An Action Research Investigation into the Effects of Teacher-Led Strategies on Selective Attention During Teacher Input in the Primary Classroom, through an Inclusive Pedagogy Lens

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Acknowledgements

Contents

List of Figures

Introduction

The research aims to investigate the impact of a range of research-informed strategies on pupils' selective attention and the extent to which these strategies reflect inclusive pedagogy, particularly relating to neurodiversity. Within the specific school context, this question is important as some children were not able to maintain their attention during teacher input which was a compulsory part of the standard lesson plan. Within the wider educational context, its importance relates to selective attention being seen as a precursor to, and predictor of, pupil performance (McClelland et al, 2013) which, from a policy perspective, also elevates its importance as a necessary contributory factor to the Government's standards agenda (Beck, 2023). Tension exists, however, for those children for whom selective attention is particularly challenging as policy-driven practice privileges children whose selective attention matches both the requirements of the pedagogic approach and the structure and form of national testing (Lange and Meaney, 2014; Berliner, 2011).

This study uses a first-person, action research approach and a mixed methods, explanatory design (Punch, 2014; McNiff, 2017) to investigate whether teacher-led strategies can be used to improve selective attention as demonstrated by a reduction in instances of loss of attention. A total of nine action research cycles are used, grouped together into three series reflecting the three selected strategies for research: relaxation practices, active games and vigorous exercise.

From a broader perspective, this research will consider whether the use of these teacher-led strategies represents a useful, or problematic, version of inclusive pedagogy (Florian and Spratt, 2013), particularly in relation to neurodiversity.

Literature Review

Selective Attention

Children's ability to sustain selective attention - the act of focusing on a particular object whilst simultaneously ignoring distractions and irrelevant information - is commonly considered to be a key factor influencing their performance in school and as preparation for adult life as a contributing member of society (Vani and Naik, 2023; De Monte, 2022; McClelland *et al.*, 2013). Early cognitive psychology research, which attempted to theorise selective attention, focused on 'bottleneck' models in which multiple inputs were either filtered to eliminate (Broadbent, 1958) or attenuate (Treisman, 1964) unattended material. Several decades later, these selective attention models are still under debate, particularly around the way that the distractions and irrelevant information are processed (Makov *et al.*, 2023). For the purposes of this research, the object of selected attention is a 20-minute, teacher-led, lesson input. The objects to be filtered are those visual and auditory distractions which might be encountered in a classroom setting, for example, another pupil talking (auditory) or something happening outside viewed through the window (visual).

The length of time selective attention can be sustained increases during childhood and into adulthood (Hoyer *et al.*, 2021; Levin and Bernier, 2011). More recently, research has focused on how children's attention spans are decreasing due to input-overload in the new digital age (Hunter and Morganstein, 2021) and how long-Covid has had a negative impact on selective attention (Delgado-Alonso *et al.*, 2022). There is a lack of consensus on the length of time for which children can pay attention as it is dependent upon age, task type and distractions, but there is a consensus that neurodiversity affects the length of attention span (Wilde, 2022), particularly if children are required to practise whole body listening during this time (Truesdale, 1990), that is, sitting still, making eye contact and keeping their mouths quiet. Indeed, the cognitive effort required for whole body listening can impede the ability to pay attention (Cook, Ogden and Winstone, 2018). Environmental factors, such as transitions between activities and unpredictability can further exacerbate challenges for some children (Cañete and Peralta, 2022).

Strategies to Improve Selective Attention

No one, specific strategy has been universally lauded as the best way to improve children's selective attention (Stasch, 2014) but there is evidence that strategies should be used as a type of movement/brain break before or during an activity to improve focused attention (Watson-Grace and Provident, 2020). There are many other variables which could also have an impact on selective attention, for example, the use of flexible seating (Gaston, Moore and Butler, 2016).

Relaxation on Attention

There is a body of research that indicates that relaxation activities (mindfulness and/or meditation) increase the ability to maintain selective attention during listening exercises (Lutz *et al.*, 2009; Moore and Malinowski, 2009). A meta-analysis by Chiese et al. (2011) showed that relaxation activities improved both attention and working memory. Similarly, a study by Tang et al. (2007) found that these activities cause a change in brain activity leading to increased attentional processes. Contrary to these reports, a meta-analysis by Yakobi, Smilek and Danckert (2021) found that there were limited positive effects on attention span and another meta-analysis conducted by Zenner, Herrnleben-Kurz and Walach (2014) reported great heterogeneity stating that many studies surrounding the focus are of questionable reliability.

A possible explanation of these conflicting outcomes is offered by Waters et al (2016) who attribute this to variations in facilitator skill, length of interventions, and the type of meditative practice used. Although, in relation to length of intervention there is evidence to suggest that short-term application can also benefit participants (Grecucci et al., 2015). As there is no need to purchase equipment or training, meditative practices are feasible, low-stake interventions which allows schools to be able to implement such interventions for long periods of time.

Physical Exercise on Selective Attention

Another strategy thought to improve selective attention is the use of physical activity (Turchaninov and Beshlei, 2022; Engeroff, Banzer and Niederer, 2022). One systematic review found that physical activity benefited cognitive development including attention (Carson *et al.*, 2016). It was, however, stated that six of the seven studies included in this review had a high risk of bias, weakening the argument for the claim. These claims do not stand alone as another study by Jackson *et al.*, (2016) came to the same conclusion, as long as the strategy was implemented for at least one month. There are many different opinions on the length of time needed to see the benefits of physical activity as a tool for increasing attention, stretching from one session to ten months (Thuc, 2024; Hillman, Logan and Shigeta, 2019). There is some evidence to suggest that the time of the day the exercise is used may impact the effectiveness of the intervention, however, this evidence comes from a study conducted in a Montessori school in which children have significant control over what they choose to focus their attention on, and so may not necessarily be generalisable to a mainstream school (Juanga and Ressureccion, 2015). There is also evidence to suggest that outdoor exercise has a greater impact on attention than indoor exercise (Rogerson *et al.*, 2016).

Physical activities as interventions for improving selective attention require little training for teachers to be able to implement them effectively (Mahar, 2011). Due to the flexibility surrounding what constitutes physical activity, whether that be high or low intensity, it is easy for teachers to tailor the strategy they use to fit their facilitator abilities. This is supported by evidence that suggests results from low or high-intensity exercise provide the same attentional outcome (Thuc, 2024). Teachers should be cautious, however, about the possibility of overexertion meaning the strategy causes reduced cognitive performance, and thus attention (Haunhorst *et al.*, 2022).

Active Games on Attention

There is a small body of research supporting the claim that using active games, such as 'Simon Says', can increase pupil attention, as it improves their focused listening

skills (Ni'mah, 2018; *Nurul, 2020*). An example of this in the classroom would be a teacher calling out instructions, such as 'hands on your shoulders, hands on your knees', and children following the instructions given. The main findings from research surrounding the 'Simon Says' style games are that it improves participation and listening skills, and by doing so, improves attention (Nasution, 2021; Dalimunthe, 2018). However, many of these studies were conducted outside of the United Kingdom and the participants are of secondary school age, not primary so the transferability may be questionable.

This strategy is commonly used as a therapy activity for children with ADHD, as an effective method of improving attention (Choi, 2012). However, the literature supporting this used studies from 1995-2010 and may not be entirely valid in present-day cases, for example, post-COVID times, as some children have been reported to have had cognitive difficulties being classed as 'long-covid' (Ng *et al.*, 2022).

Although the body of research surrounding the impact of active games strategies on attention is small, it is a strategy the researcher has used previously in her practice, which appeared to be beneficial, so it would be appropriate to try it as part of action research in a different setting/context.

Attention and Inclusive Pedagogy

Inclusive pedagogies respond to pupils' individual differences but aim to avoid the 'marginalisation that can occur when pupils are treated differently' (Florian and Spratt, 2013, p.119). Additional (or modified) resources, additional teacher time or the help of another adult in the classroom are commonly used to support children with SEND (Smith and Broomhead, 2019), yet this may result in the child being treated 'differently' and thus not reflecting inclusive pedagogy.

Neurodiversity, sitting within the broader field of biodiversity (Chapman and Botha, 2023), recognises the different ways in which individuals' brains process their experience of the world and, as the term encompasses all children, is used here as an inclusive term.

Much of the research on improving attention focuses on children with attention deficit hyperactivity disorder (ADHD) or autism spectrum disorder (ASD) (Hoyer *et al.*, 2021; Chapman and Botha, 2023). Whilst these strategies are intended to support children, introduction and trialling of new strategies may be problematic for some children, particularly those with autism, who may struggle with disruptions to regular routines that the implementation of attentional improvement strategies would introduce (Melo *et al.*, 2023). The research does not appear to address this and the results from children with autism were consistently positive (Varigonda, Edgcomb and Zima, 2020). This action research will remain ethically mindful of providing students with advance warning and preparation, and implementing strategies gradually and responsibly (McIntosh *et al.*, 2018).

Literature Review - Synthesis

Although the research is not overwhelmingly conclusive, there is considerable evidence to support the efficacy of relaxation techniques, active games and physical exercise on improving selective attention. When considering the range of neurodiversity among children, the theoretical picture is less clear; whilst there is evidence that selective attention can be enhanced for some children, this comes with a risk of destabilisation of the child as result of a change in routine. From an ethical standpoint, consciousness of this will be required in the research design and operationalisation. It is questionable whether these strategies reflect inclusive pedagogy.

