

How do specific types of differentiation affect learner engagement and performance? and to what extent?

Please add your targets from the previous assignment using the table below.

	Targed/Target	Yr hyn yr wyf wedi'i wneud yn yr aseiniad hwn. What I have done in this assignment.
Targed/Target 1	Caution with possessive apostrophe	I proof-read more extensively and ensured that automatic grammar changes are correct.
Targed/Target 2	Caution with semi colon.	I proof-read more extensively and ensured that automatic grammar changes are correct. I went back to basics and followed the traditional grammar rules.
Targed/Target 3	Develop conciseness in writing	I tried to prevent convoluted sentences. I tried to be rigorous when deciding what points to develop and what to omit. I removed additional phrases that were self-explanatory. I Used more concise expressions such as 'before' instead of 'prior to'. Per/ Following instead of 'in accordance with'.

This paper will 'design, conduct and critically evaluate' a lesson study (LS) based on differentiation. As defined by Dudley (2011, 14), LS is a type of action-based research that seeks to enhance pupil learning by developing pedagogical and subject knowledge through collaboration and reflection. Teachers collaborate with one or two colleagues to formulate a research enquiry and plan research lessons (RLs) regarding the aspect of pedagogy they seek to develop (Ibid).

As part of a reflective cycle, participating teachers conduct three RL, where aspects of their pedagogy can be amended after each phase of lessons (Ibid). During teaching, one participant delivers the lesson, whereas the other assumes an observational role recording pertinent data and observational insights. After each lesson, the research practitioners conduct a 'focus-group' with select 'case-pupils' (that are the focus of the enquiry) and engage in a 'post-research lesson discussion' (Dudley, 2013, 14). As elucidated in the evaluation, the latter was aided by Rolfe's (2001) reflective model, which channels reflection around three questions: 'what?', 'so what' and 'now what'. This was substantiated by Brookfield's (1995) 'four-lenses', especially our re-examination of scholarship.

This LS was undertaken during my first professional teaching placement with a fellow trainee English teacher ('research-partner'). Per Appendix J ('AJ'), all stages of the LS were conducted following BERA (2018) and the UWTSD Data Management Policy (2020). Following confidentiality and privacy requirements, all student names have been anonymised using pseudonyms such as 'S1'. Before the LS, consent and assent were secured from parents and pupils respectively. Throughout the LS extensive efforts were made to mitigate potential risks, such as conformity pressure during the focus groups and cognitive bias.

All RLs were undertaken at a large and diverse secondary school in South Wales. The school encapsulates a disadvantaged and urban demographic (Estyn, 2017). RL1 was conducted on a medium-ability year seven group with reading levels that varied from level three to upper level four. Multiple students were aiming to achieve low level five. Since 60% of the school's total population speak at least one other language as their primary mode of communication, over half of the students in the class are considered English as a Second/ Additional Language (ESL/EAL). Thus, despite their actual ages of eleven and twelve, the average reading age calculated by Accelerated Reader (AR) was nine.

In conjunction with mixed abilities, numerous students have additional learning needs (ALN) which include: Autistic Spectrum Disorders (ASD), specific learning difficulties (SpLD), speech impediments and emotional regulation/ behavioural challenges. Consequently, I have needed to differentiate extensively. This has influenced my practice from the lesson planning stage to the creation and marking of summative assessment. I have needed to modify my use of language when developing dialogue; questioning and responding to students; writing content on the boards; creating worksheets and directly instructing. Given the varied needs of the class and how these can affect classroom dynamics, the efficacy of my differentiation has also depended on my behavioural management strategies, and emotional intelligence skills, such as patience, active- listening and adaptability.

Since my research partner faced similar challenges, in consonance with transformative-learning theory pioneered by Mezirow (1978-95) and re-examined by Taylor (2008, 17), we considered that our practice would improve from an examination of our differentiation. Moreover, following Bjork & Bjork's (2011) research regarding the relationship between learning and performance, we were intrigued whether differentiation impacted learner engagement and performance. Hence, as illustrated by our observation schedules ('AA' and 'AF') we sought to discover whether 'specific types' of differentiation affected learner engagement and performance differently.

