

How to improve children's thinking skills through the use of questioning in the Foundation Phase classroom.

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The purpose of this research will be to explore how to improve children's thinking skills through the use of questioning in the Foundation Phase classroom. This essay will critically analyse current literature in relation to the proposed research question, before outlining how the research will be conducted with consideration to ethical guidelines.

The schools where the research will be undertaken already have metacognitive strategies of self-assessment in place, henceforth the research will focus on general thinking skills outlined in the original Bloom's Taxonomy (1956) and Anderson and Krathwohl's revised version (2000) (see Appendix 1). Despite Moseley et al., (2005) upholding that thinking skills are difficult to define, Cremin and Burnett (2018) attempt to define thinking skills as the capacity to think in an attentive way towards an end goal.

Before considering current literature in relation to thinking skills and questioning to give a wider context to the research, it is appropriate to firstly outline who was involved in the research and the context of where the research was carried out. The research was undertaken by three student teachers within their placement schools. These research partners will be referred to as research partner 1, 2 and 3 (RP1, RP2 and RP3) in order to maintain anonymity in line with ethical guidelines which will be discussed further in due course (BERA 2018). RP1 was based in a school (School A) in the Vale of Glamorgan in a Nursery class with pupils aged 3 and 4. The school of 471 pupils identifies 31% as having additional learning needs and 36% as being entitled to free school meals (Reference removed for anonymity). RP2 and RP3 were based in a school (School B) just outside Swansea in a Year 2 class with pupils aged 6 and 7. The school of 481 pupils identifies 34% as having additional learning needs and 21% as being entitled to free school meals (Reference removed for anonymity). School B has clear pedagogical aims to deepen critical thinking skills of pupils and develop independent thinking in line with Donaldson's core purposes (2015). The research question was developed with the school aim in mind to ensure it was appropriate beyond the classroom and within the wider context of the school. Since the research will be undertaken in two pioneer schools, which are trialling the proposed curriculum for Wales in practice and professional development, it is essential to consider thinking skills in relation to the proposed curriculum (Donaldson, 2015). McGuinness (1999) outlines how thinking skills have become

increasingly important in the bid to keep up with the changes seen in society. In support of this, Crossland (2015) states that it is the role of education to prepare learners to possess the ability to think further than purely repeating remembered facts. Thinking skills were identified as important in The Skills Framework for 3-19 year olds in Wales (Welsh Assembly Government, 2008) and subsequently by Donaldson, in the need to develop pupils' critical thinking to "activate powerful learning" (2015: 65). In support of the proposed research, Cremin and Burnett (2018) express that the use of questioning can challenge children's thinking skills in order to prepare them for their role in wider society. The importance of improving thinking skills for the greater good of education was highlighted by McGuinness, with thinking skills being proven to improve learning outcomes (1999).

Soozandehfar and Adeli (2016) commend Bloom's Taxonomy for placing a structure around thinking skills. In support of this, Ellison (2010) states that Bloom's Taxonomy should be used by teachers to develop their pupils' thinking skills. In response to this literature the research set out to explore how questioning based on Bloom's Taxonomy can be used to encourage critical thinking from young learners. Bloom's original taxonomy was based on the work of social constructivists Piaget and Vygotsky, on the basis that thinking skills can be improved by cognitive challenge (Cremin and Burnett, 2018). In Bloom's observations 95% of questions asked only required the lowest level of recalling facts (1956). The taxonomy was therefore designed for teachers to use as a scaffold to ensure questions generated higher levels of thinking (Nappi, 2017). Wragg and Brown (2001) would argue that this is not to say higher levels of thinking are considered superior; merely that teachers often fail to provide opportunities through lack of planning. Bloom defined lower order thinking (LOT from here on in) as only needing a limited level of thought, in contrast to applying deeper thought and understanding for higher order thinking (HOT from here on in) (Kerry, 2002).

