

Epistemic Insight

The Epistemic Insight Digest



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PREFACE

It's a real delight to be asked to introduce a series of research reports produced by student teachers on the School Direct PGCE course. Working with guidance and direction from their course tutor, Paula Stone, these student teachers were invited to consider and critique my own area of research which in turn has been selected as a priority area here at Canterbury Christ Church. While the term epistemic insight has existed for some time, June 2017 saw the launch of the Epistemic Insight Initiative.

Epistemic insight means knowledge about knowledge, especially, knowledge about disciplines and how they interact. The research is carried out by tutors, researchers and student teachers using an approach designed to promote research informed, research engaged teaching (Stone and Billingsley, 2020). It means that the research is tailored to the circumstances and interests of each student teacher. We envisaged and now see in practice that this is a way that future teachers can learn about and contribute to an area of active international research. I'm thrilled by the outputs that they have produced and am very grateful to Paula and the School Direct student teachers for expanding the body of research relating to epistemic insight. They have added - as you will see here - new descriptions and interpretations of the initiative aims, new strategies and pedagogies designed to overcome the challenges we identified in previous research, new subjects and so knowledge domains, new educational settings, new critical appraisals (positive and negative) and new reasons and opportunities to ask questions and to do further research. It's a wonderful success.

Dr. Berry Billingsley

*Professor of Science Education
and Principal Investigator for the Epistemic Insight Initiative*

EDITOR' S WELCOME

Welcome to the Epistemic Insight Digest. In this very first edition we showcase some of the excellent research projects that some of our School Direct student teachers carried out in their role as Associate Researchers.

As a Faculty of Education, which includes Initial Teacher Education (ITE) as part of its portfolio, we have a central role in examining what is happening in educational settings. Each year School Direct student teachers who undertake the PGCE enhancement, we offer at Canterbury Christ Church University, carry out a small piece of independent research in their school setting. Every year this offers us, teacher educators, a glimpse into school practices we might otherwise struggle to have access to. The aim of this project this year was bring together three important imperatives in the faculty:

1. to broaden the reach of the Epistemic Insight Initiative www.epistemicinsight.com
2. to encourage our students to appreciate and have respect for the importance of research engaged practice; and,
3. to gather some data about epistemic understanding in schools.

Thus, at the beginning of 2020 we invited the students to engage with the Epistemic Insight Initiative and to act as Associate Researchers. The student teachers who opted into the project each planned and developed their own enquiry fuelled by their interest in teaching epistemic understanding within their own context.

As you will see in this collection of papers the student teachers have, with tutor support been pioneers in co-creating new research in the field. Many have trialled new models, developed their own frameworks and tested epistemic understanding with very young children – something not tried before. In their research reports, you can see all the students problematising their pedagogy and the way that 'subjects' are taught in school. They have all shown critical thinking, challenging how the 'system' seems to suggest how teaching should be done, yet also great humility as they struggle with their own lack of experience or understanding at times.

They have all been willing to share their data with us for the wider Epistemic Insight Initiative but this is an opportunity to read their individual research reports first hand. All research projects went through our ethical clearance process and special permission has been requested from the student teachers' schools to publish these articles. The first three essays are written by EYFS and Primary colleagues. The remainder are written by colleagues, who teach various disciplines in secondary schools.

Dr. Paula Stone

Editor

CONTRIBUTORS



Kym Goddard worked in early years education whilst studying part time for her BA Childhood and Youth with the Open University. She then gained Early Years Teacher Status with an Early Years PGCE at Canterbury Christ Church University. She has just completed Primary School Direct with the PGCE enhancement! She is passionate about supporting children's emotional, mental and physical health, and promoting the importance of Early Years practice and pedagogy throughout children's education.



Chris Peters was a student teacher at Canterbury Christ Church University, training to be a primary school teacher. As part of the course he learnt about epistemic insight which captured his interest. As a School Direct student he had the opportunity to experiment with his pedagogy - developing and testing out ideas about how to be a good teacher.



Victoria Wilkinson is currently an Early Years teacher at a small Primary School, in Kent. She conducted her research in a Year 1 class at the same school. Victoria's research focuses largely on the accessibility of Epistemic Insight for younger children. She takes great pleasure in questioning and exploring young minds and loves nothing more than a class-based.



Claire Stockham re-trained as a Secondary History teacher following 20 years' experience working in educational administration; first at the University of London then at an independent school in Kent. She now teaches at a girls' grammar school.



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EXPLORING RECEPTION CHILDREN'S EPISTEMIC INSIGHT (EI): A SMALL-SCALE CASE STUDY.

Kym Goddard

Introduction

The National Curriculum (NC) (DfE, 2013, p.5) states schools should provide a “balanced and broadly based” curriculum, teaching a variety of disciplines in a creative and engaging manner. However, it appears that currently schools prioritise teaching the National Curriculum’s content rather than its aims (Billingsley, 2017). This has produced a focus on subject knowledge; consequently, creating discipline isolation or “entrenched compartmentalisation” (Billingsley, 2017, p.59). Concerns for the negative impact of this isolation on pupils’ educational experiences and outcomes is creating promotion of the characteristics of, and relationships between, disciplines (Billingsley, 2017; Jones, 2010; Rose, 2009). This is reflected in the new Ofsted framework (2019) which explains high-quality education will not be measured by exam results but will be based on a “rich curriculum” (Roberts, 2018) that teaches the National Curriculum’s (DfE, 2013) aims.

Methods of promoting discipline relationships vary. Rose (2009, p.11) encourages “cross-curricular” teaching strategies, explaining that teaching the relationships and distinctions between disciplines benefits pupils because they can make connections and see relevance within their learning. The National Curriculum (DfE, 2013) does not contain the phrase ‘cross-curricular’. However, it implies the necessity for this approach within descriptions of discipline intentions, stating pupils need to “draw on [previously studied] disciplines” (DfE, 2013, p.180) to improve abilities and knowledge.

Jones’ (2010, p.3) notion of “interdisciplinary studies” and Billingsley’s (2017, p.59) “Epistemic Insight” (EI) initiative expand upon cross-curricular teaching. Jones (2010) explains that interdisciplinary learning enables pupils to consider alternative viewpoints and understand subject-matter relationships between disciplines, rather than merely telling pupils about content within different disciplines. Though Jones’ (2010) article is ten-years old and relates to the American education system, Billingsley’s (2017) Epistemic Insight Initiative seems to support the importance of interdisciplinary learning, extending the principle further. Billingsley, Abedin and Nassaji define epistemic insight as “knowledge about knowledge... the attitudes and intellectual capacities required to appreciate how knowledge and scholarship work within and across subject boundaries” (2019, p.1). Though the boundaries between cross-curricular learning and epistemic insight can appear blurred, there are differences between the approaches which are explored further in this report.

Student teachers on my training programme are encouraged to engage with research to become “epistemic agents” (UCET, n.d., p.1), strengthening reflexivity, pedagogy, and ultimately pupils’ educational experiences (Carter, 2015; Shulman, 1986; Stone and Billingsley, 2019; UCET, n.d.; Winch, Oancea and Orchard, 2015). Therefore, this report presents my small-scale, ethnographic case study exploring the teaching of epistemic insight in a mixed-gender class of 28 Reception children at a mainstream, rural Church of England primary school in Kent. Initial observations explored epistemic insight within the environment, then an adult-directed activity focused upon pupils’ epistemic understanding regarding health and safety. I acknowledge the scope for discussion about curriculum organisation and delivery, and epistemic insight, is expansive. However, within this report there is only capacity to critically discuss concerns regarding the National Curriculum and assessments, and an introduction to epistemic insight and its potential implementation in Reception Year.

Literature Review

'Good' Education?

Extensive literature explores issues of high-quality education and curriculum design. As far back as 1967, the Central Advisory Council for Education (CACE) recommended a varied curriculum tailored to schools' and pupils' needs, prioritising child-led, experiential play and learning. It suggested sensitive use of formal assessments, emphasising that quality of teaching and children's capabilities are not solely reflected in tests. The current National Curriculum also intends that pupils are provided with "an introduction to the essential knowledge [needed] to be educated citizens", promoting access to equitable education through a range of disciplines (DfE, 2013, p.6). Positive though these intentions seem, there is concern the aims are overlooked due to assessment pressures (Billingsley et al, 2018), provoking attempts to redress the situation. For example, Alexander et al (2009) proposed a curriculum re-organisation and reduction of educational pressure, enabling more flexibility in how schools present disciplines.

Biesta (2009, p.3) suggests re-evaluating definitions of "good education", pertinent when the purposes of education risk being distorted by assessment-based judgements of educational quality. Biesta (2009, p.6-7) proposes interconnected educational functions: "qualification", equipping pupils with knowledge and skills, "socialisation", enabling pupils to become social beings, and "subjectification", forming pupils' individuality. He acknowledges the subjectivity of defining 'good' education, suggesting context-specific evaluations of educational practice should occur by understanding the complexities and purposes of each element of his model. Hayes (2010) argues that high-quality education encourages children to develop critical thinking skills, which necessitates deviation from focusing on teaching discipline-specific knowledge. However, despite stating teachers have "time and space" (DfE, 2013, p.6) to teach beyond its specifications, the National Curriculum's detailed requirements for pupils' attainment appear constricting and contradictory to its proposal for diverse and high-quality education.

Billingsley et al (2018, p.1116) are concerned that secondary education's curriculum delivery and "pedagogical pressures" do not educate pupils to consider the "power and limitations" (Billingsley et al, 2018, p.1119) of science. They propose this dilutes the National Curriculum's (DfE, 2013) aims, hindering pupils' epistemic insight and abilities to address "big questions" (Billingsley et al, 2018, p.1116), those which are answerable by critically applying skills from different disciplines. At this point it is relevant to acknowledge the relationship between epistemic insight, constructivist pedagogy (Pritchard and Woollard, 2010) and "dialogic teaching" (Alexander, 2017, p.9), though there is not scope for detailed discussion of these concepts. The apparent discord between the National Curriculum's (DfE, 2013) requirements and actual classroom practice could prevent teachers from incorporating epistemic insight into lessons, making pedagogy instructional to ensure assessment success. My professional experience suggests this concern exists regarding other disciplines, and primary and Early Years (EY) education. Early Years provision appears increasingly formalised and assessment-based (Ofsted, 2017; Standards and Testing Agency, 2020) to prepare children for the demands of statutory schooling, causing much consternation amongst educational professionals (Brogaard Clausen, 2015; Roberts-Holmes, 2015; TACTYC, 2017).