Following Dudley's (2013-14) advice regarding how to select suitable 'case-pupils', originally, we intended to focus on students who were under-performing and required the most individual support, scaffolding and modelling. Yet, upon examination of pupils' learning trajectories and performance data, we considered it valuable to include higher-performing students that usually require extension tasks and students that were making steady progress (according to formative and summative assessment). In RL1 S1 was higher performing and in RL2 S3. On-track pupils included S3 and S2 in RL1 and S1 in RL2. S2 in RL2 was under-performing. A fourth student (S4) was used in RL1 for contingency, they had known behavioural challenges and were under-performing. Although these 'case-pupils' represented other learners in the class (Dudley, 2014, p.8), they were also selected because of EAL requirements and other tendencies that appeared to be limiting their progress. For instance, S3 in RL1 (whilst on-track) was not making sufficient progress; S1 in RL1 (whilst high-performing) tends to rush answers and misread questions, and S2 (whilst on-track) displays limited engagement in discussions and lacks autonomy.

The Welsh Government (2019) defines differentiation as 'meeting the needs of all learners whatever their different needs' (p. 25). These 'needs' are influenced by their diverse academic backgrounds, cultural upbringing, psychology and cognitive development (Tomlinson, 2011; Gagne et al, 2005; Corno, 2008). Whilst maintaining high expectations for all learners, teachers need to ensure that each learner – whether that be the most competent in the class or least- is appropriately challenged and making continuous progress (Coe, 2014).

This requires 'knowledge' and 'understanding' (WG, 2019) of how their specific learning requirements affect their learning and appropriate planning to accommodate these needs (Kryza, 2009). Although this may derive from theoretical knowledge and experience of teaching pupils with EAL, SpLD and ASD, teachers need to develop an awareness of pupils' precise needs. To commence, Pham (2012) suggests that teachers investigate their pupils' academic backgrounds from student records and portfolios. For EAL learners, this may also

include linguistic background such as whether they are literate in their main language (Coelho, 1998; Pentrehafod, 2020). Crucially, according to extant theory such 'accommodation' should simultaneously capitalise on pupil strengths, and 'circumvent' weaknesses (Corno, 2008, p.162).

Whilst differentiated instruction can take multiple forms, 'learning-styles-theory' is one approach to differentiation. This purports that teachers should adapt their practice to meet students preferred learning styles (Dunn, 2000). These learning styles include visual (written information and illustrations), auditory (verbal interactions such as discussion) and kinaesthetic learners (that learn from hands-on and role-play activities (Clark, 2008; Tomlinson, 1999). Yet, Willingham (2010), Sherrington (2017) and Pham (2012) reject the 'learning-styles-theory' approach. Despite accepting that some differences in prior knowledge may exist, Willingham (2010) and Sherrington (2017) believe that the majority of children are more similar in their learning than different and that the inner worlds of learners cannot be known. Indeed, O'Brien (2001) considers that pupils similarities ('common needs') should guide differentiation to accommodate groups of commonality ('distinct needs') and 'individual' needs. This, in turn, will foster an inclusive learning environment which is paramount for effective differentiation (Ibid; Kryza, 2009).

Pham (2012) furthers this critique arguing that differentiation should be based on students' 'cognitive development' and 'readiness level'. The rationale for this lies in the multifaceted nature of learning, that is influenced by differences in cognitive development, social development and motivation (Gagn, 2005). Following Pashler et al (2008), Pham (2012) defines 'readiness level' as the learner's previous knowledge that will determine their unique optimal instructional methods (p. 15). Thence, in congruence with Coe (2014), who explore the components of effective pedagogy, Pham (2012) argues that teachers should utilise a myriad of instruction techniques to differentiate effectively. This is termed eclecticism, whereby teachers plan and incorporate a variety of methods so that learners have numerous options for processing information and comprehending concepts (p. 14).

