were at 10 minute intervals. This only gives a snapshot of the pupil behaviour. If more time points were used throughout the lesson, a more accurate trend pattern would be able to be established for each pupil and for each variable. This would improve the reliability of the results. A further limitation of the method is the absence of a second observer. This does not allow for conformity of observation notes, the results are generated from one observer's account of events.

Another limitation of the given study was the inexperience of the researchers, both as teachers and as researchers. Although Dudley (2013) states that a lesson study is a suitable method for teachers of varied experience, a student teacher could discount or misread displayed behaviours. Despite this, the student teacher may not be as attuned to naturally disregarding low-level disruptions or minor behaviours in the classroom. However, this experience has given invaluable experience and knowledge to the researchers. This is particularly important for student teachers with the education reform in Wales. The Welsh Government are striving for all pedagogical practice to be *"research-engaged, well informed and learning from excellence"* (Welsh Government, 2017). Literature has noted the difficulty in the sustainability and transferability of research in the classroom, therefore the importance of student teachers undertaking research to build good practice could be deemed as vital (Vaughn et al., 2000; Wolfe, 2001).

Recommendations:

A possible recommendation from the findings of this particular study could be the need for differentiation. Although it is commonly known, the need for differentiation, it can be highlighted as particularly important following an undifferentiated read-aloud input (Moon et al., 1995; Hootstein, 1998; Kohn, 2004). This is particularly important, as literature has highlighted that academic achievement can decline when tasks are either too difficult, or too easy (Csikszentmihalyi et al., 1993). This can lower pupil self-efficacy, and in turn, motivation and engagement (Duda and Nicholls, 1992).

Upon reflection (Appendix 6), a further recommendation can be to ensure the fluidity of the reading, in particular unfamiliar words, such as the Latin within the book. This was confirmed

in the focus group interviews about the read-aloud. The fluidity of reading could keep engagement through continuity of the input.

A recommendation for further research would be to repeat the study using more researchers, more pupils and more tie points. This would remove some of the previously mentioned biases and improve reliability and validity of the results. It would also be beneficial to study how other year groups engage with read-alouds. Furthermore, it would be beneficial to repeat the lesson without a dual coding read-aloud to compare engagement with a different method of information transfer.

Conclusion:

The use of domain topics shows links to Donaldson's (2015) recommendations about the use of cross-curricular learning. The findings from this study can conclude that dual-coding within a domain lesson can be an effective method for teaching this new curriculum 2022, particularly for the middle learners.

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