Methodology

Action Research

For this study, an action research methodology was used to investigate the effects of teacher-led strategies on attention during teacher input in the primary classroom and the implications for inclusive pedagogy in a neurodiverse cohort. Action research methodology is a cyclical approach to research that involves identifying a problem, developing an action plan, implementing the plan, collecting and analysing data, and then reflecting on the results to inform further action (DeMarco, 2024; Calhoun, 1994). Proponents of action research argue it generates practical knowledge, grounded in real-world contexts, and empowers practitioners to drive positive change in their own settings (Naz and Khatoon Malik, 2014). Its originator, Kurt Lewin, developed action research as an approach based on an interpretivist epistemology, which stood in direct contrast to the strong positivistic tradition of the first half of the twentieth century (Adelman, 1993). An interpretivist epistemology views reality as subjective, socially constructed, and a composite of multiple perspectives (Alharahsheh and Pius, 2019). Through this interpretivist lens, research is shaped by the researcher, who contributes their own subjective view of observed phenomena based on their personal experience; they are *insider* researchers with the unique perspective this brings (McNiff, 2017).

Critics of action research express concerns about its reliability and validity (Tekin, 2013). As the researcher is deeply involved in the context being studied, there are concerns about subjectivity and personal biases influencing the validity of findings. Since action research focuses on specific, local contexts, there are also challenges about how reliable and thus, generalisable the findings are to other settings. However, Kemmis, McTaggart and Nixon (2013,p. 70) state that it is not necessary within action research to become 'a hostage to the methodological claims of validity and reliability' but methodological and interpretative rigour are still necessary (Guba and Lincoln, 2000). This research aims to provide this rigour through acknowledging the inherent subjectivity and by using appropriate caution on the conclusions drawn in terms of their use beyond that of the researcher-practitioner. The mixed methods approach also allows two different perspectives on the same event.

The type of action research enacted here is first-person, insider, educational action research. First-person action research allows me to investigate both 'downstream' (behaviour and actions in the world) and 'upstream' (assumptions, intentions and philosophical) issues (Coghlan and Brannick, 2014); this allows simultaneous consideration of strategies which improve attention (downstream) and the broader consideration of inclusive pedagogy (upstream).   The core action research cycle used followed that offered by Kemmis, McTaggart and Nixon (2013). However, the core cycle was adapted to better meet the needs of the school placement. The core cycles were grouped into three series which aligned with the three strategies identified in the literature review: relaxation-based strategies, active game-based strategies and exercise-based strategies. Prior to cycle one, baseline observations were conducted against which subsequent findings could be compared. The number of cycles within each series was not pre-determined as this was intended to be an organic process in which each cycle continued its iterations until a clear picture emerged which could inform practice (positively or negatively). In addition to the three main series of cycles, additional reflection cycles were undertaken *between* series and *across* all series. This aimed to capture learning from preceding series and inform planning for subsequent series rather than existing as three, stand-alone series. This adapted cycle is illustrated in figure 1 overleaf.

Participants

Eight pupils in a year three class provided the sample for this research as this was the maximum number of in-action observations the researcher could facilitate. Purposeful sampling was used to intentionally select participants of who were identified by the class teacher to lose attention easily (Benoot, Hannes and Bilsen, 2016; Palinkas *et al.*, 2015).   The remainder of the class were involved in the lesson but were not observed.
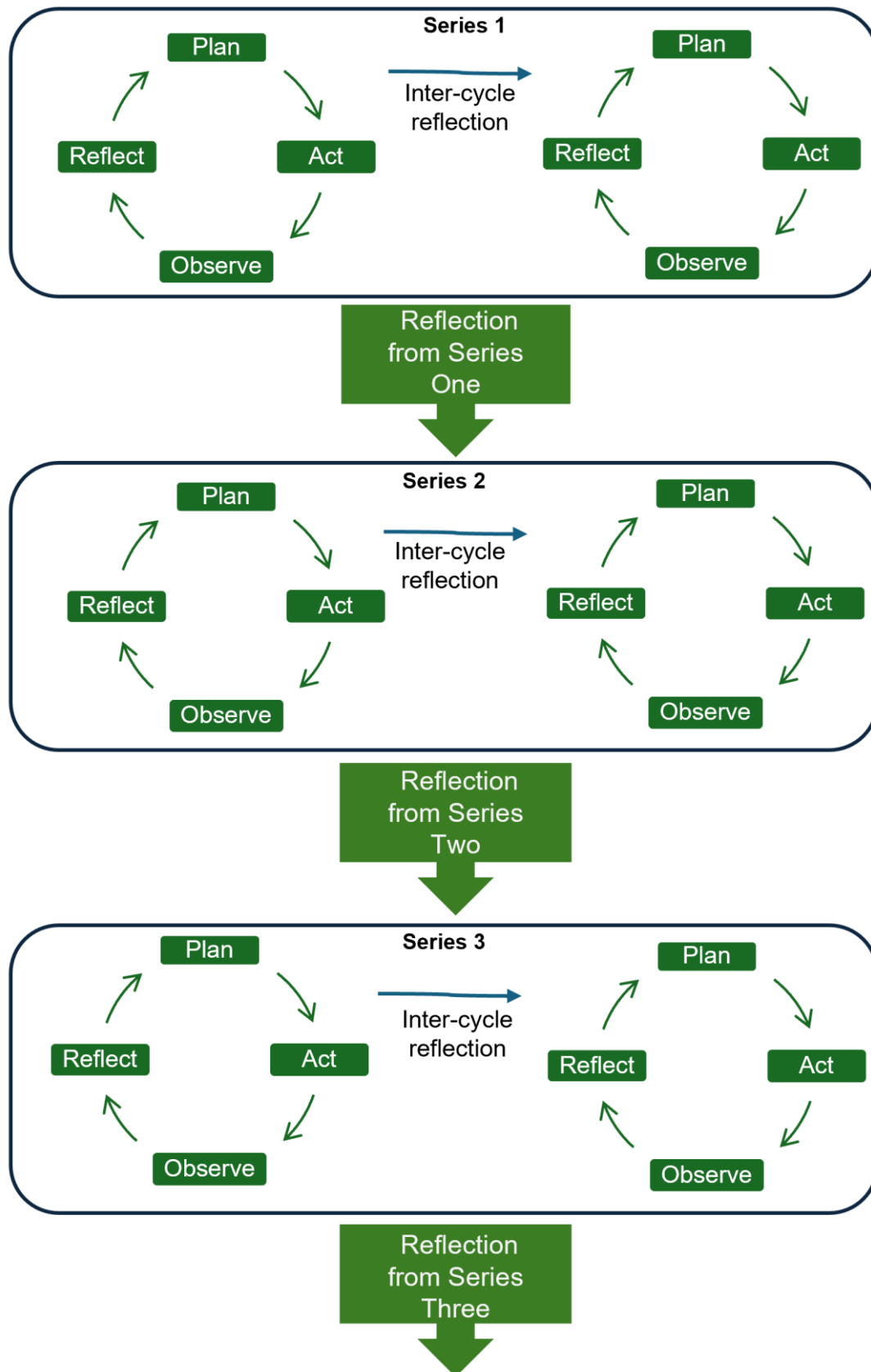
Figure 1: Action research cycle: following Kemmis et al (2013)

Data Collection and Analysis

A mixed methods approach was used with an explanatory design (Punch, 2014) which was aligned with the phases of the action research cycle. In phase one, quantitative data was collected during the observation phase of the action research cycle. This recorded the number of instances of loss of attention (ILA) for each pupil. In the second phase, qualitative data was provided through reflective journal activity and through discussion with the class teacher in response to specific questions arising from the classroom activity. As is appropriate in an explanatory design, the quantitative data was used to identify initial findings, and then the qualitative data is used to provide explanation of these findings.

For the quantitative data, this research provided descriptive statistics for each session for contextual purposes. Additionally, a nonparametric, Wilcoxon's Signed-Rank Test was to compare baseline medians with that observed during each cycle as is appropriate for a very small sample in repeated measures test (Mat Roni, Merga and Morris, 2020). This was used to determine whether there was a statistically significant difference in the median ILAs, however, it was used with caution and no inference of causality was drawn from the results due to the very small sample size.

Qualitative data, from the reflective journal and discussions with the class teacher, was used to explain and build on the initial quantitative results (Punch, 2014). A thematic analysis (Leonard and Glenwick, 2016) was then used to identify recurring ideas across and between cycles and series to inform the discussion.

Ethical Considerations and Limitations

The University's Research Ethics Policy informed the design and implementation of this research ('York St John Research Ethics Policy', 2024; Appendix Three). Permissions were sought and given by the Headteacher to conduct the research. The research was fully anonymised so that the school, members of staff and pupils are not identifiable. Initially, a triangulated design was planned, which included interviews with pupils (Punch, 2014). However, parents did not respond to the

permission request for these interviews, so the research design was adjusted accordingly. This does mean, however, that pupil voice is not represented in this research.

Additional limitations include the action research using a small sample of pupils, in one setting, by a first-time action researcher. Time constraints limited the depth which with each action research series could explore the strategy under consideration.