Pham advocates that teachers alter their teaching 'content' (such as terminology used on worksheets); 'process' (such as verbal explanations) and 'product' (such as the completion of written work or participation in group activities) (p. 17).

Although Brown and Green (2006) warn that multiple methods may confuse children, Rosenshine (2012) corroborates eclecticism, recommending that teachers explain and provide 'models and worked examples'; guide student practise (through questioning, individualised feedback and summaries) and provide scaffolds (pp. 15-18). When teaching comprehension, Rosenshine suggests that teachers frame questions around prompts such as 'who', 'what', 'when' and 'how'. Furthermore, when implementing scaffolds, Rosenshine recommends that teachers verbally explain the various steps of a task/ ideal answer; provide a 'checklist'/ example so students can compare their work and encourage students to ask questions and articulate their thinking aloud (pp. 17-18). However, as advocated by Coelho (1998), Cummins (1984), Logan (2011) and Bell Foundation (2016), for EAL students, teachers need to implement these aspects alongside modifying language, simplifying instructions and providing visual clues, videos and labels. Such adaptations are not necessarily because of a particular learning style but are ways to reduce the 'language demand' and enable EAL students to access the content (BF, 2016, pp. 34-52).

Doug (2010) upholds some of Rosenshine's advice, contending that checklists empower students by giving them opportunities to self-correct (p. 48) and agreeing that questioning enables differentiation (pp. 31-42). However, Doug, like Pham (2012), emphasises the importance of planning: explaining that activities and tasks should be carefully and efficiently linked to the learning objectives for progress to occur (2010, pp. 60-5). Crucially, in consonance with William (2011) and Corno (2008), this planning is adaptive as it relies on the pupil's progress in previous learning.

Planning is integral to the effectiveness of instructional groups within-classes, where pupils are divided into various groups (depending on ability, similar learning patterns and difficulties), to foster collaborative learning (Pigford, 1990; O'Brien, 2001). Whilst research has verified the positive influences for student achievement and engagement when managed well (Slavin, 1983); Doug (2010) asserts that differentiated questioning 'is a powerful and much simpler tool for differentiating' than organising students into different groups (p. 42). Indeed, per Bloom's (1956) taxonomy of questions: remembering, understanding, applying, analysing, evaluating and creating, he encourages teachers to 'stretch' all pupils by using oral clues and asking students to explain their rationale (p. 38).

As with instructional- groups, differentiated questioning connects with Vgotsky's (1978) Zone of Proximal Development (ZPD), where the presence of a more knowledgeable other furthers learning. Doug considers that variations in pupils' ability and engagement in questioning can support other students. For instance, when a pupil is unsure how to answer a question, Doug proposes that teachers 'call-on' another student to elicit a response from the original pupil. Although the ideal response would involve the original student using the other student's answer to form a new or more developed idea, Doug suggests that even a repetition of another student's answer is beneficial as it signifies engagement in the lesson which supports long-term student success (Ibid). Indeed, such a response could support other students who missed the correct answer initially. As well as illuminating the importance of collaboration in differentiation, this is also an example of re-enforcement which is also integral to student progression; the overarching measure of effective differentiation (Rosenshine, 2012; Tharby, 2015).

Specific differentiation techniques aside, Sherrington (2017) advances 'three main-tips' for effective differentiation that can give practitioners perspective. Whilst Sherrington (2017) agrees that teachers should maintain high expectations for all students to secure continuous progress, he considers that effective differentiation depends on a teacher's persistence in continually providing support and setting challenges (pp. 147-8). In line with his 'learning

rainforest' metaphor, Sherrington describes differentiation as 'gardening' whereby teachers need to accept that they cannot support all student needs at once, but instead focus on balancing their time and resources in each lesson (Ibid).