Billingsley (2019, p.1) describes narrowed thinking resulting from restrictive curriculum delivery as "entrenched compartmentalisation", supported by Robinson (2008, p.3) who proposes "divergent thinking" is educated out of pupils. Billingsley et al (2018) and Billingsley, Abedin and Nassaji (2019) suggest this stems from pressure on teachers to quantify discipline knowledge. This causes prioritisation of pupils' final outcomes above providing opportunities to develop Epistemic Insight. To attempt to address this, Billingsley et al. have (2018) designed an Epistemic Insight Framework which corresponds with Ofsted's (2019) drive to realign schools' curricula with the National Curriculum's (DfE, 2013) intentions (Billingsley, 2020).

Though the Epistemic Insight Initiative seems positive, it is still in its infancy and currently not widely researched. Cross-curricular education has however been advocated for some time (Alexander et al, 2009; Barnes, 2015; Rose, 2009). Its basic principle of exploring connections between disciplines to enrich children's educational experiences (Barnes, 2020) is reflected in epistemic insight. However, Billingsley et al (2018) appear to suggest epistemic insight expands upon cross-curricular teaching, analysing discipline content to enhance pupils' critical thinking. This includes exploring disciplines' "power[s] and limitations" (Billingsley et al, 2018, p.1119) when addressing questions, indicating that some disciplines are more suited to answer particular questions. Billingsley, Abedin and Nassaji (2019) imply supporting epistemic insight is important for several reasons. Firstly, promoting criticality when considering how to approach questions by analysing disciplines' strengths, weaknesses and relationships may avoid polarisation of disciplines. Consequently, practising epistemic insight may provoke creative, independent thinking. Lastly, consideration of the variety and contestable nature of responses to "big questions" (Billingsley et al, 2018, p.1116) may encourage tolerance and sensitivity in the context of England's cultural and religious diversity (Gandolfi, 2017). Generation of these transferable skills means encouraging epistemic insight could have positive implications for wider society as well as for individual pupils' development. For example, it seems reasonable to suggest that critical reflection, creativity and tolerance are desirable qualities for both individuals' and society's development, reflected in Biesta's (2009) notion that education can foster pupils' knowledge, individuality and social competence.

However, the teaching of epistemic insight does have limitations. A consideration specific to this report is that Early Years children's communication skills and ability to engage with epistemic insight concepts could be limited due to developmental immaturity. Individuals' additional needs, such as speech and language difficulties, will potentially add to the challenge of applying epistemic insight to Early Years settings.

Early Years Epistemic Insight

Currently, research into teaching epistemic insight within schools focuses upon secondary and upper-primary pupils (Billingsley, Abedin and Nassaji, 2019; Billingsley et al, 2018; Billingsley, 2017). It has not been explored within Early Years (specifically Reception) provision, and this lack of research is interesting given the importance early learning is reported to have upon children's development and educational progress (DfE, 2017; EE, 2012).

Researching the presence of epistemic insight in Reception is thought provoking, especially regarding curriculum organisation. Early Years provision should support children's holistic development (DfE, 2017; EE, 2012), enabling experiential learning and effective interactions with adults, implying high-quality provision should limit introduction of individual disciplines. This suggests children would not be exposed to dialogue exploring how different disciplines may approach questions, and therefore that epistemic insight is not likely to be present in Reception Year. However, literature reports the presence of isolated disciplines resulting from Early Years education's formalisation (Brogaard Clausen, 2015; Roberts-Holmes, 2015), risking Early Years children's development of "entrenched compartmentalisation" (Billingsley, 2019, p.1).

Additionally, research suggests primary pupils demonstrate epistemic insight and creative thinking more than secondary pupils (Billingsley, Abedin and Nassaji, 2019). Indeed, my professional experience indicates many children in Early Years ask and contemplate "big questions" (Billingsley et al, 2018, p.1116), illustrating their capacity for learning epistemic insight. This indicates two salient issues to me. Firstly, our education system has the power to teach pupils to have either compartmentalised thinking or epistemic insight. Secondly, the apparent correlation throughout pupils' education between increased focus on discipline knowledge and isolation, and decreased epistemic insight (Billingsley, Abedin and Nassaji, 2019; Billingsley et al, 2018; Billingsley, 2017), indicates the importance of primary and Early Years teachers promoting epistemic insight.

Thus, the Early Years epistemic insight research gap and my professional observations inspired me to study Reception children's epistemic insight, leading to my hypothesis that Early Years children are capable of developing basic epistemic insight skills with effective adult support.

Methodology

My ontological perspective aligns with the view that studying human phenomena cannot yield definitive truth because reality is subjective. This belief influenced my epistemology, causing me to employ a methodological approach within the interpretivist paradigm (Cohen, Manion and Morrison, 2011; Thomas, 2009). I obtained qualitative data analysed through an interpretive lens. Literature discusses the importance of reflexivity in interpretative research, emphasising the subjectivity of qualitative data analysis due to the individuality of researchers' and participants' experiences and perspectives (Cohen, Manion and Morrison, 2011; Ekins and Stone, 2012; Holliday, 2016; Thomas, 2016). My ontological and epistemological values rendered it not possible or desirable to disentangle myself from my research's subjective nature. As such, the research process was "iterative" (Thomas, 2009, p.15), requiring ongoing reflection of my influence upon the research questions, methods and conclusions.

Method

I chose to conduct an ethnographic case study, exploring mine, my colleagues' and the children's understandings of Epistemic Insight. Data obtained through such ethnographic approaches is context-specific and unique due to the researcher's participation in the study (Mukherji and Albon, 2015). Critical reflection indicated this approach best suited my aim of employing interpretative, qualitative inquiry to simultaneously explore Early Years children's epistemic insight, and reflect upon my and the school's practice to consider how epistemic insight could be further promoted. I initially thought of conducting interviews but I knew that interviews would not enable my full immersion in the Reception class environment so I chose to use observation of teaching and learning as participant observer.

Firstly, I observed children's understanding, and adults' promotion, of Epistemic Insight throughout a day of typical Reception provision. I initially planned to structure the observations with pre-determined themes. However, I decided that narrowing my focus risked limiting the richness of data, so instead I identified themes during analysis.

Secondly, I conducted an adult-directed, small-group activity using an adapted "Discipline Wheel" (LASAR, 2020) to provide the opportunity for children to display epistemic insight which may not have arisen within general provision. Friendship groups were used because previous experience suggests children converse more successfully in these rather than age-based groups. The Discipline Wheel was made more accessible for Early Years children considering their limited reading skills. I chose the most frequently used, therefore the most familiar, images from their timetable to surround the central topic-related question. The presence of named disciplines became apparent as I selected which images to include, provoking re-evaluation of my initial assumption that discipline isolation is not present in Reception.

Two data gatherers observed the activity and recorded data relating to my epistemic insight questioning and children's responses. The presence of three adults during the activity, especially the unfamiliar data gatherers, potentially affected the children's responses, such as unintentionally creating a sense of pressure for children to give certain answers. This altered behaviour is labelled "the Hawthorne effect" (Cohen, Manion and Morrison, 2011, p.246). However, the practical limitations of having to conduct and record the activity myself meant the benefits of using additional adults outweighed this risk. To maintain the focus of the research, pre-determined prompts guided my questions to the children. I reflected on my language throughout the activity, attempting to avoid leading the children's comments and respect contributions which did not directly align with my focus.

Original Discipline Wheel (LASAR, 2020)



Adapted Discipline Wheel



Simplified “investigator triangulation” (Cohen, Manion and Morrison, 2011, p.196) occurred after the activity by discussing the data gatherers’ and my observations, attempting to obtain parity between the data to increase the study’s validity. However, the subjective nature of interpretation means data validity may not have been increased because of the impossibility of ensuring complete corroboration between people’s perceptions of events and dialogue (Lincoln and Guba, 1985, cited in Cohen, Manion and Morrison, 2011, p.196).

Analysis Method

Critical analysis was challenging because of the subjective, interpretative nature of qualitative data. The presence of additional adults, and children’s varied communication skills and domestic and socio-economic experiences, would have affected responses within the study. Additionally, despite attempts to maintain objectivity, my experiences and assumptions naturally influenced my analysis and conclusions, which would subsequently differ if conducted by other researchers. Giddens’ (1984, cited in Tucker, 1998, p.43) “double hermeneutic” notion describes this subjective co-construction of knowledge between researchers and participants, acknowledging how the impossibility of reaching a definite answer to research questions potentially limits the validity of analysis (Cohen, Manion and Morrison, 2011). This has been considered throughout the analysis and discussion processes. However, this feature of interpretative research is expected, indeed welcomed, as it is perceived as illustrating the complexity of understanding social phenomena (Thomas, 2016). Wolcott (1994) suggests researchers embrace this ‘messiness’, adopting a reflective stance without seeking definitive conclusions.

Data was analysed using simple “content analysis” (Cohen, Manion, and Morrison, 2011, p.563). Other methods, such as “constant comparison” (Cohen, Manion, and Morrison, 2011, p.600) and “thematic analysis” (Braun and Clarke, 2006, p.77), were considered, but content analysis was chosen because it was easily employable from my perspective as an inexperienced researcher. Similarly, the thorough yet

time-consuming process of “thick description” (Geertz, 1973, p.310) was not feasible. Future studies could employ these analysis methods. The data was coded, and the codes organised into categories. Initially, codes were recorded quantitatively. This was useful for seeing emergent dominant themes but was not reliable as it oversimplified the complexity of qualitative data.

Ethics

Considering the ‘human’ element of ethics (Macfarlane, 2009), the social and emotional aspect of research relationships, appealed to me. Viewing research through this relationship-based ethical lens aligns with my ontological and epistemological perspectives, helping to enrich the study’s moral integrity. Macfarlane’s (2009, p.41) “virtues and vices” of research were useful tools for reflecting upon my study’s purposes and conduct, enabling me to attempt “respectfulness” and “reflexivity” throughout. I also believe I needed continuous “courage” (Macfarlane, 2009, p.58-59) to conduct a pioneering study, striking a balance between “cowardice”, refusing to attempt the research, and being “reckless” by undertaking an unmanageably challenging project.

Ethical standards and data protection regulations were maintained throughout the process (BERA, 2018; ICO, 2018). Ethical approval was granted by my university tutor, informed consent obtained from the head-teacher and Reception staff, and children’s assent was gained and their right to withdraw explained.

Critical Analysis and Discussion

Due to the nature of qualitative data, analysis was both “deductive”, observing the research focus of Early Years epistemic insight, and “inductive” (Altricher, Posch and Somekh, 1993, p.121-122), flexible regarding unanticipated findings still relevant to the research topic. This dual approach during the “constructive stage of analysis” (Altricher, Posch and Somekh, 1993, p.120) enabled me to generate theory from my data, supported by my existing understanding of epistemic insight. During the “critical stage” (Altricher, Posch and Somekh, 1993, p.120) I reflected upon the analysis process and methods. I discuss these reflections below, attempting to justify my conclusions with literature. This section presents my argument that, with adult support, Early Years children can learn the foundations for epistemic insight, and that due to the introduction of isolated disciplines, it may be necessary to teach epistemic insight in Reception to avoid “entrenched compartmentalisation” (Billingsley, 2019, p.1).