Findings

Series 1 enabled observation of baseline data. Series 2 – 4 represented the three areas of research-informed focus i.e. action game, relaxation based techniques and physical exercise. Within each series, there were variations of the particular strategy used for implementation as well as variations in time of day and at which point in the lesson the strategy was used.

A summary of the descriptive statistics for each cycle is provided in Appendix One, for context. For each cycle, a graphical representation of the ILAs is presented to give a visual depiction of the session as a whole, and by pupil. These data have been selected for graphical display as they represent both the total ILAs, which is important as this indicates the demands on the teacher on managing these, and the individual ILAs for each pupil, which is important as this indicates the extent to which each child was able to maintain attention during the session. Then reflective journal extracts (RJE) are used (in quotes) to suggest qualitative explanations of the quantitative findings at group and pupil level in line with an explanatory design.

Active Games
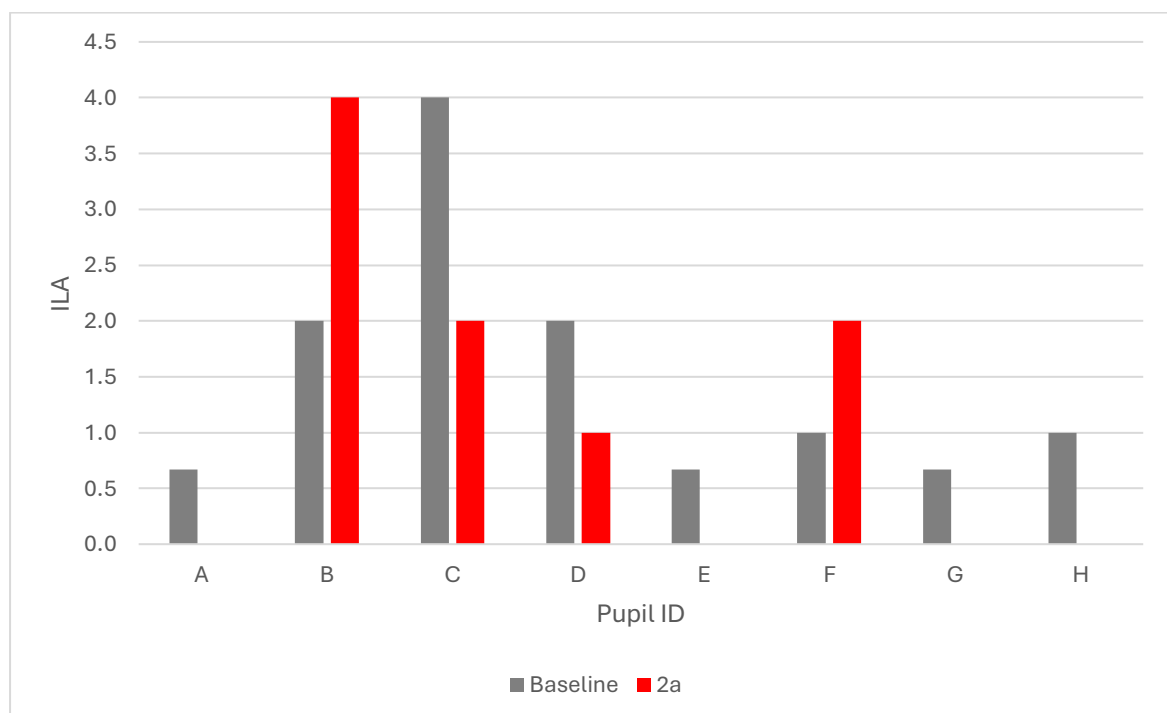
Cycle 2a – Seated Simon Says

At an individual pupil level, six pupils experienced fewer ILAs and two pupils experienced an increase from baseline. The Reflective Journal Entry (RJE) for this cycle showed that the seated active-games strategy 'grabbed the pupils' attention' at the beginning of cycle 2a but that it started 'to wane during the session'. Pupil B was 'actively trying to distract other children' and pupil F seemed 'unsettled by this' as she was sitting near to him. After review, it was decided to continue this strategy into another cycle but to add the option for pupils to self-select to move to a seat in which they thought they would be able to maximise their attention.

Cycle 2b: Seated Simon Says
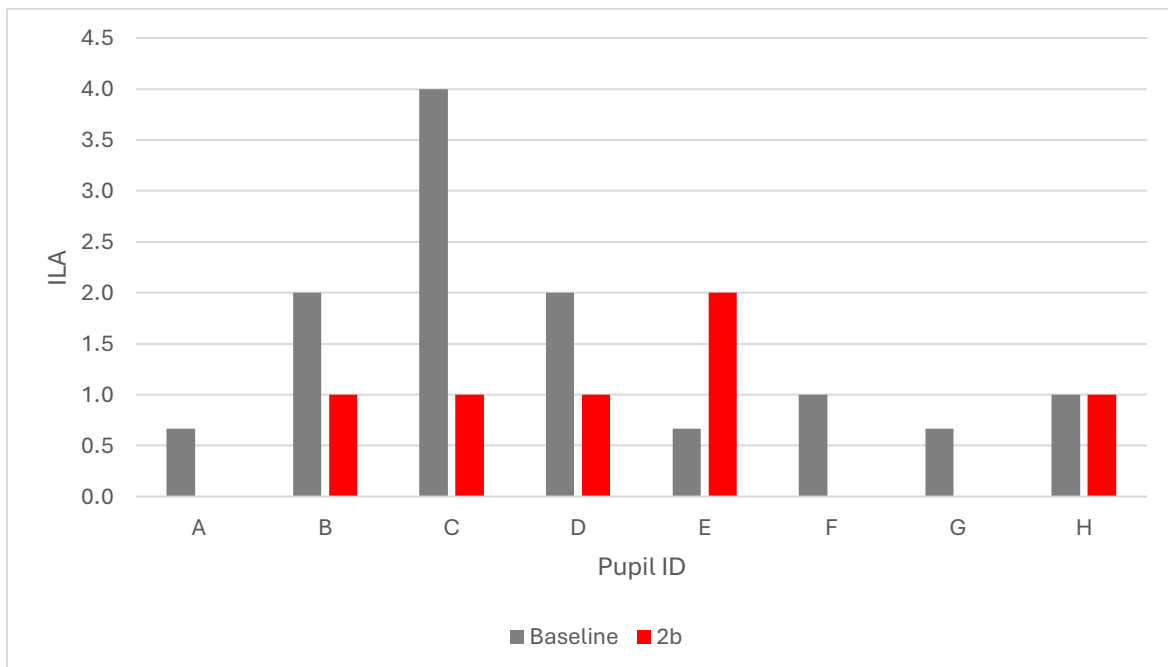
Figure 3: ILA of baseline and cycle 2b, by pupil

At an individual level, three quarters of pupils had reduced their ILA compared with the baseline. The RJE showed that the children were enthusiastic about the focus on this lesson (writing a quest story) and seemed 'very eager to write their stories' which may have contributed towards the overall reduction in ILA.

In response to the option to move seats to minimise distraction by others, pupil C chose to move away from pupil B and pupil D. This was reflected by a reduction in ILA for pupil C. Interestingly, pupil D's ILA also reduced, quite dramatically from 4 to

1, which might indicate that having no-one next to him to distract improved his own attention.

Pupil E had 'an unsettled morning' for which he used one of his planned strategies; he sat outside the classroom to regulate before coming back in before this session. This is reflected in pupil E's ILAs which totalled 2 today (compared with zero in the previous session).

On reviewing this cycle, it was decided to keep the option to move seats as this appeared to have been effective for some pupils. For the next cycle, the timings of the strategy will move from the start of the session to the middle of the session to see how this affected pupils' attention and to tackle the issue in the last two sessions of attention waning as the session progressed.