To achieve this and overcome periods where refined differentiation for all may be unfeasible in every lesson, Sherrington advises teachers to build strong relationships with pupils and their parents/ carers (Ibid). Moreover, extending scholarships' emphasis on planning, Sherrington believes that teachers should only differentiate the support given to students rather than the actual curriculum and learning objectives (Ibid). In turn, Sherrington asserts that this will prevent discrepancies in prior knowledge from perpetuating, thus weakening Pham's argument that elevates the role of prior knowledge in learning. We recognised that differentiated needs exist because of an array of factors hence our experimentation with a range of methods, and intrigue regarding their effectiveness for particular students.

When co-designing our observation templates, we identified four key variables for 'learner engagement' and three variables for 'learner performance'. The former included: behaviour, oral contributions, written work produced, and frequency of questions asked. The latter comprised: quality of oral contributions, the grade of written work and the time frame that activities were completed in. These variables were decided upon following extensive consultation with my research partner and deliberate testing in our cohort group (Punch, 2014, p. 235). Three post-graduate students examined our preliminary recording templates to assess their suitability and feasibility. After experimentation, the group explained that our variables were too broad and our organisation difficult to use. Thus, we reduced the number of our variables from twelve to seven and re-structured our operational-definitions and data collection tables, by forming a 'description' and 'scale-key'.

Our rationale for 'behaviour' as an indicator of learner engagement was influenced by research on non-verbal communication (Lewis, 2012) and the impact of well-being and involvement on child learning (Laevers, 2008). We referred directly to 'body-language' when describing the behaviour variable and how it may vary along a continuum. Moreover, in a similar vein to the Leuven scale, which measures child well-being and involvement from 1-5, where one is representative of an 'extremely low' level of well-being/ involvement, our scale measured each variable using a four-tier scale from 'weak' to 'excellent' (Punch, 2014, p. 234). We sketched an operational definition for each level of behaviour (Marshall & Ross, 2010). We applied this throughout our guide, forming a 'scale-key' with concise definitions for each variable. Thereof, these tables were utilised when collecting pertinent data from each RL. In consonance with the LS approach (Dudley, 2014), this ensured consistency in our data collection method, and collaboration.

Our finalised observation-guide followed our examination of examples from Phillips (2016). Whilst these provided visual cues Dudley's (2011-14) recommended 'observation sheet' was exceptionally useful, as it prompted us to analyse pupil learning at various stages of the lesson; record quantitative data in the form of times and the frequency of questions asked; and have separate recording space for each 'case-pupil' (Dudley, 2014). Hence, as illustrated by 'AA' and 'AF' a separate table was produced for each 'case-pupil' for both learner engagement and performance. This helped ensure that we were compiling specific data for each case-pupil and striving to produce data that was valid and reliable (Bell, 2010)

Following a summative assessment, the purpose of RL1 lesson was to apply prior learning to new and creative writing tasks. Before RL1 the class had studied multiple aspects of the Titanic such as social attitudes surrounding her maiden voyage and the reasons for her sinking. During RL1, the class were designing a front cover of a newspaper to convey the news (to 20th Century society) that the Titanic had sank. The 'extension' and later second task required students to write an informal letter, imagining that they had survived the Titanic.

Differentiation was incorporated in numerous ways including a levelled success criteria, availability of extension tasks, individual feedback and support (when circulating) (William, 2011), scaffolding, modelling and altered language (especially when interacting with EAL and ALN students). While some aspects of differentiation could be planned (such as the success criteria and extension tasks), other aspects (namely responding to pupil questions and providing specific support) unravelled naturally. When observing, we strove to record the impact of both.