Theme 1: Indications of Children’s Epistemic Insight

Noise-level and practical difficulties of handwriting field-notes made it challenging to accurately record a large amount of children’s verbal interactions during child-initiated periods. Therefore, the initial observations did not provide much evidence of children’s epistemic insight, proving most useful for exploring discipline isolation and adults’ promotion of epistemic insight. However, incidental data arising from the opportunity for me to ask questions about exercise suggests children are beginning to ‘think rigidly’, compartmentalising discipline skills and knowledge:

MH talking about doing gymnastics after I made comment about not wanting to be too hungry for gym.

↳ Gym is PE. "What does PE mean?" "exercise".
 "Do you do exercise at any other time?" "we do spinning."
 "Do you do exercise at a time other than PE?" "After lunch".
 ↳ indicates thinking only ex. in PE.

Phonics does not make us healthy ↑
 Painting does not make us healthy ↑

NB: PE is timetabled after lunch once a week.

The Discipline Wheel activity necessitated much more discussion, making children's epistemic insight and 'rigid thinking' easier to observe by providing greater insights into their thoughts than observation alone, supporting the importance of "dialogic teaching" (Alexander, 2017, p.9). The discussions prompted children to make connections between life-experiences and discipline knowledge.

It seems understandable that children might discount art and phonics as ways of keeping healthy and safe, especially if their school-based experiences have focused on more commonly discussed aspects of health and safety, such as nutrition.

However, the curriculum could be re-considered to explore alternative health and safety aspects, such as emotional wellbeing arising from creativity. The above comments could be interpreted as children segregating discipline knowledge, indicating the beginning of their "entrenched compartmentalisation" (Billingsley, 2019, p.1) which could have been learned during their time in the Reception environment.

My data suggests children's ability to learn to compartmentalise disciplines paradoxically indicates their capacity for developing epistemic insight, the opposite of compartmentalisation. There were several occasions when children showed awareness that disciplines overlap:

Building keeps us safe: Stop it wobbling. Don't go on it if it is wobbling.
 ↳ If we building which of these

Child: "Building keeps us safe. [You need to] stop it wobbling. Don't go on it if it is [wobbling]."

Me: "If we're building, which of these [pictures might we use]?"

(Planning, maths, draws a triangle on paper)

Child: "Building with shapes in PE."

Its exercise when
 move our legs
 in tidying up

Child: "It's exercise when [we] move our legs in tidying up."

This did not display their understanding of disciplines' "power[s] and limitations" (Billingsley et al, 2018, p.1119) when answering questions, but demonstrated their potential for learning epistemic insight with adult support.

These interactions between the children and I suggest their potential for developing either discipline compartmentalisation or epistemic insight, demonstrating that discussion is inherent to the nature of eliciting epistemic insight:

KS maths AOEI (M)
 Do you play in maths
 All No ↑

(Discipline compartmentalisation)

when we do art (A) (CT)
 - makes us healthy
 when you do it makes
 feel better. (EM)

Child: "When we do art [it] makes us healthy. When you do it, [it] makes [you] feel better". (EI).

KS Do you know about the
 happy & safe when we
 do things for other (CT)

Me: "[What] do you know about health and safety?"

Child: "[It is] happy and safe when we do things for other [people]". (EI).

This contrasts with my initial observations which did not yield evidence of children's epistemic insight, suggesting to me that developing Early Years children's epistemic insight necessitates raising adults' understandings of their role in fostering epistemic insight by dedicating time for meaningful interactions and "dialogic teaching" (Alexander, 2017, p.9).

Indications of adults' promotion of Epistemic Insight

Adult-directed interactions with children in the initial observations frequently focused upon developing subject-specific skills, notably mathematics and phonics. Additionally, most references to named disciplines were initiated by adults. Recently the Reception provision has transitioned from being formal to play-based, with staff embracing holistic and child-led learning as much as possible. However, my initial observations indicate adults currently focus on supporting subject-specific skills and knowledge when supporting play, suggesting prioritisation of "core subjects" (DfE, 2013, p.7) without promoting epistemic insight. Adults could direct discussion to consider that keeping healthy and safe is multi-faceted and could, for example, be viewed through the lenses of art and phonics. They could then introduce the concept that these disciplines are potentially less useful at answering the question

than others, in-keeping with Billingsley's (2019) definition of epistemic insight. It is important to note this is not a criticism of the staffs' practice, merely an observation which is not unexpected, given concerns regarding discipline isolation and prioritisation of Government targets (Billingsley et al, 2018; Brogaard Clausen, 2015; Roberts-Holmes, 2015; Robinson, 2008; TACTYC, 2017), combined with the infancy of Early Years epistemic insight engagement. Identification of these interactions provides the opportunity for reflection upon staffs' values and priorities, creating potential for adapting practice to encourage epistemic insight.

Some of my Discipline Wheel questions indicate that non-epistemic insight questions typically elicit answers which focus on one discipline or knowledge area:

EA Why is important that we eat (AO) (CX)

~~BA~~ Its healthy (CX)

KA Why do we have to eat healthy (AO) (CX)

~~EA~~ Its good for our bodies makes us fast & strong

In contrast, when posed with epistemic insight focused questions, children demonstrated their potential for possessing epistemic insight:

<p>Me: Types of exercise - what would that be part of AOEI (EX)</p>	<p>Child: "PE helps us [learn] about exercise. It's good for you, it gives you energy."</p> <p>(PE) PE - helps us about exercise (EX) 'It's good for you' it 'gives you energy.' (CX)</p>
<p>Me: AOEI (EX) Do we exercise in other times too?</p>	<p>Tidy up time is important - phonics we exercise with actions (PH) (CX) (EX)</p> <p>Child: "Tidy up time is important. [In] phonics we exercise [by doing] actions."</p>

* What shapes were we talking about PE? AAEI
 PE
 CAT → we talking about shape in PE & maths M
 EX

Me: "What shapes were we talking about [in] PE?"
 Child: "We talk about shapes in PE and maths."

* KG - Does phonics keep us healthy & safe?
 PH
 A Because we have to learn how does learning keep us healthy & safe?
 PH
 A Phonics isn't food
 PH Phonics keeps our hands healthy & safe
 EX

Me: "[How] does phonics keep us healthy and safe?"
 Child: "Because we have to learn."
 Me: "How does learning keep us healthy and safe?"
 Child: "Phonics isn't food".
 Child: "Phonics keeps our hands healthy and safe."

The children's responses demonstrate their potential for understanding epistemic insight. However, asking effective questions was challenging because I am learning about epistemic insight and so my questioning skills were not sufficiently developed, especially as there is currently no Early Years epistemic insight research to draw upon. These examples illustrate children's ability to be epistemically insightful and the importance of adults supporting this through appropriate questions and environments. It seems reasonable to suggest the Discipline Wheel activity questions elicited more evidence of children's epistemic insight because the questions specifically targeted this, creating implications for staff to critically reflect on how their current questions and environment supports children's epistemic insight.

Indications of discipline isolation

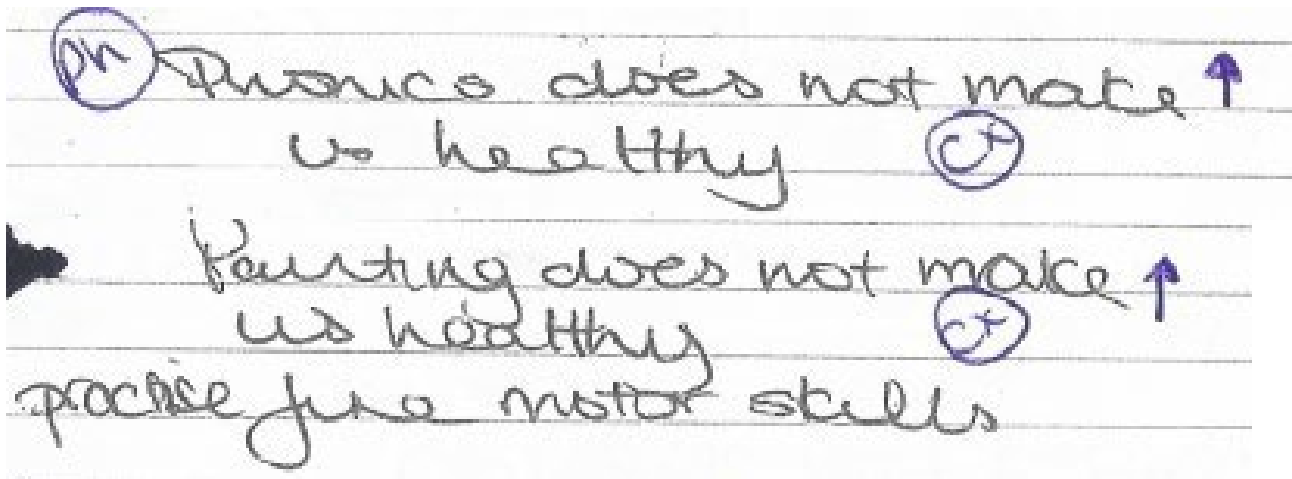
There was evidence throughout both research elements of adults isolating disciplines, potentially arising from a desire to promote and assess children's discipline-specific skills and knowledge. This could be in response to top-down assessment pressure, concerns for which are previously discussed, causing construction of teachers' educational priorities. Below are some examples:

- outside. (AW) (W)
- Adult - 'what are you writing?' = Helping ch'n to write in their play, not using 'phonics' but promoting skills. (JP) (ph)
 - Ch'n playing in most areas - same as indoor play & holistic learning, no mention of discrete subjects) other than adult interaction.

Review.

- Adults reviewing morning - emphasised Phonics eg ch'n who built a ship and labelled it s_h_i_p. (ph)
- Playing teachers - ch'n acting out phonics. (ph)

The children also demonstrated discipline compartmentalisation:



The last comment could indicate discipline compartmentalisation, suggesting the child's lack of awareness of potential health benefits from painting (which others have recognised, as previously discussed). However, there is simultaneously an indication of the child's potentially emergent epistemic insight, connecting painting and "fine motor skills", but without acknowledging the connection to physical health. Again, this indicates that Early Years children can be taught to isolate disciplines and learn epistemic insight, reinforcing the argument for adults' awareness of Early Years epistemic insight pedagogy and reflexive practise when supporting its development.