Cycle 2c: Seated Simon Says
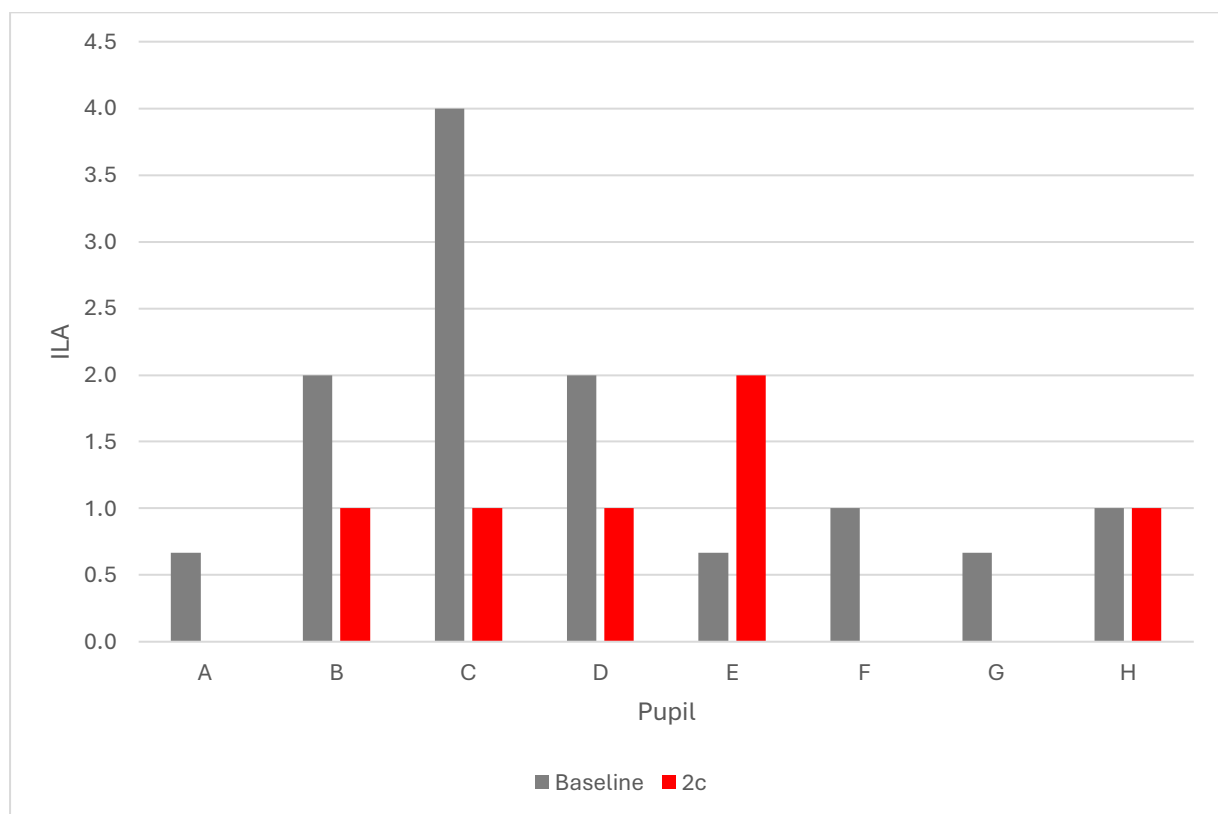
Figure 4: ILA of baseline and cycle 2c, by pupil

RJE showed that some ILAs occurred before the intervention and some after; there 'did not appear to be a discernible pattern to this'. Children were 'quite excited' in this lesson as they were using recorders which meant they were generally 'more distracted than usual'.

On review, the next intervention would be kept in the middle of the session but to use it in an afternoon session as the combination of afternoon and middle of the session had not yet been tried out.

Cycle 2d: Seated Simon Says
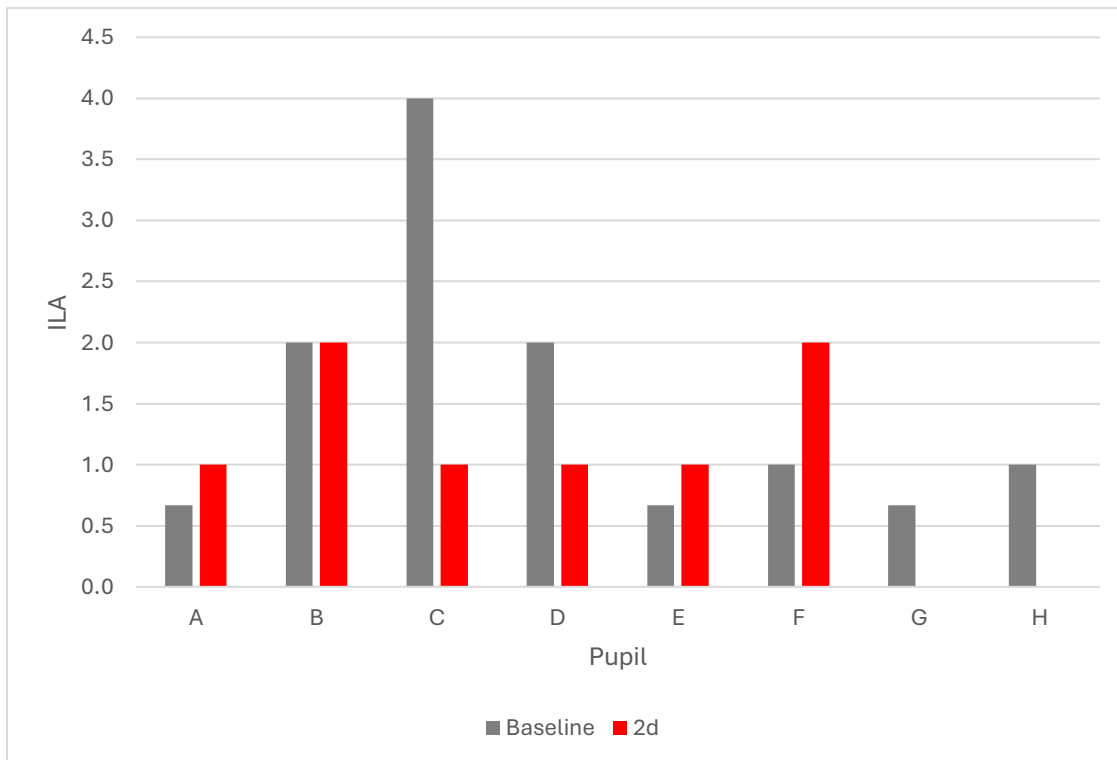
Figure 5: ILA of baseline and cycle 2d, by pupil

The net increase in ILAs was the result of three pupils experiencing more ILA and two pupils experiencing fewer ILA. Interestingly, pupil F's ILA increased from being zero in the two previous (morning) cycles back to 2 ILA which matched her previous afternoon score. The RJE notes that pupil F seemed to be 'tired during this session' and the researcher queried this with the class teacher.

For part of this lesson the children spent just under 10 minutes watching a cartoon video about the easter story during which they 'really engaged with' and during which there was only one ILA from pupil B. The remainder of ILAs were in the first half of the input. It is possible that the reductions in the ILA were due to the children's enjoyment of the video rather than/in addition to the movement break strategy intervention.

Cycle 2e: Standing Simon Says
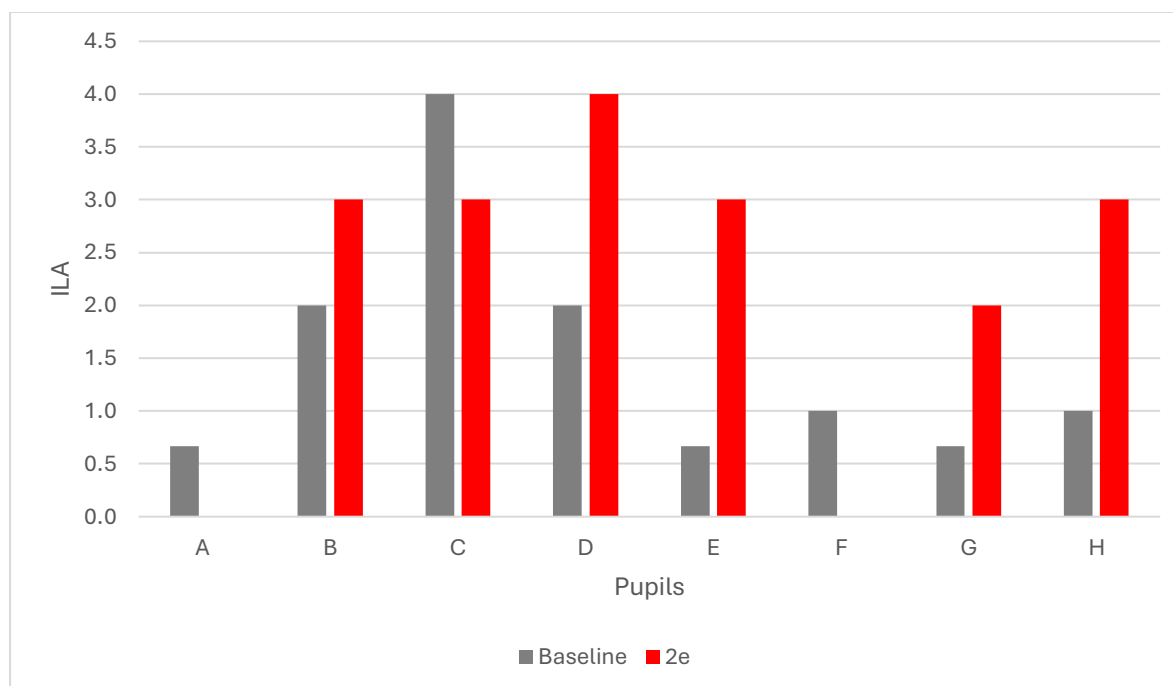
Figure 6: ILA for baseline and cycle 2e, by pupil

Pupil F had returned to her zero ILA which strengthens the possibility that this pupil has a particular issue in the afternoons.

During this exercise, pupil B and another group of non-sample boys had to be reminded about their behaviour as they started moving to try and 'bump into each other'. Many children 'started laughing' which turned into 'talking and shouting just before the activity stopped'. Today, there was a supply teacher in the classroom, which seemed to unsettle the pupils, and may offer some explanation of these behaviour changes.

Pupil E, who normally stays at his seat for inputs, 'moved onto the carpet with the rest of the class so he could see due to the position of the whiteboard'. This meant he was not colouring during the session as he normally would when listening. He was sitting next to pupil C, a friend of his, and they were 'frequently distracting each other by talking'. Eventually, the boys were asked to move to other sides of the classroom, and there were no incidents from the two after.

On review, this cycle was discontinued as the standing active game strategy created too many behaviour incidents to have a positive effect on attention.