Regarding engagement, as illustrated by ('AA') the data displayed an inverse relationship between 'behaviour' and 'oral contributions'. This was consistent for S1, S2 and S4 whom each displayed 'excellent' behaviour yet scored as 'very weak' for oral contributions as they did not answer any questions nor share any ideas with the class during the lesson. Despite this trend, S4 and S3 asked one clarification question during the transition phase of the lesson. Further differences were displayed by S3 as their 'oral contributions' were considered 'moderate' whereas their behaviour was marked 'good'. Nevertheless, as explained above, the impact of differentiated questioning, modified language and simplified verbal explanations on S1,2 and S4's oral engagement at a whole-class level can't be verified. This was the case for all stages of the lesson that were directed from the front. Consequently, for RL2 we refined our focus of the case-pupils (Merriam, 1998) and substantiated the quantitative data with qualitative comments.

The data elicited for performance ('AA') revealed that differentiation in the form of scaffolding, modelling and individualised feedback positively affected the 'quality of written work'. For S1, 2 and 3, their designs were considered 'good' and S4, 'excellent'. This activity was set after deliberate instruction where I modelled an example newspaper title; main image on the whiteboard and provided three examples of front-covers. These were verbally explained and annotated using colourful textboxes to link the task explicitly to the success criteria. As exemplified by 'AE', the use of arrows and text boxes to label the key features of

the examples, directed students to replicate this in their designs for instance: 'main title to capture the public's attention'.

This information was also described in the colour-coded success-criteria checklist (Clarke, 2005; William, 2011) to portray the more higher-marked aspects such as facts/ statistics. We observed that numerous students were able to include these elements. For instance, S4 included 'bullet points' underneath their subheading adapting the example which used a small paragraph. This showed that the example and levelled- success criteria had positively impacted pupil engagement and performance.

This relationship is confirmed by the 'case-pupils' responses to interview question seven. All students explained that the success-criteria was beneficial. S4 remarked: 'Yes it helped a lot otherwise I wouldn't know what to write. I could look up and test so I knew what to write'. Similarly, S2 articulated: 'It helped me understand what to do more. I needed a reminder of bullet points'. Although S3 admitted that they forgot initially, they explained that it did help them especially when it was linked to the examples.

Moreover, when asked to scale the level of difficulty from one to four for both tasks set - where four was the most challenging- all students ranked the front-cover as 1, whereas task two was categorised as a 3 (S4 and S1) and a '2-3' (S2 and S3). Asked to explain how they tackled the openings of their letters, S4 revealed: 'I didn't understand at first. I thought I needed to copy the main part'. S3 experienced similar confusion initially, admitting that 'I wasn't sure how to start'.

However, when trying to disentangle when their confusion diminished, S4, S3 and S1 agreed that they understood the task expectations following my verbal explanation of the example using hand-gestures to convey emotions (Goldin-Meadow, 2003). S3 elaborated: 'I copied the 'have you heard the news'... I took some ideas from the second sentence to change

words'. S4 recalled a similar experience: 'I changed some words'. Interestingly, S2 stated they 'only copied the first sentence' and were able to develop their ideas thereafter. Similarly, as indicated by S2 and S3 who used their initiative by altering my example of a family member to a friend in the class, the students were able to work more independently following the example. These insights emphasised the importance of modelling and explaining examples before setting independent tasks as this had a beneficial impact on pupil understanding despite their differing needs and ability levels.

Given S2 and S3s indecision between a '2' or '3' when asked to rank the difficulty, an additional question was asked so that we could elicit suggestions about how to improve our application of differentiation. S1 and S3 elucidated that they wanted more 'spaces' and 'gaps' to edit example sentences with their own words. S4 suggested that I 'repeat' the example of the letter introduction. Alternatively, S2 suggested more 'discussion time' to share ideas. Given S2s lack of participation in whole-class group discussion, I asked S2 to clarify what type of discussion they meant. S2 quickly responded 'more partner work'.