The revised Bloom's Taxonomy (2000) illustrates six cognitive process levels: remember; understand; apply; analyse; evaluate and create. These are arranged in a hierarchical model and are described as going from simple to more challenging means of thinking (Wilson, 2013). According to Soozandehfar and Adeli (2016) the hierarchical structure often leads to LOT being interpreted as being less important than HOT. In contrast to these findings, Crossland explores the notion that recall of memory is a more complex process than the hierarchy gives credit to (2015). Yet, Tienken et al. (2010) uphold that questions within the bottom level of the hierarchy do not encourage deep thinking, but instead should be

considered a stepping stone to achieve HOT. Conversely, Dr. Richard Paul (1993, cited in Crossland, 2015) argues that there is not a sequence in the hierarchy and questions do not need to be asked in a particular order to progress to HOT. This informed the decision to refine the research question to look at thinking skills in general rather than merely HOT. The Skills Framework in Wales upholds that thinking skills are progressive, dependent on the level of challenge (WAG, 2008). It was therefore decided that the questions would be asked from different levels in no particular order to apply varying levels of challenge.

Ellison suggests that the age of the pupil may limit their ability to think critically. Yet, goes on to argue that pupils' limited responses should not be mistaken as the incapability to think in depth. Instead, teachers should re-evaluate the way they ask questions as learners need their thinking to be challenged at a young age (2010). Due to the differing ages of the research participants it was essential to structure the questions using Bloom's Taxonomy in order to ensure their thinking was challenged. According to Nappi (2017) questions are only effective if teachers plan opportunities for HOT. Alternatively, Nuthall (cited in Didau, 2014) suggests that planned questions bare little benefit as children can forget from one lesson to the next. Rather than planning questions, Cremin and Burnett (2018) place greater emphasis on the importance of providing sufficient time for the child to think before responding to questions. Dixie (2003) goes further to explain that teachers often rush responses or fill gaps with prompts due to nervousness. Despite prompting being a questioning skill identified by Kerry (2002), teachers need to be careful that they are not diminishing the opportunity to develop thinking skills (Thomas and Lewis, 2016).

It was necessary to consider criticisms of Bloom's Taxonomy in order to address these when planning the research. It is clear from current literature that there is an inconsistent application of Bloom's taxonomy (Soozandehfar and Adeli, 2016). It was therefore essential to plan the questions before the research lesson in order to ensure thinking was challenged at all levels of the hierarchy and overcome the limitations highlighted. Additionally, Bloom's taxonomy does not acknowledge that pupils can operate at different abilities within each level. Instead of assuming that younger pupils cannot operate HOT skills, it should be accepted that they will do so at a different proficiency (Ellison, 2010; Soozandehfar and Adeli, 2016). In support of this, Grigg (2015) states that HOT is needed for pupils to be able to understand their learning. Piaget would argue that this occurs when the child is ready to learn (cited in Thomas and Lewis, 2016). Despite this, Piaget's theory on thinking skills relate to ages of children (2002).

Current literature accentuates that a link between questioning and thinking skills already exists and henceforth the research does not claim to be new in its field. Nonetheless the proposed question has not been accredited within the identified school settings.

In order to research the proposed question effectively in the context of the classroom the chosen methodology is Lesson Study. Lesson Study (LS) originated in Japan, where teachers work together to investigate how to improve their practice (Cremin and Burnett, 2018). First introduced to the UK by Peter Dudley in 2001, LS has since become a leading approach in teacher training as it allows the opportunity to reflect on practice, whilst improving pupil attainment (Dudley, 2015). Moreover, teachers need to reflect on how they teach in order to best prepare children to become lifelong learners (Ellison, 2010). This bares particular relevance with lifelong learning being identified as a principle of the proposed new curriculum for Wales (Donaldson, 2015).

LS falls under what Hargreaves refers to as “joint practice development” (2012:8) as it requires working collaboratively with a group of researchers from the same field, namely teachers (Dudley, 2015). In support of this, Lewis and Hurd (2011) state that teachers work together to deliver a constant learning environment through sharing good practice and having the opportunity to see into classrooms of other teachers. It was identified by the Welsh Government (2019) that the new curriculum is reliant on confident and skilful teachers with a focus on professional development. LS can be valuable for professional development by giving teachers the opportunity to see what is normally difficult to appreciate within busy classrooms (Dudley, 2015). The process of LS can be represented as a cycle (see Appendix 2). Following this process, the research undertaken by a group of three student teachers aims to improve pupils’ thinking skills within the classroom. Charles Desforges maintains that LS is a flexible and autonomous way to achieve improvements in pupil learning (Dudley, 2015). The cycle requires a process of research partners observing teaching, a reflective discussion over what learning had been observed and concluding how their reflections will inform future practice (Cremin and Burnett, 2018). As the purpose of LS is to improve learning, focus needs to remain on observing what learning is taking place rather than the teaching (Dudley, 2015). According to Didau (2014) this is not as straightforward as it seems. Didau (2014), with the support of Hattie (2012), argues that focusing on what has been learnt in order to inform future practice is flawed due to the nature of learning being invisible. Limitations of this method can be that the observer focuses on the teaching instead of on what learning has taken place (Hopkins, 2014).