Relaxation

Cycle 3a: Mindfulness Video
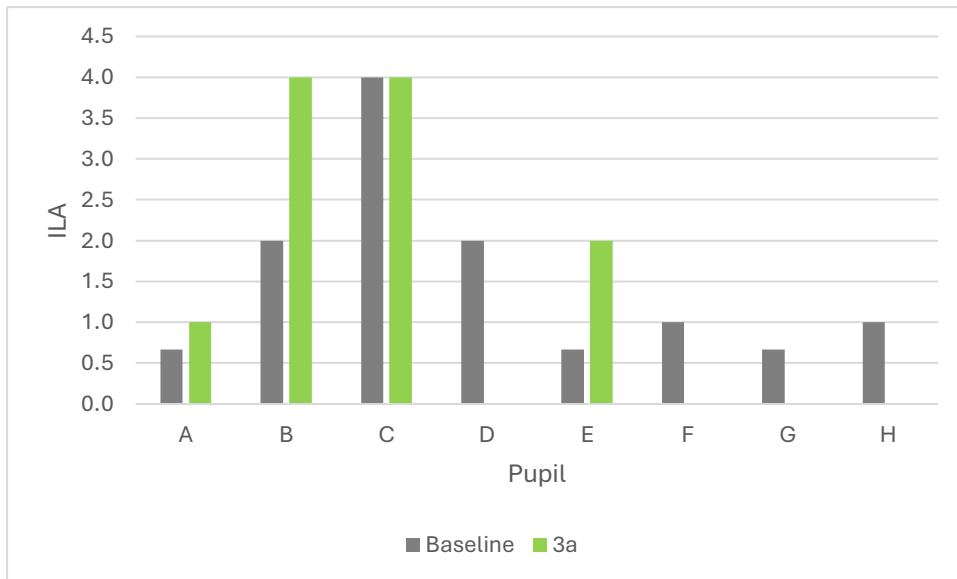
Figure 7: ILA of baseline and cycle 3a, by pupil

Two pupils recorded their highest ILA since the baseline whilst the remainder of the pupils had ILA which were in line with their emerging trends and four pupils experienced zero ILAs. Pupil B was actively 'trying to distract pupil C' which explains their high ILAs. Today was 'break the rules' day in school which meant that children could attend in non-uniform and bring sweets for break. This change in routine may explain some of the very high ILAs.

On review, it was decided to continue with the relaxation series but to focus on a different strategy.

Cycle 3b: Meditation Exercise
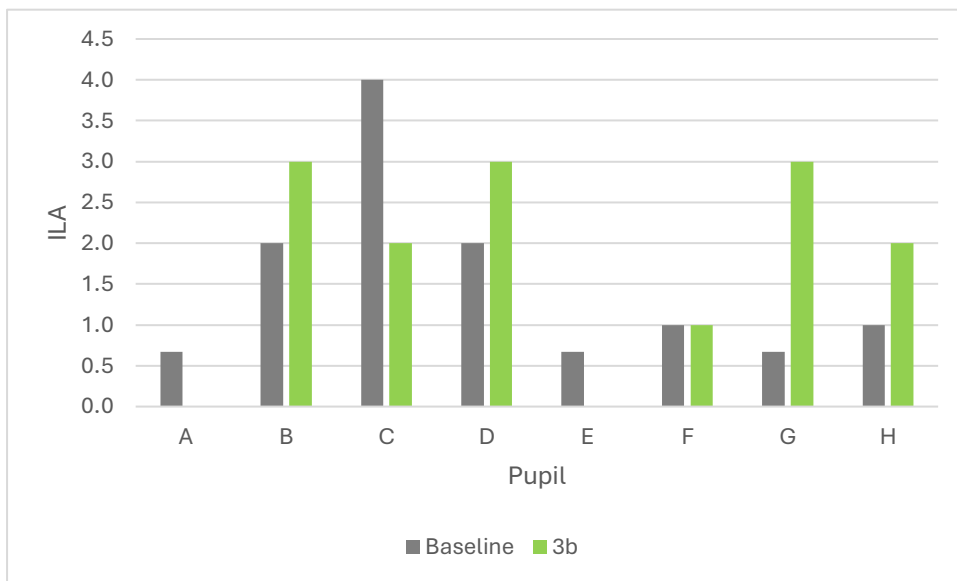
Figure 8: ILA of baseline and cycle 3b, by pupil

In this cycle, 5 out of 8 pupils experienced ILAs higher than or equal to their baseline indicating that this strategy was not effective. RJE showed that pupil B was making fun of the exercise saying, 'Look, I'm a monk, ommmmmmm' and that this distracted several other pupils. This day was the day of the school talent show and children were 'very excited' about this which may explain their high ILAs in this session.

On review, it was decided to terminate the relaxation-based series as some pupils were finding it difficult to take seriously which was impacting negatively on other pupils' ILA.

Physical Exercise

Cycle 4a: Indoor Exercise
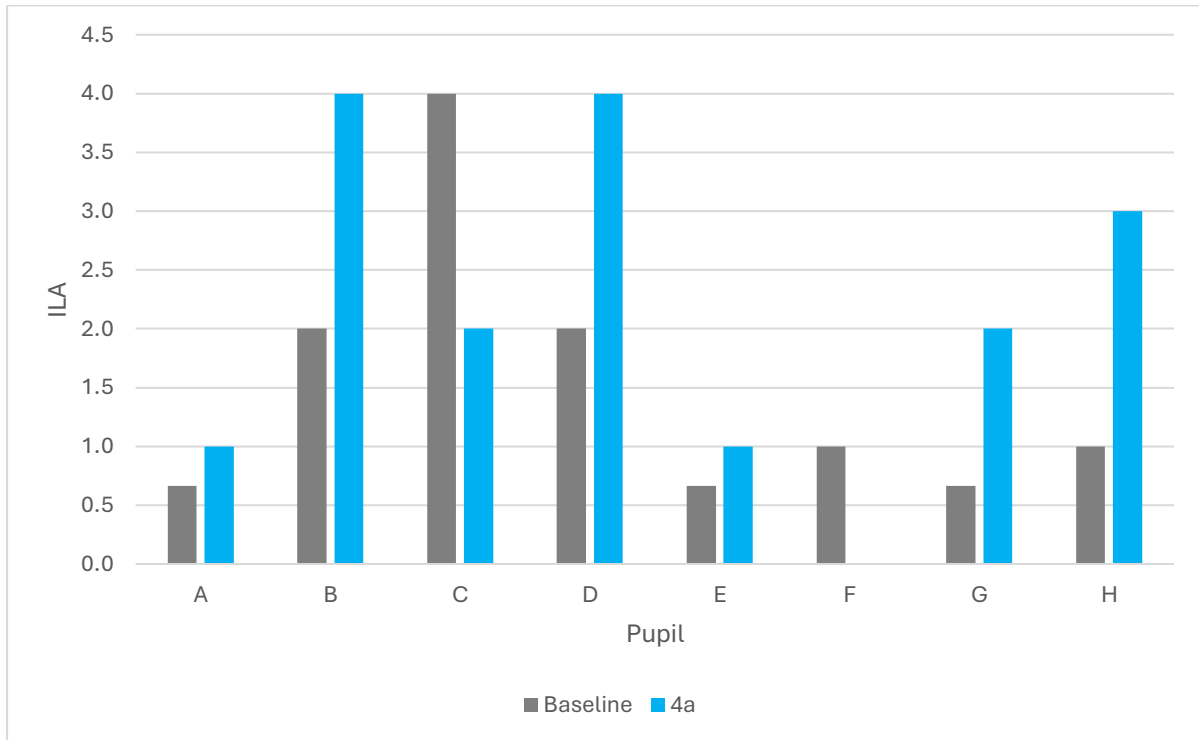
Figure 9: ILA of baseline and cycle 4a, by pupil

This cycle produced a total of 17 ILA with five of the eight pupils having ILAs above their baseline. RJE showed that pupils B, C and D demonstrated 'silly' behaviour during the activity in which they intentionally bumped into each other whereas pupils F and G (both female) were 'reluctant to participate'.