Environmental observations indicated various examples of discipline isolation: the daily visual timetable, mathematics and phonics displays, dedicated areas for discipline-specific resources, and discrete teaching focused upon mathematics and phonics. This school's play-based approach is designed upon the premise that Early Years provision should be child-led to optimise children's engagement, learning and well-being, with the understanding that adults have ultimate influence upon the construction of learning environments (Bottrill, 2018; EE, 2012; Ephgrave, 2018). It seems logical adults influence children's experiences, and subsequent discipline isolation and epistemic insight, through these environments. Again, this is not a criticism of the school's practice but an opportunity for reflecting upon how adult constructs affect children's learning opportunities and experiences. If the staffs' professional values align with the potential benefits of promoting Early Years epistemic insight pedagogy, they could synthesise supporting subject-specific skills and knowledge with fostering epistemic insight.

Reflexive Analysis

The study necessitated constant re-evaluation of my epistemic insight understanding, but did demonstrate Early Years children are capable of learning basic epistemic insight. Children do not naturally distinguish between disciplines during play; discipline compartmentalisation is a construct created and reinforced through adults' teaching. Therefore, it appears that children need to be taught epistemic insight to counteract the potential for learning "entrenched compartmentalisation" (Billingsley, 2019, p.1). It seems reasonable to suggest distinct disciplines and epistemic insight can be complementary when both are taught effectively. Some subject-specific skills, such as mathematics, need teaching discretely, but epistemic insight pedagogy could be synthesised with pupils' skills and knowledge to consider the usefulness for disciplines when answering "big questions" (Billingsley et al, 2018, p.1116).

Much literature expresses the importance of student teachers "engaging with research" to establish an "evidence-based profession" (Carter, 2015, p.8; Shulman, 1986; Stone and Billingsley, 2019; UCET, n.d.; Winch, Oancea and Orchard, 2015). Engaging with Epistemic Insight Initiative research (Billingsley, Abedin and Nassaji, 2019; Billingsley et al, 2018; Billingsley, 2017) has been hugely influential to

developing my practice. Analysing literature and conducting this study has illustrated the importance of fostering epistemic insight. It seems reasonable to suggest altering the focus of teaching to reflect the National Curriculum's (DfE, 2013) aims and promote epistemic insight would improve pupils' educational experiences by expanding their critical understanding of disciplines. Transferable skills of critical, creative and reflexive thinking could be encouraged too, potentially benefitting wider society if viewed through the lens of Biesta's (2009) educational functions. I am now particularly aware of my and other adults' questions and our impact upon the learning environment, and how these affect children's epistemic insight and discipline perception. This would not be possible if the study had not provoked me to reflect on the relevance of epistemic insight within Reception, and education in general.

Before conclusions can be drawn about epistemic insight's place within our education system (including student teacher education programmes), and corresponding change can be actuated, more research is needed. Large samples sizes across all educational phases need studying, along with epistemic insight's long-term effects. As discussed, re-prioritising education's aims seems challenging given teachers' accountability for, and preoccupation with, ensuring pupils meet specific targets. Despite this, there are two allied considerations which I would like to acknowledge. Firstly, adults must think reflexively about how their responsibility for shaping educational environments impacts pupils' experiences. Subsequently, given epistemic insight's potential importance to pupils' education and later lives, those responsible for curriculum design and implementation on national, local and individual school levels should acknowledge epistemic insight's place within education, and how it can be promoted.

References

- Alexander, R., Armstrong, M., Flutter, J., Hargreaves, L., Harrison, D., Harlen, W., Hartley-Brewer, E., Kershner, R., MacBeath, J., Mayall, B., Northen, S., Pugh, G., Richards, C. and Utting, D. (2009) *Introducing The Cambridge Primary Review*. UK: Routledge.
- Alexander, R. (2017) *Towards Dialogic Teaching: Rethinking classroom talk*. 5th edn. UK: Dialogos UK Ltd.
- Altricher, H., Posch, P. and Somekh, B. (1993) *Teachers Investigate their Work: An introduction to the methods of action research*. London: Routledge.
- Barnes, J. (2015) 'An Introduction to Cross-Curricular Learning' in Driscoll, P., Lambirth, A. and Roden J. (eds.) *The Primary Curriculum: a creative approach*. 2nd edn. London: SAGE Publications Ltd, pp.260-283.
- Barnes, J. (2020) *Epistemic Insight (EI) Scholarship Afternoon* [Keynote Speech]. Canterbury Christ Church University. 27 February.
- Biesta, G. (2009) 'Good education in an age of measurement: on the need to reconnect with the question of purpose in education', *Educational Assessment, Evaluation and Accountability*, 21, pp.33-46. DOI: <https://doi.org/10.1007/s11092-008-9064-9>
- Billingsley, B., Abedin, M. and Nassaji, M. (2019) 'Primary school students' perspectives on questions that bridge science and religion: Findings from a survey study in England', *British Educational Research Journal*, 46(1), pp.177-204. DOI: 10.1002/berj.3574
- Billingsley, B. (2020) *Epistemic Insight (EI) Scholarship Afternoon* [Keynote Speech]. Canterbury Christ Church University. 27 February.
- Billingsley, B., Nassaji, M., Fraser, S. and Lawson, F. (2018) 'A Framework for Teaching Epistemic Insight in Schools', *Research in Science Education*, 48, pp.1115-1131. DOI: <https://doi.org/10.1007/s11165-018-9788-6>

- Billingsley, B. (2017) 'Teaching and learning about Epistemic Insight', *School Science Review*, 98(365), pp.59-64.
- Billingsley, B. (2019) 'Thinking like a scientist in a multidisciplinary arena', unpublished.
- Bottrill, G. (2018) *Can I Go & Play Now?* London: SAGE Publications Ltd.
- Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3(2), pp. 77-101.
- British Educational Research Association (2018) *Ethical Guidelines for Educational Research* 4th edition. Available at: https://www.bera.ac.uk/wp-content/uploads/2018/06/BERA-Ethical-Guidelines-for-Educational-Research_4thEdn_2018.pdf?noredirect=1 (Accessed: 22 March 2020).
- Brogaard Clausen, S. (2015) 'Schoolification or early years democracy? A cross-curricular perspective from Denmark and England', *Contemporary Issues in Early Childhood*, 16(4), pp. 355–373.
- Carter, A. (2015) *Carter review of initial teacher training (ITT)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/399957/Carter_Review.pdf (Accessed: 22 March 2020).
- Central Advisory Council for Education (1967) *Children and their Primary Schools*. Available at: <http://www.educationengland.org.uk/documents/plowden/plowden1967-1.html> (Accessed: 22 March 2020).
- Cohen, L., Manion, L. and Morrison, K. (2011) *Research Methods in Education*. 7th edn. Oxon: Routledge.
- Department for Education (2017) *Statutory framework for the early years foundation stage: Setting the standards for learning, development and care for children from birth to five*. Available at: https://www.foundationyears.org.uk/files/2017/03/EYFS_STATUTORY_FRAMEWORK_2017.pdf (Accessed: 24 March 2020).
- Department for Education (2013) *The national curriculum in England: Key stages 1 and 2 framework document*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/425601/PRIMARY_national_curriculum.pdf (Accessed: 21 March 2020).
- Early Education (2012) *Development Matters*, London: Early Education.
- Ekins, A. and Stone, P. (2012) 'It's all about me...?' Complex understandings of the positioning of the researcher within the research process', *At the Crossroads Conference*, Canterbury Christ Church University, Canterbury, 25 April 2012. Unpublished conference paper.
- Ephgrave, A. (2018) *Planning in the Moment with Young Children: A Practical Guide for Early Years Practitioners and Parents*. Oxon: Routledge.
- Gandolfi, H. E. (2017) 'Teaching about nature of science in secondary education: a view from multicultural classrooms', *School Science Review*, 98(365), pp.77-84.
- Geertz, C. (1973) *The Interpretation of Cultures*. Basic Books, Inc.
- Hayes, D. (2010) 'The seductive charms of a cross-curricular approach', *Education 3-13*, 38(4), pp.381-387. DOI: 10.1080/03004270903519238
- Holliday, A. (2016) *Doing and Writing Qualitative Research*. 3rd edn. London: SAGE Publications Ltd.
- Information Commissioner's Office (2018) *Guide to the General Data Protection Regulation (GDPR)*. Available at: <https://ico.org.uk/media/for-organisations/guide-to-the-general-data-protection-regulation-gdpr-1-0.pdf> (Accessed: 22 March 2020).
- Jones, C. (2010) 'Interdisciplinary Approach - Advantages, Disadvantages, and the Future Benefits of Interdisciplinary Studies', *ESSAI*, 7(26), pp.76-81.

- LASAR (2020) *Toolkit*. Available at: http://www.epistemicinsight.com/?page_id=813 (Accessed: 23 March 2020).
- Macfarlane, B. (2009) *Researching with Integrity*. Oxon: Routledge.
- Mukherji, P. and Albon, D. (2015) *Research Methods in Early Childhood: An Introductory Guide*. 2nd edn. London: SAGE Publications Ltd.
- Ofsted (2017) *Bold Beginnings: The Reception curriculum in a sample of good and outstanding primary schools*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/663560/28933_Ofsted_-_Early_Years_Curriculum_Report_-_Accessible.pdf (Accessed: 22 March 2020).
- Ofsted (2019) *The education inspection framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/801429/Education_inspection_framework.pdf (Accessed: 22 March 2020).
- Pritchard, A. and Woollard, J. (2010) *Psychology for the Classroom: Constructivism and Social Learning*. Oxon: Routledge.
- Roberts-Holmes, G. (2015) 'The 'datafication' of early years pedagogy: 'if the teaching is good, the data should be good and if there's bad teaching, there is bad data'', *Journal of Education Policy*, 30(3), pp. 302-315. DOI: 10.1080/02680939.2014.924561
- Roberts, J. (2018) *Need to know: Ofsted's new inspection framework*. Available at: <https://www.tes.com/news/need-know-ofsteds-new-inspection-framework> (Accessed: 21 March 2020).
- Robinson, K. (2008) *RSAnimate: Changing Education Paradigms*. Available at: <https://www.thersa.org/globalassets/pdfs/blogs/rsa-lecture-ken-robinson-transcript.pdf> (Accessed: 22 March 2020).
- Rose, J. (2009) *Independent Review of the Primary Curriculum: Final Report*. Nottingham: DCSF Publications.
- Shulman, L. S. (1986) 'Those Who Understand: Knowledge Growth in Teaching', *Educational Researcher*, 15(2), pp.4-14.
- Standards and Testing Agency (2020) *Assessment framework: Reception Baseline Assessment*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/868099/2020_Assessment_Framework_Reception_Baseline_Assessment.pdf (Accessed: 22 March 2020)
- Stone, P. and Billingsley, B. (2019) 'Framework for Integrating Teaching and Research', in print.
- TACTYC (2017) 'Bald Beginnings'. Available at <http://tactyc.org.uk/wp-content/uploads/2017/12/Bold-Beginnings-TACTYC-response-FINAL-09.12.17.pdf> (Accessed: 22 March 2020).
- Thomas, G. (2016) *How to do your Case Study*. 2nd edn. London: SAGE Publications Ltd.
- Thomas, G. (2009) *How to do your Research Project*. London: SAGE Publications Ltd.
- Tucker, K. H. Jr. (1998) *Anthony Giddens and Modern Social Theory*. London: SAGE Publications Ltd.
- UCET (n.d.) 'UCET – the intellectual base of teacher education'. London: UCET.
- Winch, C., Oancea, A. and Orchard, J. (2015) 'The contribution of educational research to teachers' professional learning: philosophical understandings', *Oxford Review of Education*, 41(2), pp.202-216.
- Wolcott, H. F. (1994) *Transforming Qualitative Data: Description, Analysis and Interpretation*. California: SAGE Publications Ltd.