The observation schedule was designed using the structure of the revised Bloom's Taxonomy (2000) in order to remain focused on the use of questioning to improve thinking skills.

The observations were carried out as non-participant observations, requiring the research partners to observe only (Greig et al., 2007). It was decided before hand what the research partners would be observing and how the observations were to be recorded in order to collect consistent data (Hopkins, 2014). A possible limitation of using this method of observation is that the observers cannot ask for further clarity from the participating children. As a result, the data collected may be interpreted in a different context to how it was meant (Brooks et al., 2014) Further positives and limitations of using this method can be seen in Appendix (3).

The reflective discussion incorporated into the LS methodology ensures that each research partner has a chance to share their findings. However, reflections may not be truthful as research partners may intentionally choose to avoid conflict by withholding true opinions (Dudley, 2015). The ability to reflect honestly is rooted in initial teacher training and encouraged throughout the teaching profession (Cremin and Burnett, 2018). Hence, reflective practice is commended by the Welsh Government for contributing to continued professional development (2015).

Takahashi and McDougal (2016) highlight that LS is normally conducted over a five-week period and should not be conducted within one day. Given the isolated research time, conducting research over two days with a day being spent in each school, it may limit the impact of the research and the ability to draw clear conclusions on the research question (Hopkins, 2014). Despite these limitations LS is an appropriate method for trainee teachers as it requires minimal guidance or training (Dudley, 2015). With the added benefit of being able to adapt and adopt new approaches, LS provides a good way of improving teaching practice with immediate effect (Dudley, 2011).

As LS is considered a reflective method of research, a reflection pro-forma was designed to capture reflections (see Appendix 4). The pro-forma was based on a combination of Brookfield's four lenses (2017) and Schön's reflection in action and on action (2016). Brookfield upholds the best way to reflect on teaching practice is to use the four lenses: "the students' eyes; colleagues' perceptions; personal experience and theory and research" (2017:8). Reflections from the students were in the form of a focus group interview conducted at the end of each research lesson. The group interview was semi-structured,

allowing for additional questions to be added and for the participants' ideas to fully develop (Greig et al., 2007). As the purpose of the semi-structured interview is to obtain the views of the children, it is essential to give scope for their ideas to develop in order to get a true reflection of their feelings (Hopkins, 2014). The second lens of colleagues' perceptions was carried out as the reflective discussion as part of LS cycle. Personal experiences were noted by RP1, 2 and 3 at the end of each research lesson in the form of written notes on the pro-forma. Lastly, a review of current literature surrounding the research question was carried out in relation to the fourth lens.

Influenced by the work of Dewey, Schön introduced using the notion of reflection to inform future practice (Cremin and Burnett, 2018). Reflection in action refers to reflections made at the time, whereas reflection on action refers to reflections made after the event (Schön, 2016). Reflection on action can be seen in the four lenses as the reflections took place after the research lesson had been conducted. It was decided that reflection in action would also be used to combat Didau's (2014) idea that learning is implicit, by showing how confident the participants felt in their ability to answer the questions. The participants in School B were given traffic light faces to indicate how confident they felt about the question being asked. Doing so enabled RP2 and 3 to reflect in action by changing the questions to suit and to make the participants' thought process explicit to the non-participant observers (Didau, 2014). It was decided that the participants in School A were too young to reflect in action, so participants only took part in the reflection on action. Reflection in action was used by RP1, 2 and 3 when altering the questions to suit the participants. Additional questions were added in attempt to extend their thinking, which Kerry (2002) refers to as probing to sustain the thought process.