On review, it was decided to try this strategy again but on the carpet to allow more space.
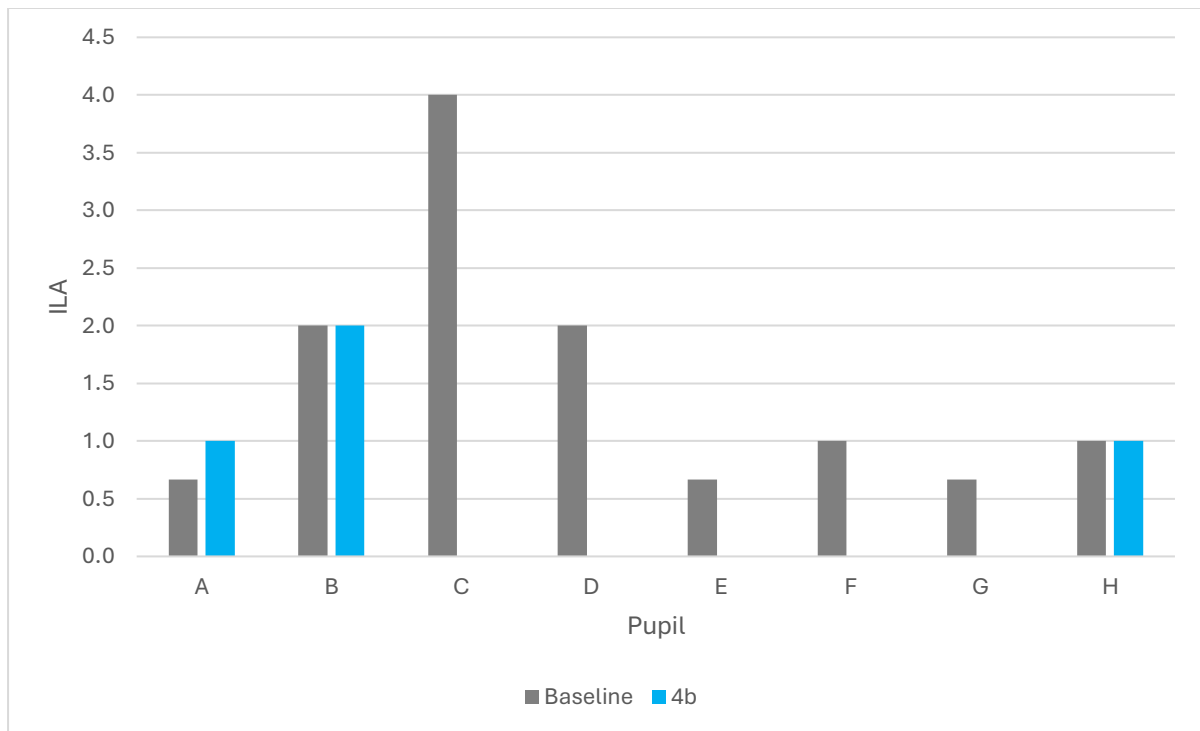
Figure 10: ILA of baseline and cycle 4b, by pupil

This cycle showed a great reduction in ILAs across the board with five students experiencing zero ILAs. Following cycle 4a's review, RJE showed that this cycle was conducted on the carpet to allow the children 'more space to move and to enable them to be next to their friends'. This additional space may have been the reason for this improvement. It was also a very typical day so children's excitement wasn't heightened by external factors.

Cycle 4c:Outdoor Exercise
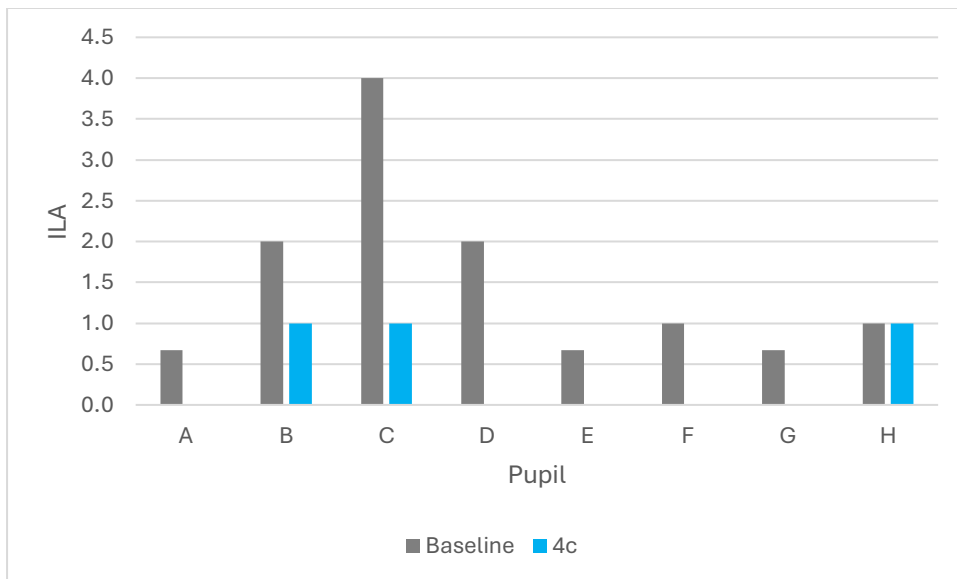
Figure 11: ILA of baseline and cycle 4c, by pupil

This cycle was the most effective of all in securing low ILAs even showing statistical significance at the p<0.05 level using Wilcoxon's Signed-Rank Test (Appendix Two). It was the only cycle which showed statistically significant results. This means that it is unlikely that this reduction occurred by chance and indicates that outdoor exercise may be effective in reducing instances of loss of attention.

RJE reports that, 'children enjoyed the exercise and sat down quietly when back in the classroom'.

Discussion

In the methodology, a version of action research was offered in which the cycle operated at different levels, including reflections at series level, *between* series and *across* all series. This approach will be echoed during the following discussion starting with discussion of individual strategies, to emerging themes and finally broader issues for professional practice and inclusive pedagogy.

The only strategy which appeared to produce a convincing reduction in ILA for the sample group as a whole (and for each individual within the group) was outdoor exercise. This aligns with Turchaninov and Beshlei (2022), and Engeroff, Banzer and Niederer's (2022) findings in relation to exercise's effect generally, and, more specifically to Rogerson et al's (2016) findings around outdoor exercise being more effective on attention than indoor exercise. On this basis, this strategy will be integrated into the researcher's teaching toolkit for future use to determine whether it would be equally effective with a different cohort of pupils in a different setting.

Across the remaining strategies, there was some evidence that seated active games and indoor exercise had some positive impact both on the group as a whole and on some individuals within the group, but this evidence was not as strong as that for outdoor exercise as some pupils did not experience reductions in all cases. This aligns with the rather mixed picture presented in the literature review. That being said, it may be worth revisiting these strategies in future to explore their potential in different contexts. Relaxation-based techniques showed little or no positive impact in contrast to the evidence indicated in the literature review. This is not to say that these strategies have no merit; it may be that pupils needed more time to develop the skills associated with these techniques or that there were other, unknown factors which were influential. The standing active game was not effective at all and created more issues than the baseline. It is unlikely that this strategy will be reused by the researcher.

There were additional interesting themes which emerged *across* the action research cycles. Firstly, when children were given control over their use of a strategy, for example, choosing to move seats, this produced some positive impact. Secondly, there appeared to be no clear pattern around differences in effectiveness between

timing of strategies within the session (start of session or midway through session) but this is an area which might warrant further exploration, particularly in relation to the activity in which the children were engaged immediately prior. Thirdly, disruptions to the normal practice of the school day, for example, a new supply teacher or an exciting event planned for the afternoon, appeared to have a negative impact on pupils' attention which reflects the research by Melo *et al.* (2023). As these disruptions may be unavoidable, it would be important for practitioners to mitigate the impact of these events. One way of doing this could be to employ flexible planning in which the scheduling of lessons which require high levels of attention can be adjusted to accommodate disruptions. Flexible planning may introduce additional challenges for those pupils for whom routine is important so it will be necessary to balance the options to secure the best outcome for all pupils in a given situation.

Issues relating to inclusion emerged across the whole action research project which were illustrated well in two examples: firstly, one pupil had a very clear difference between attention levels in the morning and in the afternoon. This particular pupil is not registered as having any SEND needs, yet discussion with the class teacher revealed that she suspects that the pupil has undiagnosed autism which the pupil is consciously masking. Masking occurs when individuals, consciously or unconsciously, use strategies to hide their differences from other people and this may explain her observed tiredness in afternoon sessions and difficulty in maintaining attention span as masking can be exhausting to maintain (Cook, Ogden and Winstone, 2018). However, masking represents a larger issue due to its potential long-term, negative mental health impacts (Sedgewick, Hull and Ellis, 2021) This is a speculative analysis but it highlights the potential challenges the pupils are dealing with which are not necessarily evident to the teacher.

Secondly, a pupil who used an existing strategy to support his additional needs was impacted negatively when unable to access this strategy, for example, when the activity took place on the carpet. This example highlights the complexity of securing the best outcome for individuals and the difficulties of supporting a pupil with a strategy which only works in limited contexts (Aspiranti and Hulac, 2022).

The two examples above raise broader issues in relation to inclusive pedagogies and, particularly, to neurodiversity. The reason behind trying out strategies to enhance selective attention was that some children struggled to maintain attention during the teacher input. The strategies aimed to resolve this issue; some children were unable to maintain their attention for the duration of the input so strategies were 'bolted-on'. This approach is increasingly seen as a 'flawed concept of inclusivity', despite its 'laudable intentions' (Wallis, 2023) in that it is placing a sticking plaster over the problem rather than addressing the problem itself. If a quarter of the pupils were originally identified as struggling to maintain attention during teacher input, this could represent an issue with the input rather than the children.

This realisation leads to the key implication for practice of this action research in that, as a teacher, the important question may not be the 'what can I do?' question, but the 'why do I need to do it?' question, as this question may reveal the reason there is an issue in the first instance, for example, there may be a practice which has gone unquestioned or unchallenged and which is not fit for purpose within an inclusive pedagogy. As Watson (2022) asserts, teachers should create learning environments which are adaptable, flexible and accessible rather than making concessions to accommodate a particular need. Compassion-based practice and strengths-based pedagogical approaches (Hamilton and Petty, 2023) might be useful here, for example, universal learning design (Rapp, 2014), with its multiple means of representation, action, expression and engagement can build flexibility into the curriculum from the start rather than retroactively making accommodations. Despite originating in HE settings, research interest is beginning to emerge in relation to its application in the primary classroom (Griffiths and Leach, 2022) although there is a lack of consensus on what universal learning design 'looks like in the classroom' (Edyburn, 2021).