A SMALL-SCALE CASE STUDY TO EXAMINE THE EXTENT TO WHICH MULTIDISCIPLINARY TEACHING IS USED WITHIN THE PRIMARY CURRICULUM TO DEVELOP EPISTEMIC INSIGHT.

Christopher Peters

Introduction

After a seminar talk from Professor Berry Billingsley, Director of LASAR (Learning about Science and Religion) and lead researcher of the Epistemic Insight project (EI) (Billingsley, 2019) my interest was aroused. I left with a sense of feeling I had listened to something important but wasn't certain what. Through further seminars and reading, my appreciation of what epistemic insight was and what it was trying to research grew and when presented with the opportunity to undertake a piece of research within the study I knew it was something that I wanted to do. For me, and others I have spoken to, a major issue seemed to be understanding what epistemic insight was. How could it be taught (or identified), let alone taught effectively, if there wasn't a basic understanding of what it is? My research, therefore, sought to understand and address five key questions.

1. What is epistemic insight?
2. Is it being taught in primary school? Why or Why not?
3. Is it something that should be being taught in primary school?
4. What impact is this having on learning?
5. What are the implications for my future practice?

What is Epistemic Insight – Literature review

As I mentioned before, I originally struggled with the concept of what Epistemic Insight (EI) was. The Epistemic Insight Initiative website defines epistemic insight as "'knowledge about knowledge' – and, particularly, knowledge about disciplines and how they interact." A catchy 'sound bite' but what did that mean? A quick Google search of 'What is Knowledge?' gives over 1,670,000,000 results. Delving into 'The Theory of Knowledge' site (Dunn, 2013) suggests that centuries of discussion on the point would take some time to unravel and is for another discussion! However, if we take it in its broadest sense Henriques (2013) suggests knowledge is an "...awareness of or familiarity with various objects, events, ideas, or ways of doing things." Over time I took this to mean that "Knowledge about Knowledge" (Epistemic Insight, no date) meant an awareness of why we know what we know.

In the course of my research, despite reading around and engaging with the Epistemic Insight Initiative, it took one 'eureka' moment to bring clarity to my thinking. (Regrettably, this had implications for the effectiveness of some of my research, but I will discuss that later). I was planning for the following day's science lesson about chalk when it occurred to me, as we live near the White Cliffs of Dover, that I could also cover some history and geography (it had already been decided that as it was World Book Day in the second half of the afternoon we would use chalk to do art) – perfect cross-curricular (or multidisciplinary) teaching, one item and four subjects covered! Barnes (2018) suggests "Cross-curricular learning occurs when the thought processes, skills, language and dominant values of two or more curriculum subjects are used to throw light upon and understand a single experience..." (Barnes, 2018, p.2)

As I researched the lesson and thought about what I was going to cover it struck me that whilst I was planning to introduce these subject areas, I planned to do little more than inform the children

that they'd covered this assortment of subjects. What useful learning about these subjects would they actually be able to take away? I suspect this was a prime example of the teaching described by Alexander et al. (1992, cited in Barnes, 2018) referring to poor cross-curricular or 'topic-based' teaching with no planned progression or objectives. Barnes (2018) himself might argue, at best, that this was a case of 'token connectivity', using one or more 'foundation' subjects to enhance the learning of the core subject.

Barnes (2018) suggests that one of the most effective methods of using cross-curricular learning is by using 'a single experience' and looking at that through different subjects but doing so 'quite separately'. The idea of looking at how a tree has grown from a scientific view one day and then using the same tree for a piece of descriptive writing or drama the next. But what do we learn about the individual subjects and their uniqueness or overlapping skills if we view them in isolation? We might come to understand that we get different answers, or ideas, if we approach an 'experience' from the view of different subjects, but only if we make this connection ourselves as it is not being explicitly taught.

This, I believe, is one of the fundamental differences between the cross-curricular approach to multidisciplinary teaching and the teaching for epistemic insight. The notion that, rather than leaving it to chance, the links and differences are explicitly taught (Billingsley et al., 2018).

Billingsley et al. (2018) suggest this is currently not being done in secondary schools because of, for one, 'entrenched subject compartmentalisation', the inability for the different disciplines to leave their classroom and interact with one another. It must be noted that this is a current weakness of the research, the initiative was started based on the research of the LASER study (Billingsley et al., 2012) based in secondary schools, with a specific focus on the relationship between science and R.E. and how they answer 'big' questions. Here lessons are broken down into different subjects and with different teachers, unlike at primary school (where this study will occur) where it is usual for the class teacher to teach all subjects so the 'compartmentalisation' may be different, and the value in 'big' questions and other disciplines needs to be explored further.

Billingsley et al. (2018) argue that by teaching these disciplines 'in a silo' children aren't learning the uniqueness of each discipline or the relationship with other disciplines, a skill needed to break down the cross-curricular inputs of everyday life (Barnes, 2018). One consequence of this narrow vision, learning everything in a vacuum, according to Billingsley et al. (2018), is that discipline can seem to have no limitations, especially with science it can be seen to hold all the answers. This is a particular issue when you consider the National Curriculum's (DfE 2015) aim of ensuring by the end of Key Stage 4 pupils are "appreciating the power and limitations of science..." (2015, p.214). It's notable, amid the current Coronavirus pandemic, the number of people expecting science to instantly have the answer and not recognising its limitations.

The key difference between the cross-curricular approach and the teaching for EI appears to be that the importance placed on the understanding of the discipline you are learning and why that discipline is appropriate. Whilst Barnes (2018) argues that it is 'often' required that the child (and teacher) have specific subject-discipline skills, in cross-curricular learning the purpose of the learning isn't to understand more about the discipline it is just an opportunity to look at an 'event' a different way. The purpose of teaching for epistemic insight, on the other hand, is to explicitly understand the skills and limitations of the discipline within which you are learning, with the view to being able to identify that another discipline may offer a different, sometimes more appropriate, perspective, or help combine and enhance the understanding of the current learning (Billingsley et al., 2018).

Methodology

My aim here isn't to provide an appraisal of all the routes my research could have taken, or the pros and cons of each route, because as Thomas (2017) suggests, this would require another paper. Rather, the aim is to highlight and justify the methods I have chosen whilst acknowledging the shortcomings.

I have chosen to conduct a mixed-method, autoethnographic, case study across two primary schools in key stage 1 and lower key stage 2. I will mainly collect qualitative data through unstructured observations, interviews and the planning, teaching and reflections of a lesson for epistemic insight. Two questionnaires, one before and one after my lesson teaching for EI, will provide quantitative data to support my observations.

The choice of case study over an action research study was mainly due to time and control. The case study, according to Robson (2011, quoted in Coe et al., 2017, p. 114), "...involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence." It seeks to understand what has happened and allows the researcher to draw conclusions as to why, and what the implications may be. Whilst an action research project seeks to "...change and the emphasis is on problem-solving in whatever way seems most appropriate." (Thomas, 2017, p 154). The researcher identifies an issue which they believe requires change, implements the change, reflects on the impact of the change and then repeats the processes in an ongoing process. Whilst the end goal of the research is to inform my practice, I wasn't seeking this immediate and continued evaluation in my research and didn't believe I would have enough time or influence to have a significant impact.

I decided a mixed-method approach, "...combining quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study." (Johnson & Onwuegbuzie, 2004, quoted in Yin, 2009, p. 62), was the best choice as it would allow me not only to collect what I saw and heard (qualitative data) but also, through a questionnaire, gain the student's feelings (quantitative data), giving me another perspective.

Observation formed a key part of my data gathering. It allowed me to capture first-hand data that is naturally occurring within the school environment ensuring that I am not affected by the actions of people's accounts unintentionally, or otherwise, differing from reality (Cohen, Manion & Morrison, 2018). I also recorded any appropriate contextual information that may arise. Regrettably, there will be those, as suggested by Mills and Morton (2013, cited in Cohen, Manion & Morrison, 2018), that view observations as lacking objectivity and therefore undermine the research. However, as an autoethnographic study (discussed later) whilst I aimed to remain objective, I didn't wish to remove myself from the data so this wasn't an issue. There was a need to remain vigilant that the presence of an 'observer' didn't lead the children and teachers to behave differently purely because of the act of observation (Thomas, 2017; Cohen, Manion & Morrison, 2018).

There are many different opinions on how observation can and should be conducted – from a strict 'outsider' having no interaction with that which is being observed, to the complete 'insider' where the observer is inseparable from what is being observed. Thomas (2017) ventures that observer involvement (non-participant to participant) can be associated with the type of observation being carried out on a 'continuum'. He suggests a structured observation (looking for occurrences of specific predetermined things to produce numerical data) will be found at one end along with non-participant observation. At the opposite end of the 'continuum' are unstructured observation (the gathering of information that seems relevant and important to the researcher) and participant involvement, with the reality being a level of fluid involvement somewhere between the two. As a trainee teacher, at times I get to observe the class rather than teaching them, however, the children don't (and I wouldn't expect them to) stop asking questions about their learning. So, whilst I may start an observation closer to the end of the continuum of non-participant it is easy to get pulled across to the participant side and continue the observation.

My research was, therefore, be mostly conducted as a participant-observer (Thomas, 2017) conducting unstructured observation, collecting qualitative research - taking notes and conducting conversations (unstructured interviews). The benefit of using the unstructured observation is I was not contained to looking for a narrow, predetermined, set of occurrences as I would be with a structured observation looking for more numerical data (the number of occurrences of a given thing). The unstructured nature allowed me to have conversations as they arose naturally and 'follow' the research rather than going down a predetermined path. Thomas (2017) cautions though that the danger of this route is that the lack of structure means anything or everything can be observed. This can leave the researcher with nothing more than a series of unrelated quotes and observations as data, and a danger of missing the crucial information you may gain from a structured observation.