The research set out to collect qualitative data in the form of observational notes (Hopkins, 2014). Qualitative data refers to data that requires a "depth of understanding" (Greig et al., 2007:136). Mac Naughton and Hughes (2008) maintain that qualitative data requires being made sense of as the meanings only exist after being analysed. Research gathered through observation is open to personal interpretation (Macleod-Brudenell and Kay, 2008; Herr, 2015). It is therefore possible that the research partners will conclude different meanings from the observations. Qualitative data is commended as an appropriate method when carrying out research with children (Greig et al., 2007). Denscombe (2014) suggests the grounded theory approach can be effective to compare empirical data to existing data which helps to draw conclusions when analysing qualitative data.

According to Greig et al., (2007) the sample needed to be representative of the whole class. In consideration of LS involving “planning with three target pupils in mind” (Dudley, 2015:7), RP1 and RP2 chose one higher ability, one lower ability and one middle ability pupil as the focus sample. Choosing pupils from the ability range of the class was suggested by Dudley (2011) as a way of representing the class overall. Additionally, qualitative research lends itself to the researcher being able to use their judgement when selecting participants for a particular purpose (Greig et al., 2007). Being the class teacher meant it was feasible to use knowledge of the class to choose participants for the research. Based on this, RP3 chose two higher ability pupils and one middle ability pupil as the focus sample. Biased recording of data will be avoided by not disclosing which pupils are which when conducting the research lesson (Mac Naughton and Hughes, 2008). Writing observational notes worked well for the purposes of this research as notes were only written on the three identified participants (Hopkins, 2014).

When conducting research with children special attention needs to be given to ensure the research was carried out ethically (Greig et al., 2007). Brooks et al. (2014) maintain that some ethical guidelines signpost children as vulnerable due to their lack of experience and knowledge. Conversely, Alderson (1995) disputes that children should be deemed as competent to make decisions for themselves. The complexities surrounding research involving children signifies that research should be approached with care (Brooks et al., 2014). Ethical guidelines are set to certify that research is carried out with integrity and the researcher acts in a justifiable and proper way (BERA, 2018). Before undertaking the research, the University Ethics Committee had to approve an ethics form which outlined details of the research. The form was signed by both participating school settings prior to the research. Students at the University are required to adhere to ethical principles set out in the Research Ethics and Integrity Code of Practice (UWTSD, 2017). As the participants in the research were children under the age of 18, informed consent was requested from the parent or guardian by means of a consent form (UWTSD, 2017; BERA, 2018). UNICEF (2002) state that despite not legally being allowed to give consent, parental consent is not enough in respect of the child’s rights. Consequently, the child must be made aware of the implications of the research to be able to give informed assent (Greig et al., 2007). In light of this, an information sheet was designed to clearly outline the purpose of the research at the level of the participants (see Appendix 5). The information sheet outlined the following information: the aims of the research; how the research was going to be conducted; the level of

confidentiality given and their rights to withdraw at any time. According to Greig et al., (2007) children can react differently to strange people, hence it was necessary to introduce the research partners to the class before undertaking the research to limit disruption. It was decided that the information sheet would have pictures of the research partners to reduce the element of surprise when entering the classroom to undertake the research. The United Nations Convention on the Rights of the Child (1989) upholds the rights of all children. Baring particular relevance to this research is Article 12: the child's right to be heard (UNCRC, 1989). Furthermore, the importance of children knowing their rights is highlighted in one of the four core purposes of the proposed curriculum for Wales, for all children to be "ethical, informed citizens" (Donaldson, 2015:31). Furthermore, it was highlighted by the Welsh Government (2016:2) that children should be 'actively involved' in decision making. According to Cremin and Burnett (2018) pupils are being given progressively more responsibility to share their opinions in relation to their education. Henceforth, all participants were given a chance to voice their opinions during the focus group interview. The schools and researchers will remain anonymous to protect the identity of the participants. Furthermore, the participants were made aware that they could not be guaranteed anonymity as the research partners would be aware of their contributions to the research. Instead, confidentiality was guaranteed and participants were assured that the data would be anonymised at the source (UWTSD, 2017; BERA, 2018). Consent was obtained to allow audio recording of the focus group interviews; however, it was decided only used consistently for the focus interviews. Due to lack of appropriate software, the recording was unable to be played back, so seeking clarity was done through 'member checking' instead (Greig et al., 2007:75).