Underpinning this with central policy which has inclusion at heart would target resources towards a future which sees schools as instruments of social justice through which to rebuild a more equitable social order (Gorski et al, 2013). Unfortunately, there is no evidence that central policy is leaning towards a change of direction in this way. Indeed, there appears to be a move towards even less inclusive policy with the Government's announcement this month of the provision of 2000 pupil places at new 'special' schools (*GOV.UK*, 2024).

This action research project began as a systematic, cyclical exploration of the effectiveness of strategies to increase selective attention during teacher-led input. As would be expected from an action research project, it addressed the general question in the manner of 'what can I do to improve the effectiveness of this action?' However, as a result of the emergence and analysis of cross-cycle themes and broader issues, it has highlighted that there were deeper, more fundamental questions to address, such as 'why am I doing this action?' and 'is this the right action?' The use of strategies bolted-on to a teacher-led input in order to make it accessible to all could be considered to be a version of the flawed version of inclusivity in that it 'focused on fixing disadvantaged people rather than the conditions that disadvantage them' (Gorski *et al.*, 2023) – a deficit model. However, going through this action research process has enabled me to elevate my level of consciousness and to see how inequity is *constructed* on a day-to-day basis in the classroom, albeit sometimes unwittingly. Whilst my intention was to be able to leave this action research project with some effective strategies to use in the classroom, I leave instead with a new perspective from which to analyse and observe my practice, within the wider context, which I consider to be infinitely more valuable. This represents a personal journey of reflexivity in which I recognised my own part in the social world I was researching (Palaganas *et al.*, 2017). Specifically, it demonstrates how my innovative use of ever-increasing cycles of reflection within the action research process shaped the research and how this, in turn, shaped my perceptions of what inclusive pedagogy should look like in the classroom as opposed to how I was seeing it operate.

Conclusion

In terms of the impact on selective attention of three research-informed strategies, the value of this research has been primarily at the level of the individual pupil. From a teacher-researcher perspective, developing an understanding that certain strategies worked well to support individual pupils' selective attention is incredibly useful and can inform future practice with other children. However, there is a need to be mindful that these strategies should be used to develop pupils' attention over time and not as a quick fix to compensate for non-inclusive practice.

Surprisingly, considering the small sample size, vigorous outdoor exercise showed statistically significant results for the sample group. This finding should be treated with extreme caution as there was no attempt made to control other factors, however, the strength of the combined positive result from both the quantitative data and the qualitative, explanatory, reflective journal entry does give some confidence to try this strategy again in the future.

As would be expected with small scale, first-person action research, there is no claim to transferability of these findings to other teachers in other settings, rather, they may act as a starting point or inspiration for others to conduct action research with their own pupils in their own settings as part of their own reflective practice.

Finally, the relationship between strategies to improve selective attention and inclusive pedagogy, as discussed in this paper, may warrant further research as they both aim to support inclusivity, but a tension exists between them. The individual strategies adopt a 'bolt-on' approach which does not align with the integrated, holistic approach championed by inclusive pedagogy. Using the lens of inclusive pedagogy in this action research work has revealed the importance of ensuring that inclusive practice is the mainstay of teaching and learning, and that teachers are not merely layering additional strategies on top of non-inclusive practice as a compensatory measure.

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Appendices

Appendix One: Descriptive statistics by cycle

Series Description	Cycle/Session	Sum	Mean	Median	Mode	Standard Deviation
Baseline	1	12.0	1.5	1.0	0.7	1.2
Action Games	2a	9.0	1.1	0.5	0.0	1.5
	2b	6.0	0.8	1.0	1.0	0.7
	2c	6.0	0.8	1.0	1.0	0.7
	2d	8.0	1.0	1.0	1.0	0.8
	2e	18.0	2.3	3.0	3.0	1.5
Relaxation	3a	11.0	1.4	0.5	0.0	1.8
	3b	14.0	1.8	2.0	3.0	1.3
Exercise	4a	17.0	2.1	2.0	1.0	1.5
	4b	4	0.5	0.0	0.0	0.8
	4c	3	0.4	0.0	0.0	0.5

Appendix Two: Wilcoxon Signed-Rank Test (two-tailed)

Baseline (1st observation) compared with...	Seated Active game (all cycles)	The result is *not* significant at $p < .05$.	Seated Active game 1 of 4	The result is *not* significant at $p < .05$.
			Seated Active game 2 of 4	The result is *not* significant at $p < .05$.
			Seated Active game 3 of 4	The result is *not* significant at $p < .05$.
			Seated Active game 4 of 4	The result is *not* significant at $p < .05$.
	Standing Active game	W = 10.5 The result is *not* significant at $p < .05$.		

	Video	Sample size not sufficiently large to use Z or W value due to number of matched samples		
	Breathing Exercise	W = 16.5 The result is *not* significant at *p* < .05.		
	Indoor Exercise (across both cycles)	W = 10 The result is *not* significant at *p* < .05.	Indoor Exercise 1 of 2	Sample size not sufficiently large to use Z or W value due to number of matched samples
			Indoor Exercise 2 of 2	The value of W is 2. The result is not significant at p < .05.
	Outdoor Exercise	**The value of W is 3. The critical value for W at N = 8 (p < .05) is 3.** **The result is significant at p < .05.**		

Appendix Three: Ethics Form

Research ethics

Research at YSJU is conducted according to the principles set out in the university research ethics policy. The policy applies to all staff and students of the university (including those with visiting or honorary contracts) and to third parties (e.g. staff from other institutions) who propose to undertake research with YSJU students. The policy states that all research must be conducted according to appropriate ethical, legal and professional frameworks, obligations and standards, and as a guide for staff and students, it specifies that the following types of research must undergo ethical scrutiny by the appropriate research ethics committee and obtain formal approval before it is undertaken:

- research involving living human participants, their tissue or their data;
- research with the potential for adverse environmental impact;
- research involving NHS patients, staff or resources;
- research involving animals;
- research into terrorism, extremism, radicalisation, and other areas under the counter-terrorism and security act (2015) and prevent duty for higher education (2015).

Other forms of research may also raise significant ethical issues, and this too should be subject to ethical review. if in doubt about whether research requires ethical review, advice should be sought from the chair of the university research committee which has oversight of research ethics at YSJU.

Open Data & Data Management

YSJU supports the principles set out in the UK Concordat on open research data, and supports the principle of open access for both research data and outputs, recognising the benefits to the public and wider academic community. These principles are set out in the YSJU Data Management Policy, and which outline that all researchers have a duty to:

- Take responsible ownership of all research data that they generate.
- Follow legal, regulatory and compliance needs.
- Ensure the maximum possible security and confidentiality of research data and that personal, confidential or sensitive data is not disclosed to unauthorised recipients.
- Ensure the integrity of research data.
- Ensure the appropriate availability of data.

Therefore, integrated into the research ethics form, is a section on data management, focusing on the storage, sharing and availability of your data.

APPLICATION FOR ETHICAL APPROVAL

Section 1: About you and the project	
Title of research:	How can teachers improve primary students' attention, during inputs, through teacher-directed strategies?
Researcher:	Rachel Simister
Email address:	Rachel.simister@yorksj.ac.uk
School:	Education Language and Psychology
Telephone number:	07901806336
Main supervisor:	Ruth Unsworth
Start date of project:	January 2024
Expected duration of the project:	5 months

Section 2: Brief overview of the project

Objectives of the investigation
Please provide a plain English summary of the investigation including an academic rationale and justification for the project. This should not exceed 500 words.

The research aims to help develop my own practice as a teacher.

I have chosen this area as I believe it is an important and current topic that is being discussed within education. If children are not maintaining attention during teacher instruction, their academic achievement will suffer as an implication of their off-task behaviour (Flippin, Clapham and Tutwiler, 2021), (Slattery *et al.*, 2022). This inattention to learning not only limits their achievement in primary school but also can be a key indicator that they will have a hindered education in later life (Lundervold, Bøe and Lundervold, 2017).
Other issues children may face from their inability to maintain their attention could present as emotional well-being struggles (Crescentini *et al.*, 2016) and struggles interacting with peers (Matson *et al.*, 2010), (Motamedi, Bierman and Huang-Pollock, 2016).

I want to explore attention span within my own practice and try different research informed strategies to see which ones, if any, improve the attention span of the pupils with whom I'm working with. Preliminary reading indicated that there are numerous strategies that have been shown to be effective through research to date. Below is an example of some of these strategies:

Movement breaks
- Mahar et al (2006) – A study evaluating the effects of classroom-based physical activity programme and how this impacted children's on-task behaviour during teacher instructions. The study found that children's on-task behaviour during teacher instruction was improved when the physical activity programmes were conducted.
- Malyszeck (2022) - A study focusing on the impacts of movement breaks on children's focus during mathematics lessons. The findings showed that children were more focused after the implementation of the movement breaks. This was show by a decrease in teachers having to give verbal reminders, individually and the group.
- Savina *et al*. (2016)- A systematic review detailing how movement activities can improve on-task behaviour.

Relaxation strategies
- Hooker and Fodor (2008) - A study that details how training in mindfulness can potentially enhance children's attention and focus.
- Fisher (2006) - A paper presenting arguments for meditation with children. They present that meditation develops concentration skills.