Quantitative data was gathered using a questionnaire one before the epistemic insight lesson and then repeated with the same questions after. This was adapted from those used by the Epistemic Insight Initiative (Stone, 2020) to make it more suitable for the primary audience I was teaching. They are based on the Likert Scale (Thomas, 2017) measuring attitudes, with, importantly due to the age of the children and potential lack of exposure to the knowledge required, an 'I don't understand the question' option. Whilst Krosnick and Presser (2010, cited in Cohen, Manion & Morrison, 2018) reflect that overuse of the 'don't know' option may compromise the data, I believe ethically this needs to be included to stop the children becoming upset at not knowing or understanding the question.

The essence that it is me as the researcher looking, observing, making the assumptions and inference from what I observe, means that I must recognise I come with my own view and understanding of the world which can't be separated from what I am seeing – how I view the world will influence how I view other people's actions (Thomas, 2017; Bochner and Ellis, 2016) and this will impact the research. Aligned with this, the fact that I will be teaching an EI lesson and using the 'self-reflections and self-observations' (Thomas, 2017, p.168) within the research means I am inseparable from the data, and the research is, therefore, autoethnographic.

Bochner and Ellis (2016) argue this narrative, storytelling, style of autoethnographic writing allows the author to convey the true feelings and emotions of what the researcher and participants are expressing. A narrative analysis of the observations, alongside reporting the questionnaire data using descriptive statistics will allow this evocative autoethnographic research to tell the case study story (Bochner and Ellis, 2016; Thomas, 2016; Cohen, Manion & Morrison, 2018).

As with any research, the ethical considerations to protect participants was highly important. Macfarlane's (2009) ideas of virtuous research along the lines of respect, humility and reflexivity have guided my thinking throughout. All research data will be kept confidentially, securely and reported anonymously (Thomas, 2017). The nature of my research meant that all activities carried out were that of a student-teacher engaging with critical and reflective practice. However, as well as gaining ethics approval from Canterbury Christ Church University, before the teaching of the lesson for EI pupils were informed that the lesson was to form part of a research project and given the option not to take part, they all offered their assent to be included.

Results and Analysis

Through the reporting of my results, I will attempt to draw connections and meaning from my research to answer the questions I posed at the beginning (Thomas, 2017).

Is Epistemic Insight being taught in primary school? Why or Why not?

The short answer is I don't think it is. And, there is little evidence of the cross-curricular teaching as suggested by Barnes (2018). A 'topic' (theme for the terms learning) was present in both schools but at no point did any learning occur based around a single aspect of that topic through one or more subjects. This meant there was no capacity to compare explicitly the skills of two or more disciplines

and what they were offering, which would be needed for EI learning to occur. Neither was it expressed why a particular subject was chosen over another to study a particular aspect of the topic, another requirement to engage in EI thinking. The use of 'topic' like this could be an example of the schools thinking they are working in a cross-curricular manner, as the theme could be applied to learning in different subjects, but in reality, no multi-disciplinary learning was occurring.

Question 1 on the questionnaire asked about a connection between what you learn in science and what you learn in history. Over 70% of students thought there was no link or didn't understand the question. This could suggest the children haven't been made aware of the links or perhaps more worryingly, that children have already begun to think of subjects in their own entrenched silos (Billingsley et al., 2018).

During one observation when asked what they had studied the previous week in RE a child responded with the incorrect answer and was told that that was the history lesson. This demonstrates that the child was unable to recognise and separate the different disciplines/subjects. Possibly because of a focus on teaching the content related to subjects at the expense of learning about the unique skills and characteristics of each subject and why that makes it the appropriate choice to look at that particular issue/question. Without the understanding that subjects/disciplines have different properties, there is a danger that all learning can become blurred or seen as 'topic'. (OFSTED, 2011; Barnes, 2018; Billingsley et al., 2018)

The absence of teaching for epistemic insight or in a cross-curricular fashion may be for many reasons, and, in hindsight, shouldn't be a question for the study. In brief, one of the major issues could be down to the educational environment within which schools are operating. Biesta (no date) suggests that education has become about what can be measured, whilst Brookfield (2017) takes a more cynical view that its objective is to maintain the 'status-quo' of those in power. In their research Billingsley et al. (2018) complain that teachers aren't spending time critiquing sensationalised news headlines. If they are operating in the environment where it's the statistics that matter (teaching becoming about the recall of facts and passing tests) and all about test scores (Biesta, no date), and then these statistics are used to represent 'good' teachers or schools, the danger is teaching becomes about those scores to remain "good" (Brookfield, 2017). Teachers have to comply to this code because to deviate and teach skills (spend time developing critique skills that aren't on tests) rather than knowledge, risks getting poor results (statistics) and being labelled a poor teacher. As I said, the long and complicated history of the education system is for another research project but until, as Biesta (no date) suggests, the purpose of the education system is clearly defined these questions will remain.

Is Epistemic Insight something that should be taught?

Billingsley et al. (2018) highlight that the National Curriculum (DfE, 2013; DfE, 2015) already mandates that this should be happening, so yes. When teaching the lesson for epistemic insight children were definitely able to participate in discussions about what different skills the different disciplines had and had begun to understand why this might be important. This is shown by the questionnaire responses, particularly question 3, where after the EI lesson the number of students that were able to suggest that science wasn't the best discipline for looking at the subjective question of if a painting was beautiful, more than doubled to over 2/3 of the responses.

During one conversation after a local authority visit, it was suggested that the 'floor books' for the foundation subjects needed to be more explicit about which subjects had been taught. This reflects the idea of the Epistemic Insight Initiative which calls for explicit teaching of the differences and similarities between disciplines (Billingsley et al., 2018; Epistemic Insight, no date). The new OFSTED framework for school inspections (OFSTED, 2019) also appears to support the need for teaching for epistemic insight. It places great emphasis on the Intent, Implementation and Impact of a school's education provision, what is being taught and why. It could be argued then that if children aren't

recognising what they are learning (which subject), then this obligation isn't being met and it should and will need to be addressed moving forward.

What impact is the teaching for Epistemic Insight, or the lack it, of having on learning?

When asked "Do you like Andy Warhol's paintings?" one student raised their hand and suggested that was the sort of question that was good for art, and not science, because it was subjective, based on their opinions and would be different for everyone. This generated a lot of agreement from the class. Taken from the vantage that the skills developed from having epistemic insight, notably understanding why one discipline would be more suited to answer a question or that different disciplines would generate different answers, are positive, I would suggest the teaching for epistemic insight lesson had a positive impact. The fact that two weeks after the lesson they were able to recall that one of the limitations of science is that it can't answer subjective questions is positive for their learning.

On the other side of the argument, it could be argued that the absence of teaching for epistemic insight has left some children without a clear understanding of the subjects they are learning, and this would be seen as detrimental. This lack of exposure means that when presented with a question students will have no reference as to how or why (a given subject) might be the best route to answering it. Also, traits such as thinking science holds all the answers, described by Billingsley et al. (2018) as 'uncritical scientism', could start to develop. This may be what is present in the responses to question 4 when both before, and after the lesson, over 50% of students thought one-day science would answer all our questions.

Reflections and the implications for my future practice?

Firstly, I had a stark awakening that I was in danger of being one of the teachers about to produce a lesson that was a "...bland broth' of weak, unspecific, vague and untransferable learning." (Roth, 2001, quoted in Barnes, 2017, p 23). Covering off subjects and relating 'across subjects' but with no actual purpose other than to say they had been covered. This has made me step back and question what I am teaching and what skills the children are learning, rather than just being exposed to.

It has awoken an awareness that for future practice I wish to be more explicit about what we are doing and why. Rather than the notion we are doing geography this afternoon because it's a Wednesday I will endeavour to start the lessons with looking at why we've chosen geography to look at the particular aspect we are looking at and not another. I believe this small change in process could have a big difference in developing an epistemic insight within the children, as it will help to understand the skills related to that specific subject, but also start to introduce the idea of looking at things from a different perspective.

The process of conducting the research project has taught me a lot about identifying limitations within my teaching and questioning what is happening in the teaching environments I am in. I think that from my observations in the study that there is a lack of teaching children skills and the reason why they are learning things. I think the introduction into my teaching of real cross-curricular learning, with specific emphasis on the skills and limitations of each discipline, would allow the children to practise identifying which skills belong to which disciplines and encourage them to think about how to go about answering different types of questions.

Regrettably, there were issues with the study that I would change if I were doing it again. Firstly, as I mentioned at the start the 'eureka' moment happened one evening and I taught the lesson for epistemic insight the next day. This was a large part of my research project and I don't feel, due to running out of time, it got the full care and attention it warranted. Being aware that the children lacked exposure to the idea of epistemic insight and then teaching a lesson looking at four different

disciplines was too much. Introducing the idea that it could be looked at by the four disciplines differently and then looking at just two in detail would have been more appropriate. Being able to look at them one at a time on different occasions would have been the most effective scenario.

When adapting the questionnaire from the Epistemic Insight Initiative (Stone, 2020) I selected the ten questions I felt appropriate. It wasn't until I came to process the data that I paid close attention to the wording of some of the questions and realised that they weren't appropriate to being answered on the Likert Scale, something prewarned by Champagne (2014, cited in Cohen, Manion & Morrison, 2018). This, along with the new subject matter for the children, won't have helped their responses.

Having completed the research and found so little evidence of multidisciplinary teaching it has left me with limited data. Whilst in itself that doesn't make it a bad research design, I do question whether, as warned by Thomas (2017), the unstructured nature had any bearing and whether different methods could have been more productive.

Finally, the ideas behind the issues within education and the history involved offered by Biesta (no date), Brookfield (2017) and Barnes (2017) (encompassing the 'Three Wise Men' report and the Cambridge Primary Review) to name a few, fascinated me. They argue, with good reason, that the lack of teaching for skills, curiosity and developing a love of learning is a consequence of the establishments drive for results above all else. I believe this has impacted the teaching I've observed, where time constraints have led to the teaching of facts and ideas before moving onto the next thing, at the expense of gaining a deep and true understanding. This awareness will allow me to be critical of how I develop my future practice.