These insights suggest that the impact of our differentiation could improve if we provide more refined scaffolding; introduce more think-pair-share (to overcome potential shyness when communicating to a whole-group) and repeat key instructions and explanations when introducing new tasks (to overcome confusion/stress caused by transitions and the challenges to short-term working memory). This is pertinent given the underdeveloped reading abilities of the class and the effect that these feelings can have on the classes co-operation. Nevertheless, as indicated by question five, embedding these alterations in future teaching may not improve the ease of the writing task, as the 'case-pupils' expressed a dislike of writing and preference of collaborative 'mind-maps' (S3), 'team-posters' (S1 & 4), 'drawing-activities' (S4) and note-taking when watching videos (S2).

Therefore, contrary to scholarly disagreement with 'learning-style-theory' (Pham, 2012), these suggestions could be incorporated to assess whether they positively impact learners'

engagement and performance. Indeed, teachers involved in the Bell foundation's consultation (2016) reported the benefits of collaboration for EAL pupils. Whilst, S3 and S2 are considered fluent, perhaps in future teaching, I can experiment with same-language and multicultural buddying (ibid, p. 52). This could extend to similar ability grouping which is carefully planned and monitored (Pigford, 1990). As warned by O'Brien (2001), experimenting with alternative differentiation methods will help ensure that my differentiation is not based on my potential learning style/ preference (p. 64).

RL2 was delivered to a low-medium ability year eight group with approximately thirty students (where nearly 50% of the class were EAL). Following the post-lesson research discussion that was conducted immediately after RL1, we incorporated further pair-work; provided more deliberate scaffolding for sentence construction and sought to incorporate alternative questioning techniques (Lemov, 2010) and simplified language to stimulate more discussion. Additionally, given the absence of detailed narrative notes to support the scaled data, I strove to include a detailed and chronological narrative account of the impact of differentiation ('AG').

Turning to the quantitative data for engagement, as with RL1, an inverse-relationship was identified between pupil behaviour and oral contributions. S1, 2, and 3 were marked as displaying 'weak' oral contributions, yet 'good' behaviour. This was especially true during the first whole-class discussion based on the theme of Animal Rights and Vegetarianism. However, unlike RL1, where only one clarification question was posed, two questions were asked: one by S1 before the first task and one by S2 during the main task where students had to produce a summary paragraph on the arguments for and against animal rights.

As no further questions were asked, the teacher's response to S1 was deemed satisfactory. Similarly, the teacher's reply to S2 involved re-iteration of the task; re- explanation of the key arguments and gesturing to the whiteboard to encourage the student to utilise the sentence starter and example. Nevertheless, as demonstrated by ('AF') the observer

classified S2's work as 'moderate' noting that 'support was needed'. This is substantiated by their completion time of eight minutes, even though 'some had written full paragraphs in five minutes'. Such differentiated support for S2 was furthered during the final discussion task where students had the opportunity to express their points of view utilising their summary paragraphs. S2 demonstrated difficulty expressing their opinion, thus, the teacher used oral prompts, (reminding the student of the key terminology and ideas); allowed greater time for the student to answer (Stahl, 1994) and attempted to deepen the student's ideas using hot-seat- questioning (Lemov, 2010).

Whilst S2 was unable, on this occasion to fully develop their points, these differentiation questioning techniques, (unlike in RL1) illustrate a positive impact on learners' oral engagement and performance as some response was elicited from S2. Indeed, as the observer, I noted that during the independent writing time the teacher's deliberate questioning of certain pupils prompted them to ask questions (such as 'can you check my work Miss') to clarify their understanding and gauge their performance (Hattie, 2012,14). This confirmed the need to consistently apply AfL principles such as 'live' feedback (BF, 2016; Sherrington, 2017; Williams, 2011).

When asked whether they preferred the teacher to read the set extract rather than individuals in the class, mixed responses were received. This is displayed in 'AH' (interview question ten). Both S1 and S2 agreed that despite English not being their first/ only language, they preferred to read the extracts aloud rather than the teacher. Asked to explain their answer, both S1 and S2 commented that mispronunciation was a regular occurrence and they considered it helped them with their language development and oral confidence. This was opposed by S2 who believed that the teacher's reading of the set material was exceptionally helpful as their voice can be heard clearly, and during the reading important ideas and vocabulary can be explained.