Conducting research in an ethical way ensures that risks to both the participants and researchers are kept to a minimum. These were identified in the ethics form and actions to prevent or minimise risks were adhered to throughout the research project.

BERA (2018) requires data to remain within the research group and for researchers to have consideration for the correct storage of data. In light of this, all data will be stored on a password protected device and shared through the University drive, which has sufficient protection software. Hard copies of the collected data will be disposed of in the appropriate way as to retain confidentiality and electronic copies will only remain saved on encrypted devices for the remainder of this module (UWTSD, 2017; BERA, 2018).

The Lesson Study cycle began with RP1. When setting the research question, it was initially decided that the research lesson would consist of reading a story to facilitate asking questions from the hierarchy of Bloom's Revised Taxonomy (Anderson and Krathwohl, 2000). The differing age range of the pupils in RP1's class compared to RP2 and RP3's classes were taken in to consideration when planning the lesson collaboratively. However, the planned session was altered by School A and RP1 was required to deliver a session on observational drawings. This immediately impacted the ability to generate questions from higher levels of the Taxonomy appropriate to the age of the participating pupils. RP1 began the lesson by orally explaining the ethical implications of participating in the research. The participants were given a codeword of "bubbles" if they wanted to withdraw from the research at any time (UWTSD, 2017; BERA, 2018). RP1 introduced the lesson by showing the pupils a daffodil and asking, "who remembers what this is?". No one answered so RP1 directed the question to Pupil B and prompted by saying "Daff..". Kerry (1982) suggests that prompting is a questioning skill used to lead pupils to an answer. The types of questions asked by RP1 were generally closed questions, which did not allow for extended thinking (see Appendix 6). It was noted during the planning of the research question that RP1 did not feel as though the research question was well suited to the age of the participants. However, Ellison (2010) would argue that their thinking should have been challenged further. Limitations of LS became evident at this stage, as it was difficult to reflect honestly (Dudley, 2015). Despite planning the questions in advance to generate HOT, external factors impacted the research lesson (Nappi, 2017). According to Greig et al., (2007) working with children can be unpredictable and chaotic. This is particularly relevant for RP1's lesson as the majority of the pupils had been off ill and having been out of the school routine for some time they were still adjusting to being back in school. Due to the change in activity it was difficult for RP2 and 3 to record both the questions and answers in the observational notes, which meant the observational schedule was not fit for purpose for RP1's lesson.

Whilst reflecting on RP1's lesson, the research partners' discussion led to the consensus that HOT was not encouraged from the questions asked. Peer reflections revealed the belief that if the questions had already been planned as suggested by Nappi (2017) and categorised under the levels of Bloom's (Anderson and Krathwohl, 2000), then there would have been further opportunity to encourage HOT. Wragg and Brown (2001) maintain that teachers often expect HOT to take place even when they have not prepared to challenge thinking further up the hierarchy.

The majority of questions asked were closed questions requiring a certain answer, meaning their thought process more than likely stopped as soon as the question was answered (Wragg and Brown, 2001). Clarke (2001) suggests starting questions differently can show the pupil that there is not a certain answer. It could therefore be argued that open questions encourage thinking skills (Grigg, 2015). There was also evidence for needing additional thinking time as gaps were generally filled with additional questions, “Is it pink? What colour is it?” (Dixie, 2003).

The focus group interview was conducted after the session, with Pupil B refusing to participate. In consideration to ethical guidelines, RP1 reminded the participants that they could stop at any time if they say the word “bubbles” (UWTSD, 2017; BERA, 2018). Pupil A did not respond to any of the questions. Upon reflection on action, RP1 noted that this was out of character. Despite pre-empting the disruption, it was clear that having two additional adults in the room during RP1’s lesson affected the participants’ responses. Therefore, the ‘observer effect’ can be a possible explanation for their anxious behaviour (Denscombe, 2014:91).

The reflection pro-forma (Appendix 7) was used to inform the planning for RP2’s lesson. It was decided that the planned activity needed to be more suited to asking thought provoking questions, which led to the decision to use a story related to Philosophy For Children (P4C). P4C is a programme used to encourage critical thinking skills using every day issues (P4C, 2008-2017; Cremin and Burnett, 2018). As RP2 and 3 were both based in a Year 2 class, it was also decided that the same lesson would be taught to enable the comparison of results. The chosen story was “Not now, Bernard” by David McKee (1980). The questions were pre-planned and put into the categories within the observation schedule in order to scaffold the critical thinking of the participants (Nappi, 2017).