References

Barnes, J. (2018) *Applying Cross-Curricular Approaches Creatively*. Oxon: Routledge

Biesta, G. (no date) *Good education in an age of measurement: On the need to reconnect with the question of purpose in education* Available at: https://learn.canterbury.ac.uk/bbcswebdav/pid-2275548-dt-content-rid-3463277_1/courses/E19MTETT4PRE4SRE/BIESTA-GOOD-EDUCATION-met-highlights-11.pdf (Accessed: 18 April 2020)

Billingsley, B. (2019) *The Epistemic Insight Initiative*. Available at: https://drive.google.com/file/d/1HWj6_uksp3nlt8yNqXsUGyl2h1520mu/view (Accessed: 18 April 2020)

Billingsley, B., Nassaji, M., Fraser, S. and Lawson, S. (2018) *A Framework for Teaching Epistemic Insight in Schools*. Available at: <https://doi.org/10.1007/s11165-018-9788-6> (Accessed: 18 April 2020)

Billingsley, B., Taber, K., Riga, F. and Newdick, H. (2012) *Secondary School Students' Epistemic Insight into the Relationships Between Science and Religion—A Preliminary Enquiry*. Available at: <https://doi.org/10.1007/s11165-012-9317-y> (Accessed: 18 April 2020)

Bochner, A. and Ellis, C. (2016) *Evocative Autoethnography*. New York: Routledge

Brookfield, S. (2017) *Becoming a Critically Reflective Teacher* 2nd edition. San Francisco: Jossey-Bass

Coe, B., Waring, M., Hedges, L. and Arthur, J. (2017) *Research methods & methodologies in education* 2nd edition. London: Sage

Cohen, L., Manion L and Morrison, K., (2018) *Research Methods in Education* 8th edition. Oxon: Routledge

DfE (2015) *National curriculum in England: science programmes of study*. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study> (Accessed: 18 April 2020)

- DfE (2013) *The national curriculum in England. Key stages 1 and 2 framework document*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/425601/PRIMARY_national_curriculum.pdf (Accessed: 18 April 2020)
- Dunn, M. (2013) *What is knowledge?* Available at: <https://www.theoryofknowledge.net/about/knowledge-and-knowers/what-is-knowledge/> (Accessed: 18 April 2020)
- Epistemic Insight (no date) *About Us*. Available at: http://www.epistemicinsight.com/?page_id=2 (Accessed: 18 April 2020)
- Epistemic Insight (no date) *Epistemic Insight*. Available at: <http://www.epistemicinsight.com> (Accessed: 18 April 2020)
- Henriques, G. (2013) *What is knowledge? A brief primer*. Available at: <https://www.psychologytoday.com/gb/blog/theory-knowledge/201312/what-is-knowledge-brief-primer> (Accessed: 18 April 2020)
- Macfarlane, B. (2009) *Researching with integrity. The ethics of academic enquiry*. New York: Routledge.
- OFSTED, (2011) *History for All* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/413714/History_for_all.pdf (Accessed: 18 April 2020)
- OFSTED, (2019) *The education inspection framework* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/801429/Education_inspection_framework.pdf (Accessed: 18 April 2020)
- Stone, P. (2020) E-mail to Chris Peters, 21 February.
- Thomas, G. (2016) *How to do your Case Study* 2nd edition. London: Sage
- Thomas, G. (2017) *How to do your research project. A guide for students* 3rd edition. London: Sage
- Yin, R. (2009) *Case Study Research. Design and Methods*. 4th edition. California: Sage

HOW CAN I USE THE QUESTION BOX TO ENABLE MY PUPILS TO DEVELOP EPISTEMIC INSIGHT IN HISTORY AND SCIENCE? A SMALL-SCALE CASE STUDY.

Victoria Wilkinson

Introduction

Professor Berry Billingsley from Canterbury Christ Church university and her LASAR (Learning about Science and Religion) team have adopted the idea that by using 'Big Questions' within our learning it aids to bridge the gap between, science, history, religion and the wider humanities by teaching Epistemic Insight.

Epistemic Insight (EI) is "knowledge about knowledge" (Billingsley et al. 2018) and this is the study of how children and adults can use their own epistemology to make links between the disciplines offered within the National Curriculum. *Billingsley* "found that entrenched compartmentalisation could be a barrier in schools to students' intellectual progression" (Billingsley et al. 2017). One could not be blamed for assuming that this means the epistemic insight framework is about breaking down the barriers of these disciplines to allow a new, free and unstructured curriculum; indeed, this was my first impression. I however, found upon further analysis that it seeks to keep the defined disciplines that society has spent many years and investment in refining. Epistemic insight is about giving deeper purpose to our education, getting the children to understand what it means to think like a scientist, and how this differs from a historian or theologian. Using the 'big questions' is a catalyst to enable the children to nurture their epistemological knowledge, and to understand which 'hat' they must don to explore the ideas associated within the subjects. It appears almost a backwards approach whereupon the children are presented with the objectives and then they must retrospectively decide which discipline is best required to respond. It aims to discourage rote learning and promote critical thinking. *Komal, (2016) supports this theory arguing, "The purpose of education should be an acquisition of knowledge and to enhance a student's skills rather than scoring high marks and doing well in exams. Merely memorising facts and cementing them in one's memory is not effective education."*

Much of Billingsley's research to date is implemented within secondary schools and has not been fully explored in a primary setting. Working in Key Stage 1 I can understand many may feel that the children are too young to address 'big questions'. Billingsley herself would seem to suggest that exploring the 'big questions' and even asking the children to address the disciplines involves a developed epistemological knowledge that is unlikely to have been matured yet. *Tarlowski (2018)* details that at a young age, children have not developed their own understanding, and much of what they know is influenced by their background and ontology which may be heavily weighted by their influencing grownups, not excluding teachers and educational professionals. Therefore, their inductions will be directed by ontological constraints.

My research aim as a student teacher was to understand how my practice in the classroom and approach to the curriculum could benefit a Year one class in learning how to exercise their epistemic insight. Encouraging them to think beyond the prescribed lesson objectives.

I don't believe that introducing the epistemic insight framework at an early stage to be unrealistic considering the comprehensive support of National Curriculum (2013) for mastery learning. The similarities between nurturing epistemic insight and the current push for critical thinking indicate that the two would be compatible.

Literature Review

Multi-discipline approaches

Current learning seems to focus on the process (which some could argue is also valuable to acquire a transferable toolkit of skills), but the children are offered little direction as to the purpose of learning, and what it is to achieve. Without this insight or point of reference it is entirely possible that the children will become disengaged. They may possess the “what’s the point?” attitude that is often stereotypically associated with children in education. The epistemic insight framework gives the children the opportunity to take ownership of their own learning; self-determining their own purpose and direction through observation and investigation, thus giving them more engagement in their practice. Employing epistemic insight, the children may begin to develop an understanding that education and learning doesn’t follow a solitary path along the boundaries of the prescribed discipline, moreover is an interlinked path between different disciplines combined to support the aims.

Biesta argues “The multi-dimensionality of educational purpose is precisely what makes education interesting.” (Biesta, 2012). He suggests that the function of education is split between three main domains: qualification, socialisation and subjectification (Biesta, 2010) Each domain has a relevance and importance within education and the weight on the different domains may vary between the institutions, but it is the synergy of these domains that drives the purpose of education and learning. Again, the epistemic insight framework would support the exploration of the key aspects of the domains, building on the children’s knowledge and understanding of the freedom of thought.

The combination of the concepts of Biesta and Billingsley leads me to review my own practices. Teaching practice is built upon pedagogical knowledge; many can mistake this for meaning exclusively subject knowledge, indicating that as primary teachers we must be an authority in the practice of all disciplines and have boundless knowledge of what we teach. Pedagogical knowledge however is also knowledge of teaching methods to create an effective learning environment for all children. It’s not just about what we teach, but how we teach. Teachers must be competent in the ‘delivery’ of the disciplines (Collins et al, 2007). The epistemic insight framework allows teachers, as facilitators, to change the way we model the learning, giving the opportunity for a multi-discipline approach and bridging the gap between the STEM (science, technology, engineering and mathematics) subjects.

Shulman suggests “Teachers must not only be capable of defining for students the accepted truths in a domain. They must also be able to explain why a proposition is deemed warranted, why it is worth knowing, and how it relates to other propositions, both within the discipline and without, both in theory and in practice” (Shulman, 1986). Therefore, asking the big questions allows for gaps in the teacher’s subject knowledge where their own world view invariably predominates. As a result, the teacher’s agenda influences the direction of the children’s learning. A teacher’s personal epistemologies can influence their content knowledge. Following this further, we could reason that a child as young as five or six may not have much to contribute in terms of knowledge due to their socio-economic background, and consequently may not really be ‘thinking’ and is just adapting our prior knowledge and epistemologies.

Another limitation of the use of the epistemic insight framework in Key Stage 1 is that by coining the phrase “knowledge about knowledge” Billingsley is “seeking to signpost that a strategy to promote epistemic insight is not the same as a course to teach epistemology” (Billingsley et al. 2018). Epistemic insight is using your epistemological knowledge to explore the wider disciplines. In order to explore and develop epistemic insight, the epistemology is already being established based on the individual’s ontology. It is this establishment that may be lacking in the early years and thus restricting the considerations of investigation. However, epistemic insight is a holistic approach to provide fluidity between the subject disciplines and our attitude to scholarly wisdom. The children are required to use their own world view to explore the big questions and understand the strengths and limitations of the disciplines presented to them within their educational life.

The unworldliness of a KS1 classroom may offer a stronger adaptability to self-questioning as the children are in the early stages of developing their ontology and will therefore offer a higher flexibility of thought.

I suggest that the younger the child, the better their epistemic insight may be as they have not had as many opportunities to be manipulated by their own socio-economic and educational environment and rely on their own imaginations and perceptions to make inferences.

Is the Epistemic Insight Framework accessible to Key Stage 1?

Much of the research carried out by the LASAR (Learning About Science and Religion) team is concentrated on science, religion and the wider humanities, and their workshops have been largely focused on Key Stage 2 and 3 students, so there is little literature to support the value of epistemic insight within the Key Stage 1 classroom. I therefore, propose to apply frameworks which are similar to the model Billingsley and her team is employing, to understand the relevance of epistemic insight.

Billingsley suggests that epistemic insight is introduced in early primary “by developing students’ perceptions of how to ask a question that is amenable to the materials and methods of science available to them in the classroom.” (Billingsley, 2019). Most schools now adopt a practical primary curriculum in the early stages, and the heavily supported initiative of continuous provision in Early Years Foundation Stage moving into Key Stage 1, in partnership with Bloom’s revised taxonomy (Anderson et al, 2000) offers an excellent platform to cultivate the children’s development of epistemic insight using the truths of their current schemas in a practical way.

The theory of continuous provision is not a new one. In a historical study, John Dewey (1897) endorses the idea of ‘learning by doing’. “The teacher is not in the school to impose certain ideas or to form certain habits in the child, but is there as a member of the community to select the influences which shall affect the child and to assist him in properly responding to these.....I believe, therefore, in the so-called expressive or constructive activities as the centre of correlation”. Through this thinking we are drawn as we are time and time again to the idea of teachers being facilitators and not instructors. Over time, elements of this idea of teaching have been adapted into a methodology called ‘project-based learning’.