Since S1 was exceeding their target levels, S2 was on-track and S3 was not-on-track for their term target, it is evident that oral differentiation has different impacts on learners, depending on their measured ability level. Given the individualised needs of each learner and the variations in performance, this data suggests that teachers should vary how texts are read, including some teacher-led reading and some pupil-led reading. However, this contradicts PiXL's (2020) literacy advice that teachers should capitalise on reading as opportunities to model expert pronunciation, expression and vocabulary. Perhaps, allowing students more reading time is necessary for EAL dominant classes such as this where students are trying to develop their language competence. This particularly applies to EAL students between stage C- E that are focused on improving their academic language proficiency (BF, 2016).

The use of scaffolding (Rosenshine, 2010) is further supported by RL2. Asked how they tackled the construction of their paragraphs, S2 and S3 explained they used the extract and sentence starter. S2 expanded: 'I looked at examples in the article and picked two points from each side that I found best. It would have been more tricky without the sentence starters on the board'. A similar rationale was communicated by S3: 'You know on the article; I went to the good and bad sections and used the sentence starter'. Consequently, both S2 and S3 considered that they completed the writing activity well and ranked the difficulty as '1' and '1.5'. Thence, the data indicates that differentiation through an example introductory sentence and well-organised/ appropriately pitched content positively impacted learner engagement and performance for on-track and not-on track pupils.

Nevertheless, S1 considered that the provision of notes and sentence starter was non-beneficial as it made the writing task 'too easy'. Crucially, when asked whether the main-task was 'a suitable level of challenge' they asserted: 'I could have done the paragraph on my own'. This response reveals that whilst differentiation may benefit some students that are on-track and not-on track, it may not appropriately challenge higher-performing

students (Light, 2017). Consequently, my research partner and I agreed that in future teaching we would continue this type of scaffolding for students represented by S2 and S3, but encourage students like S1 to develop an opening sentence independently and to select points that were not summarised by the teacher, but located in the main body of the text. This would have challenged their retrieval and verbal-reasoning skills. Nonetheless, the observer considered that the construction of their summary paragraphs gave students preparatory material for the final think-pair-share activity. In this regard, per adaptive teaching's ultimate goal for 'self-regulated learning' (Corno, 2001) students had created a scaffold which helps foster long-term learning habits such as autonomy.

Although our mixed-methods approach provided an abundance of data when analysing this was difficult to synthesise. Similarly, we did not secure parental consent from any students with SpLD and ASD. Following McCormack-Colbert et al (2017) we consider that this data would have been exceptionally insightful as we would have been able to observe, experiment and refine our application of differentiation to support learners with these challenges. Indeed, these new insights could have benefited learners in different classes. Whilst we recognise that our data illuminates aspects of differentiation regarding EAL and varied abilities, we consider that data from at least one 'case-pupil' with a diagnosed SpLD/ALN would have elevated the representativeness of our data and thus, enhance the impact of our research when sharing our conclusions with educational professionals and implementing changes to our practice. Whilst this would require further vigilance (Rodgers, 2019) and adaptations should we undertake a LS on differentiation in the future acquiring such approval would be a priority.

Regarding data-collection, as illustrated by 'AA' and 'AF' significant alterations were made to our observational-guide whilst observing. Despite Creswell's (2007) advice, our observational guide did not include a descriptive note section. Thence, my research partner wrote a more generalised narrative of their interpretation of the impact of differentiation. During our first post RL discussion, my research partner recognised that their style of

narrative writing lacked efficiency and specificity. Thus, as exemplified by 'AG', for RL2, I added chronological narrative remarks to capture the different stages of the lesson; the differentiation techniques deployed by my research partner and the effects that these appeared to have on the 'case-pupils' (DoE, 2011; Taylor & Brogden, 1984). Likewise, we had insufficient space to record detailed qualitative remarks to support our judgements when scoring the variables. In future designing of a LS, I will ensure to experiment with the observation guide (as well as the pilot group), to check its feasibility given the challenges with simultaneously observing and recording data (Denzin, 2011; Lewis, 1998).