- Karmarkar *et al*. (2020) - An experiment conducted by the Heartfulness Institute found a significant improvement in children's attention span through heartfulness relaxation and meditation. Heartfulness meditation is defined as 'a form of meditation that transmits peace and love'.

I also find it personally relevant to my own practice as, during my school experiences, I have worked with children who have struggled to focus their attention, especially during teaching inputs.
I will use this action research approach with the objective of finding what research informed strategies work to help inform my own teaching practice.

Will the research involve visual/vocal methods where participants may be identified?	☐Yes ☒No

Section 3: Participants

Will the research take place outside the UK?	☐Yes ☒No
If Yes will the research take place outside the EU?	☐Yes ☒No
Will the study require the co-operation of a gatekeeper to give access to, or to help recruit, participants? *(e.g. head teachers giving access to schools, ministers giving access to congregations, group leaders publicising your research.)*	☒Yes ☐No
Will it be necessary for participants to take part in the study without their knowledge or consent at the time? *(e.g. observations of group behaviour, or the use of data that was not intentionally collected for research.)*	☐Yes ☒No
Will inducements be offered to participants? *(e.g. the offer of being entered in a prize draw, or, for students, the offer of course credit for participation.)*	☐Yes ☒No
Does the study involve participants who are particularly vulnerable or unable to give informed consent? *(e.g. if any participants are under 18. Adults with learning disabilities, the frail elderly, or anyone who may be easily coerced due to lack of capacity. If you teach and you wish to research your own students, they should be classed as potentially vulnerable.)*	☒Yes ☐No
Is there a possibility that the safety of the researcher may be in question? *(e.g. lone working)*	☐Yes ☒No

Participant recruitment
Please detail the nature of the participants.
Detail should include the number and age range of participants. You should outline how the sample size has been determined, important characteristics, and any inclusion/ exclusion criteria.

My sample is yet to be confirmed as I am awaiting details of my placement.
The sample will include children from my class.
I will be using purposeful sampling, choosing children who tend to lose attention during teacher-led episodes.

Where will the research be conducted?
Please explain where your research will be collected, for example in a laboratory at the university, or in participants' homes.

The data will be collected within my class on my school experience placement (….).

Describe the method of recruitment
Please explain how participants will be recruited, including detail on any gatekeeper approval you require, and information on any incentives (payments, expenses, prize draws etc.)
I will obtain headteacher consent to include the participants. There will be no incentives for participants. The participants will be chosen if they display short attention spans within my school experience placement class.
Participant consent
Please outline from whom consent/ assent will be sought. Detail should include how consent/ assent will be obtained, whether there will be a cooling off period, whether consent/ assent will be sought electronically or using paper forms. Copies of the participant information sheets and consent forms should be attached to this application form.
I will acquire signed headteacher consent to include the participants in the study. If the headteacher deems it appropriate, I will acquire consent forms from teachers/ children/ parents.

Section 4: Methodology

Please describe the research methodology and procedure.
Describe the research methodology and procedure, providing a timeline of activities where possible. Please use plain English.

I will be using a first-person action research approach to inquire into the effectiveness of my own practise. With this approach, I will be using a cyclical process, typical of action research, such as the: plan, observe, reflect, replan example suggested by Cohen, Manion, & Morrison (2007).

I will be triangulating data to assist in producing reliable results (Bans-Akutey and Tiimub, 2021). These results will be formed through observing students (evidenced on a table), comparing my observations with children's work from the lessons, and their thoughts on how they thought their level of focus was within the lesson. Below is an example outline of how I will conduct the research:

Week 1

- Identify potential pupils through purposeful sampling whilst observing class teacher's lessons.
- Identify potential interventions.

I will observe children during my teaching dialogues to see if/when students lose focus and what it was, they were doing when this happened. I will first observe common actions children do when they lose attention, from this I will create a table where I can note how long into the lesson the child lost attention and what they were doing when it happened.

Week 2
- Undertake baseline activity to determine attention spans prior to action research interventions.
- Plan first intervention (PLAN)
- Implement first intervention (OBSERVATION)
- Collect data on first intervention (DATA COLLECTION/OBSERVATION)
- Review effectiveness of intervention and impact on attention span (REFLECT)
- Plan second intervention (RE-PLAN)

Week Three

- Implement second intervention
- Review effectiveness of intervention and impact on attention span through triangulated data collection

I will compare children's work to the observation table to see whether, for example, the quality of work is better when they have paid attention longer.

I will also discuss with the children at the end of the series of sessions to see which strategies they felt were the most useful. For example, if they felt after a movement break that they were able to focus their attention more.

- Plan third intervention
- Implement third intervention
- Review effectiveness of intervention and impact on attention span through triangulated data collection
- Plan fourth intervention

(The same plan for week three will be used for the following weeks)

Please provide details concerning what your participants will be required to do.
Please describe the specific techniques that will be used, and outline exactly what will be asked of participants. This could include a description of the experimental methods to be used, or a description of the questionnaire or interview schedule. It may be helpful to provide reference to supporting material supporting the use of such techniques with your sample. Please attach a copy of any scales or measures, or focus group/ interview schedules to this application.

Throughout the study, I will be observing students and producing reflective journals.

From these data collection strategies, I will be able to see what exactly is working/ not working in improving children's attention spans and what changes need to be made to further these results. This will then be reflected through my 'effectiveness review' section in my outline plan and in planning of the following interventions.

Section 5: Ethical Issues
Please describe the main ethical issues under the sections listed below and how you propose to address them. You may find that you need to discuss different mechanisms for different participants. Please attach any documentation that relates to the aspects identified below such as letters of introduction, information leaflets and consent forms.

Informed consent	The headteacher approval will come from the signed consent form and parent consent forms for the pupils.
Openness and honesty	I will check interpretations with participants before including it in my writing. I will also be using triangulation to help with this.
Right to withdraw	Participants have the right to withdraw at any point throughout the study without giving a reason.
Protection from harm	I will not be collecting any sensitive data.
Anonymity/confidentiality	Children will be assigned numbers to maintain anonymity
Data security	All information will be stored securely through my university OneDrive
Debriefing	I will feedback my results to my placement school by providing a copy of my dissertation

Section 6: Data management plan & data protection impact assessment

If you are collecting any data about individuals then you will need to fill this section in. if your data collection is from documentation that is in the public domain, i.e. from books or publicly available statistics such as those kept by the Department of Education,, then you can go straight to section 7.

Please identify how you plan to keep your data safe and who will have access to it.

6A

Data type	Original format	Preservation format	Estimated volume	Active storage location	Completed storage location
e.g. questionnaire, observations, interview responses. Audio/video file	e.g.. Qualtrics files; Word .docx files Excel .xlsx files MP3/MP4	e.g.. Qualtrics files; Word .docx files Excel .xlsx files MP3/MP4	<10 mb unless in video format	YSJU One:drive account	YSJU One:drive account
Observation sheet (anonymous – pseudonyms used)	Excel .xlsx files	Excel .xlsx files	<10 mb unless in video format	YSJU One:drive account	YSJU One:drive account
Audio recorded interview (anonymous – pseudonyms used)	MP3/MP4	MP3/MP4 Word .docx files	<10 mb unless in video format	YSJU One:drive account	YSJU One:drive account
Photo file (anonymous – pseudonyms used)	TBC	Word .docx files	<10 mb unless in video format	YSJU One:drive account	YSJU One:drive account

6B Who, other than yourself, will have access to your raw data?

Who	Please delete as appropriate	Name	Reason for access to data
Tutor	YES	Ruth Unsworth	Only if required for assessment purposes
Participants	YES		During interviews - Triangulation of data
Other	NO		

6C please confirm that data will be destroyed on successful completion of project

Expected date of completion	Signature to confirm data will be safely destroyed
July 2024	R.Simister

Section 7: Declaration

Declaration – I have read the ethics policy and guidance and the general data protection regulation information alongside abiding by the practice in place within my research discipline. The information supplied here is accurate to the best of my knowledge.

Student Signature	R.Simister
Name	Rachel Simister
Date	13.12.23

Staff Signature for approval	R Unsworth
Name	Ruth Unsworth
Date	14.12.23

Appended material

List here the material you have appended to the end of this form. This should include letters to gatekeepers, examples of informed consent sheets, copies of questionnaires, interview schedules, participant screening tools etc.). If you cannot easily append this material, email it as an attachment.

Checklist	Attached	N/A
Participant Information Sheet(s)	☐	☐
Consent Form(s)	☐	☐
Sample questionnaire(s)	☐	☐
Sample interview format(s)	☐	☐
Any other documents (please specify below)	☐	☒

QTS6004M Research Project Permission form

Student name: Rachel Simister

SE3 School: ███████████████████████████ Primary School

Headteacher permissions: Observation of students, analysis of student work and semi-structured interviews with students.

I have read this student's ethical clearance form and give my permission for the conduct of this small-scale research project.

Additional parental passive consent is not required/has been obtained (pleased delete as applicable)

Headteacher's name: ████████████

Headteacher's signature: ████████████

Date: 19-1-24

Students:
This completed form must be scanned or photographed and uploaded to the permission submission area on Moodle **prior to commencing your research project and by 29 January 2024 at the latest**