At the beginning of the session, RP2 showed the information sheet to the participants and explained each section in relation to the ethical guidelines (UWTSD, 2017; BERA, 2018). The participants came up with the code word “rose” to indicate whether they did not want to continue with the research. It was evident that structuring the questions allowed opportunities to challenge thinking at all levels of Bloom’s (Anderson and Krathwohl, 2000) as each level was reached on the observation schedule, which suggests the lesson goals were achieved (see Appendix 8).

The pupils were given traffic light faces to indicate how confident they felt about the question being asked. However, they had to be prompted to use them throughout as their initial reaction was to purely answer the question. Grigg (2015) argues that it should not be assumed that children know how to think about their learning, which could explain why the pupils did not fully use the reflection in action method.

The questions were not asked in a progressive order up the hierarchy levels as suggested by Tienken et al., (2010). As the story was new to two out of the three participants, they would not be able to answer questions relating to the remembering level until after the story had been read. It was decided that questions would be asked throughout by stopping at relevant places in the book to engage the participants' thinking skills (see Appendix 9).

On the fourth page of the book, RP2 asked "What do you think Bernard wanted?" which relates to the creating level by asking for a prediction. This would be classed as an open question, meaning there was not a definite answer (Wragg and Brown, 2001). Pupil A had read the book before so relied on recall of knowledge to answer the question with "to see a real monster". Despite the question being classified within a HOT level by Bloom (1956), Pupil A engaged in LOT by memorising facts as they were aware of what was coming up in the story (Bloom, 1956). On the contrary Pupil B and C came up with their own predictions. This would be interpreted by constructivists as applying their prior knowledge to new situations (Piaget, 2002), directly relating to HOT (Kerry, 2002). After Bernard had told his Mum there was a monster in the garden, RP2 asked "what do you think will happen next?" which also related to the top of the hierarchy. Pupil B predicted that Mum would go outside and be shocked that Bernard was not telling the truth. Pupil C predicted that Mum would go outside with Bernard and say, "no Bernard" and Pupil A said there was going to be a monster on the doorstep. In this instance, Pupils B and C show HOT by considering Mum's reaction if Bernard was lying. Pupil A again relied on their prior knowledge of the story.

The next sequence of questions went up the hierarchy levels from understanding up to creating. This could be seen as a stepping stone to HOT (Tienken et al., 2010). The understanding question required looking at the illustration and interpreting the feelings of the character. Pupil B suggested the character was "worried because he would be blamed for making everyone do wrong stuff". RP2 used the questioning skill of probing to clarify what the pupil meant by asking, "what wrong stuff?" (Kerry, 2002). Pupil B inferred from the pictures that it was Bernard's fault for Mum tipping water and Dad hitting his thumb with a hammer. As these themes were not discussed in the story text it shows HOT by Pupil B. However, it is not clear whether this was encouraged by asking the question, or whether the

thinking was already occurring and the question made the thinking visible to others (Didau, 2014). In agreement with Anderson and Krathwohl (2000), HOT was most evident in the top three levels of the hierarchy. Pupil C showed good thinking skills when asked “What do you think would have happened if Mum or Dad had answered Bernard?”. Pupil C’s answer, “Bernard wouldn’t have got eaten – they didn’t listen to him”, shows HOT in interpreting facts to make a prediction. In asking the participants what they thought the story was about immediately after reading the story (understanding level) and then again after discussing other questions, Pupil A and B had changed their answer. Pupil A’s responses to the first question suggested the story was about parents saying “not now, Bernard” because they do not want to be disturbed. This could be interpreted as memorising facts of the story instead of thinking deeper. Pupil B thought that Bernard was annoying his parents and that it was his fault overall. The last question asked was “do you think there was a message from the story?”, to which Pupil A and B both answered, “if you ignore people something will happen”. Pupil C showed the red face to say they did not feel confident enough to answer the question asked. This could be considered as using Taba’s (cited in Wragg and Brown, 2001:37) notion of “extending and lifting” as a means of asking lower level questions before being extended to higher levels. Accordingly, LOT can be seen to be used as a support to achieving HOT, as they used what they knew about the story to conclude an overall message from the story (Tienken et al., 2010; Nappi, 2017).