Despite our attempts to be objective, a degree of observation-bias is inherent when observing, as we are not always conscious of the factors that may influence our interpretations (Denzin, 2011). To mitigate this bias, Ratner (2002) and Dewalt (2002) advise that we reflect on how our beliefs, gender, sexuality, social-standing, culture, background and experiences may affect our interpretation before observing. Whilst we endeavoured to do this, we cannot verify how this altered our interpretation. This may be explained by our commitment to ethical research and our non-participatory observer role that meant we weren't directly immersed in the activities (Gold 1958; Kawulich, 2012).

Whilst all students were aware of the purpose of our presence when observing and recording data in the interviews, the data obtained may have been hampered by the 'Hawthorne-effect'. This measurement bias explains how children may act differently in front of an observer thus may alter their behaviour/ interactions to meet their assumed expectations of the observer (Berthelot, 2011; McCambridge, 2014). Since one of the 'case-pupils' were on a behaviour report card, this student may have deemed my research partner's presence, as behaviour related. However, the exact effects of the 'Hawthorne-effect' (including their degree), are not conclusive (McCambridge, 2014).

Another risk to our data was asymmetry of power, whereby as researcher-teachers we would have more 'power' than our 'case-pupils'. Yet, as per 'AJ', we strove to mitigate this

and the Hawthorne-effect by communicating the purpose of our research clearly; limiting the attention and level of interaction with our research partner during data collection, and - following Agar (1980) and Dewalt (1998) - harnessing our emotional intelligence skills by developing a rapport, being sensitive and interacting with our 'case-pupils' as research 'collaborators' (Whyte, 1979; Danby, 2011).

Finally, as warned by Denzin (2011) and Creswell (2007), this was pertinent during the interview stage. We recorded pupils' thoughts publicly to gain their trust and to demonstrate our sincerity. Similarly, we displayed our thinking and 'active-listening skills' by repeating student responses aloud and giving them opportunities to correct our comprehension (Brooker, 2001). In addition to helping our 'case-pupils' feel at ease, this supported the reliability and validity of our data, as it ensured that we were continuously striving to capture their perspective, rather than recording our interpretation of their utterances.

Our data revealed that the impact of oral differentiation ('process') is difficult to capture and does not necessarily affect students' oral engagement. However, differentiation through levelled success criteria, scaffolding, modelling and responsiveness positively affected performance in written work. This was confirmed by students' self-perceptions and interview responses. However, for high-performance, this was at the cost of sufficient challenge and autonomy (Light, 2017). Observational narratives confirmed that continual checking on pupils enabled teachers to be responsive, and in the case of EAL learners explain vocabulary (BF, 2016; Sherrington, 2017). To enhance our application of differentiation, we need to consider how to further modify activities/ tasks ('product') to balance support and challenge. This will involve experimenting with more collaborative activities and planning/ managing these to support EAL/ mixed abilities and ALN.

Whilst 'action-research' can blur personal and professional boundaries (Denscombe, 2007) undertaking this LS has been exceptionally insightful and beneficial (Hargreaves, 2012;

Warford, 2011). Through collaboration, reflection, experimentation and consultation with the scholarship, I have developed my knowledge, understanding and application of differentiation. Differentiation is exceptionally multifaceted: tapping into debates that are central to effective pedagogy, including instruction methods, the nature of learning and student progress. Our research question was very apt in an increasingly diverse society that values education for all (UNESCO, 2009). Although challenging, I recognise that effective differentiation depends on being openminded, flexible and innovative (Randi, 1996, 2005). Throughout my career, I will continue to reflect, seek feedback, share best practice, and engage in professional development.

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