Reflections made during the focus interview show that despite enjoying the session, they usually feel nervous when being asked questions in a classroom (see Appendix 10). When asked why they feel nervous, Pupil B said it was in case they did not know the answer. Frey et al., (2018) uphold the need to provide emphasis on learning instead of performance. In response to this literature, RP2 explained that the majority of the questions were open to their interpretation and there were no right or wrong answers. This may suggest that children are used to associating questions with right and wrong answers which are generated from closed questions (Wragg and Brown, 2001). It could be possible that being aware of the research looking at questioning, meant the pupils were anxious about getting questions wrong (Nind et al., 2016). Pupil B indicated that the questions from the evaluating level were most difficult which would relate closely to the original Bloom’s Taxonomy (1956). To improve the lesson, the participants suggested giving more thinking time (Cremin and Burnett, 2018) and the chance to collaborate thinking with others for harder questions (Wragg and Brown, 2001; Hattie, 2012; Burke and Williams, 2012). Emphasis on a positive environment will make sure

children are not afraid to make mistakes and withhold their thoughts (Black and Wiliam, 1998).

Taking heed of the reflections to give waiting time and allow collaboration, RP3 conducted the exact same session with their chosen participants (see Appendix 11). The participants decided on the codeword “had enough” to indicate if they wished to withdraw from the research. All three participants already knew the story which led to them relying on memorising facts instead of using their thinking skills to answer some of the questions. It was more evident in RP3’s lesson that the participants collaborated ideas by answering “I think the same as [Pupil...]”. Although copying answers of others could be seen as a way out of having to think for themselves, it was clear when the participants developed the ideas further that they were engaging in valuable thinking (Nappi, 2017). Wragg and Brown (2001) maintain that pupils can benefit from thinking together for questions that elicit HOT. Hattie (2012) supports that listening to others can encourage deeper thinking. For instance, Pupil A extended Pupil B’s response to the question asking why Bernard was being ignored? Pupil A extended “they were getting ready for an important thing” to “they had to do their work and get ready for a carnival”. Reflection in action meant RP3 added in additional questions to extend understanding (Taba cited in Wragg and Brown, 2001). This is evident in the responses given to, “why did he go out to the garden if he knew there was a monster going to eat him?”. Pupil B said, “he wants to investigate” to which RP3 responded with “investigate what?”. Similarly, Pupil C said, “To prove it to Mum and Dad” with RP3 asking “Why?” to probe for clarity (Kerry, 2002). Pupil C answered, “because Mum and Dad were not listening”. This showed HOT as the pupils had understood that Bernard was being ignored. Pupil C already had a good understanding of the book’s underlying message by their answer, “It’s a safety book. Parents should listen to their children”. Pupil C’s thinking develops further when answering the final question, “is there a secret message?”. Their answer, “if there is something near your house that is dangerous they should move or just lock their house” demonstrates how HOT has been achieved as they make connections with prior knowledge to suggest a possible solution to avoid the danger (Piaget, 2002). Pupil A began with the thought that the monster was trying to eat the family to have the house to himself, to then say, “parents should always listen to their children in case there is a monster, lion or tiger in your garden”. It is open to interpretation whether Pupil A changed their thoughts due to collaborative learning, or whether their thinking skills were encouraged by the other questions asked prior to the final question (Burke and Williams, 2012). Additional thinking

time was given to the pupils dependent on the face shown when reflecting how confident they were about the question being asked. Pupil B showed the orange face when asked if they knew what the message of the story was, but after being given thinking time they responded with, “They should keep an eye on their children”. It was evident that giving thinking time enabled the pupil to answer the question (Cremin and Burnett, 2018).

Upon peer reflection it was apparent that it was difficult to measure thinking skills in relation to the research question. As the research set out to explore how to improve children’s thinking skills through the use of questioning, there was no way of determining whether the thinking had actually improved. However, it became clear that structuring questions using Bloom’s taxonomy did encourage opportunities for HOT which has been proven to generally be lacking in classrooms (Bloom, 1956; Wragg and Brown, 2001; Ellison, 2010). The focus group interview revealed different responses to that of RP2’s group (see Appendix 12). Pupil B said they enjoyed because the questions made their brain “whizzy”. They all said they felt confident when asked questions in class, which queries whether this is a true reflection of their feelings. It is possible that as a result of being aware of the research focus they tailored their answer to please the teacher (Thomas and Lewis, 2016). Furthermore, the participants suggested asking harder questions, which again could be interpreted as being aware of the research goal and referred to as the ‘halo effect’ (Denscombe, 2014:91; Nind et al., 2016). It was interesting to compare the fear displayed by RP2’s group in comparison to the confidence shown by RP3’s. Pupil B reflected honestly by saying they felt sad when they got a question wrong, to which Pupil C responded, “but we learn from mistakes”. This would suggest that RP3’s group were more aware of the focus on learning rather than performance (Frey et al., 2018). Alternatively, it could be said that RP3’s participants were not representative of the class as having two higher ability pupils could mean they had a better understanding of the research aims (Denscombe, 2014).

Overall, LS was an appropriate methodology for student teachers undertaking reflective research (Dudley, 2015). This research has emphasised the importance of sharing good practice through reflection for the greater good of the learners (Ellison, 2010). However, LS was not without its limitations. Working collaboratively was more difficult than expected as time restraints led to rushed collection of data. Furthermore, difficulties in collaboration are seen to arise when the focus is not shared by all (Hattie, 2012). More time should have been dedicated to reflecting collaboratively in order to share good practice and move the learning forward (Welsh Government, 2019).

Whilst collecting the data, the research partners clarified the participants responses to ensure the correct information was written down. Thus, ‘member checking’ was used to increase the reliability of the qualitative data (Greig et al., 2007:75). Triangulation method was used by collecting data from three different sources to strengthen the validity of the data (Greig et al., 2007). Primary data was collected from observational notes, semi-structured interviews and reflections. Secondary data was also used, through analysis of current literature, to provide an overview of existing research surrounding the topic (Denscombe, 2014). Working in a group of three also gave the opportunity to triangulate different perceptions to provide further validation (Hopkins, 2014). Despite this, the results still remain inconclusive in relation to answering the research question (Brooks et al., 2014). It is possible that the weakness comes from the first research lesson as it was concluded by the research partners that children of Nursery age, were not valuable contributors to the research. Using Piaget’s stages of development, it is possible to suggest that Nursery children at the ‘pre-operational stage’ of only being able to focus on one aspect at a time, find it difficult to contribute to focused research (cited in Hattie, 2012:38). Participants from Year 2 can be classified as being in the ‘concrete operations’ stage, with the ability to think logically (Greig et al., 2007:29). As a result, participants in RP2 and 3’s groups gave more valuable input to the group focus interview.

It is possible to draw from the empirical evidence that the research question remains at large unanswered. It is not clear whether questioning improves thinking skills or whether questioning merely makes the thought process explicit (Didau, 2014; Grigg, 2015). Having read current literature in light of the analysed findings, it is clear that collaborative learning has a pronounced impact on effective thinking skills (Burke and Williams, 2012; McGuinness, 1999; De Bono, 1999). Henceforth, if this research was carried out again in the future, a problem-solving task could have been more appropriate. The participants ability to solve the problem would have clearly signified whether answering questions collaboratively assisted their thinking process.

Altering the research question to how to improve teachers’ questioning skills by using the hierarchy of Bloom’s Taxonomy would have been more applicable to this current research findings (1956; Anderson and Krathwohl, 2000).

The findings from this research can be used to encourage teachers to refine questioning skills by recognising the importance of planning questions prior to the lesson (Bloom (1956);

Nappi, 2017). According to Kerry (2002) poor questioning techniques adopted early on become permanent in practice. This highlights the importance of reflective practice as a means of professional development (Welsh Government, 2019).

As the proposed curriculum for Wales requires children to be independent life-long learners, there would also be the assumption that the teaching profession can encourage such learning (Donaldson, 2015). As thinking skills have been identified as a means for children to make sense of their learning, it would be beneficial to research how to encourage metacognition in younger pupils (Grigg, 2015). As outlined in the Skills Framework (WAG, 2008) it is possible to learn how to think more effectively. Therefore, it could be beneficial for children to become more aware of how to think about thinking to be able to apply their thoughts more effectively (Pritchard, 2014; Grigg, 2015).

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