Markham (2012, p x) describes project-based learning (PBL) as “*an extended learning process that uses inquiry and challenge to stimulate the growth and mastery of skills.*” Children draw on their own epistemology to inform their knowledge and therefore become ‘scholars’ using the practicalities of PBL to scaffold their knowledge of certain issues. This approach can help us develop our understanding of the place of epistemic insight in Key Stage 1. PBL has teachers constructing the proposed questions/issues and cultivating an atmosphere of shared responsibility in exploring the learning and understanding. PBL is however bound by the constraints of policy and pre-determined outcomes of compartmentalised subjects, whereas epistemic insight opens the curriculum to bridge the gap between the disciplines.

Another criticism of PBL, that can also apply to the epistemic insight framework, is that the successes of the individual’s learning are not measurable using standard measurement tools. Long term, we need to explore how this framework of learning will create concrete evidence for a more rounded education and masters in intelligence.

Methodology

I am excited to be adding to the growing knowledge base of epistemic insight with my small-scale case study. As I have mentioned there is not to date any studies or research carried out investigating the benefits of epistemic insight in a KS1 classroom, so I turn to other research to find examples for my methodology and to adapt the framework for my study.

Case study as a research strategy emerged as the obvious option for for me as I sought to undertake a modest scale research project based in my setting. Yin (1994, p.13) defines a case study thus:

A case study is an empirical inquiry that:

- Investigates a contemporary phenomenon within its real life context, especially when
- The boundaries between phenomenon and context are not clear. (Yin, 1994. p.13)

Thus, case studies are a valuable way of looking at the world around us. Furthermore, case studies are, as Eisenhardt (1989) points out, "Particularly well suited to new research areas or research areas for which existing theory seems inadequate. This type of work is highly complementary to incremental theory building... (1989, p.548), and is particularly useful in providing answers to 'How?' and 'Why?' questions, and in this role can be used for exploratory, descriptive or explanatory research (Rowley, 2002). Case study research is most appropriate when the participants' behaviour cannot be manipulated (Ibid.) – like in a Year 1 classroom and typically uses a variety of evidence from different sources, such as documents, artefacts, interviews and observation, that goes beyond the range of sources of evidence that might be available in more positivist approaches (Thomas, 2016).

I want to find out 'How I can use the Question Box to enable my pupils to develop epistemic insight in History and Science?', but more importantly I need to think about why this is important. The epistemic insight initiative aims to encourage "students to think about different kinds of questions, including Big Questions, from multiple disciplinary perspectives." (Billingsley, 2019b). Since Bloom (1968), questioning and mastery thinking have gradually become key elements to enhance deep understanding and engagement in the classroom. What Billingsley and her team argue however is that we use our epistemological knowledge to go further and look at the bigger picture, offer a purpose to the learning. It is not just a case of understanding the why's and wherefores, but the how's and what ifs.

My 'how' then is to make this accessible for children aged 5 and 6; where research indicates that they are in their 'Preoperational' stage of development, meaning that they struggle to grasp more than one concept at a time. (Piaget, 1970).

The Big Question

The subject I chose to address as my big epistemic insight question was "What did dinosaurs look like?" This question correlates with their current topic and is one that is still being adapted and evolved in the wider world, allowing plenty of scope for interpretation and investigation. The aforementioned question is a topic I am not familiar with so I hoped that this would limit the danger of me imposing my own ideologies. My intention was not to see how well the children answer the question, but if by using the framework the children can understand indirectly which discipline, they can draw upon to help build their epistemological knowledge. I was looking to see if the children started to ask further multi-disciplinary questions and think in a more scholarly way. Evidence has already shown with older students "Big Question(s) can stimulate and fascinate students and ignite their curiosity and interest in STEM and develop their epistemic insight" (Billingsley, 2016; Billingsley and Hardman, 2017).

What I really wanted to know from the children initially is 'What is their current ideology of what a dinosaur looks like?' My primary task was to present them with a variety of pictures of dinosaurs and animals and ask them to sort them into groups. Dinosaurs and 'not' dinosaurs. With the results from this I aimed to establish a clearer understanding of the features the children correlate with dinosaurs.

I predicted the outcome will evidence the traditional favouring of Tyrannosaurs Rex or Pterodactyl, those that have been depicted in children's films such as 'The Good Dinosaur'. Something that may compare with my own thoughts given my world view of the topic is similarly influenced by the media and on-screen adaptations.

My case study involved the children carrying out a series of pre-arranged activities to explore different methods of finding and evaluating answers to this question. Through these activities focussed on the discussion and epistemic insight presented by the children rather than a final piece of work. I am conscious however that through the structure of the study and the infancy of the children it is possible that my own epistemological knowledge and those of the other adults could limit the children's exploration, through leading or closed questions. Stephenson spent time addressing just this whilst gathering data from educational research with children. She developed 'checking questions' to ensure the child's voices were heard (Stephenson 2009b). I intended to use these questions to influence my practices both within the study and beyond to enhance my belief that children's voices both need to be heard and empowered within education. It would be impossible for a child of any age to explore their epistemological knowledge with restrictions placed upon their learning.

To capture their voices objectively, I aimed to gather my data through a transcription of video footage taken during the study, and observations within the teaching session. I needed to think about what is realistically achievable within the constraints of the study, so I gathered my data from a small focus group. I hoped that the study will harvest a flurry of questions, with the children challenging each other's beliefs. Remmel & Flavell, (2004) suggest that when teachers challenge children to think outside their level of understanding, they can acquire richer levels of knowledge. Building this challenge and extension of thought will in the long term equip them with skills to develop their epistemological understanding to tackle the more complex questions as they develop as learners.

As Billingsley (2019) argues "What is missing from this picture, however, is the development of students' understanding of how disciplines relate to one another...". In my study the children were expected to think like a historian, wearing a specified hat and then to think like a scientist with a lab coat on. These physical items should act as a reminder to the children which discipline to focus on. Research carried out by LASAR has exposed the idea that the well-established compartmentalisation of subjects in schools has led to a misunderstanding of how the disciplines interact with each other. What will be interesting to examine is whether the children are able to decipher the difference between the disciplines, or whether in Key Stage 1 the STEM subjects are interchangeable anyway as the classroom environment differ from more formal approaches.

My research approach generated a lot of evidence from different sources; video, observation of children's learning, and children's work. Data analysis of this resource is based on examining, categorising and tabulating evidence to assess whether the evidence supports or otherwise the initial propositions of the study (Rowley, 2002).

Critical Analysis and Discussion

Did the children display the knowledge to think epistemologically?

In order to establish whether the use of the 'Big Question' helped to develop epistemic insight in the children, I need to be clear how epistemic insight presents itself. Analysing my data following Geertz's Thick Description model (Geertz,1973), findings from my study show that epistemic insight appeared to be derived from two main strands, the child's current ontology and through scholarly thinking. These can then be broken down further into themes Time, Traditional Dinosaur Facts, Observation, and Questioning,

Epistemic insight branched from ontology

Throughout the study the children took the opportunity to show me multiple moments of their independent thoughts. Offering remarks such as,

"I've seen it on TV, so it must be real!"

"I saw it on Go Jetters".

In my opinion this summarises my perception of children's education. Much of what children know of the world is related to what they have viewed on screens. One could suggest their ontology stems from a very narrow field, only allowing a static way of thinking.

When modelling how we use bones to build up a skeleton of the dinosaurs, I asked the children how we could use the information we have found. One child responded with,

"Download it onto a computer".

In context, she meant research on the computer. To me this represents a lack of epistemic insight. She has the findings physically in front of her but does not have the cognitive tools to know what to do to explore further. This resonates with my understanding of Piaget's Theory of Development suggesting that children at the age of 5 and 6 years tend not to think beyond their current schemas of knowledge acquisition. (Piaget, 1970).

1.1 Time

Looking at the disciplines and thinking about which lens to look through to answer the big question; all of the children appeared to understand the concept of time. Talking of age and timescales seemed more prevalent when the children had their history hats on. As the following comment indicates, the children have a clear understanding of what history is.

"It is something that's a long time ago."

It could be interpreted however, that it was my own language that lead them to this conclusion;

"It is through the fossils that people have found many, many years ago..."

Therefore, as educators we should guard against our own influencing of epistemic thought.

It is intriguing that this theme did also present itself briefly when looking at the dinosaur's image through a scientific eye. The discussion was about the evolution of man in comparison to the evolution of dinosaurs, using the example of how bird's tails changing was evident when observing their ancestors. One child demonstrated exceptional epistemic insight when relating this to his knowledge of humans.

"We were alive like monkeys before our legs got long and we were less hairy and before our skin got this colour".

One must be careful however, not to assume that the act of evolution is scientific. It is in fact historic; the science is the knowledge of evolution. This particular child was showing clear epistemic insight between science and history.

Reflecting on Billingsley's importance on the understanding of how the disciplines relate to one another, (Billingsley, 2019b) this is evidence that in KS1 the children can subconsciously craft links between the investigations made by historians and observations marked by scientists.

1.2 Traditional Dinosaurs

As predicted, most of the children's knowledge of dinosaurs was based on the traditional Victorian view. When completing the generic opening quiz about dinosaurs, one child commented that an image

"would have scales still, like a reptile".

This theme continued throughout the study, despite the avian images presented to the children, and some of their own ontology that not all dinosaurs walk on four legs like lizards. Most of the children continue defining a dinosaur as a reptile with scales. As I will discuss later I feel the structure and complexity of the final task may have impacted on this.

Epistemic insight branched from scholarly thinking

LASAR aims to develop "teachers' and students' scholarly characters and self-esteem by enhancing their appreciation of how education, scholarship and knowledge work." (Billingsley and Ramous Arias, 2017).

"Today we're going to be scholars."

Child 1: "What's a scholar?"

Child 2: "like hunters"

Child 3: "detective"

Child 4: "might be a scientist"

Child 5: "explorer"

Child 6: "finding stuff"

The children enjoyed the idea that scholars investigate and discover. As can be seen from the dialog above, before we even began they made links to scholarly thinking being evident in both scientific and historical contexts. Without realising it, the children displayed elements of epistemological thinking based on their ontology.

2.1 Observation

Interestingly when the children were asked to define a scientist, initially they suggested they

"Made potions..."

and created

"super powers".

Once we had discussed that to 'think like a scientist' could be to make use of observation, one child picked up a magnifying glass and said

"Now I am a scientist".

This is poignant for two reasons, firstly the strong indication that my knowledge of scientists can influence the children almost immediately, but also as the children had previously been using the magnifying glasses all afternoon when 'thinking like a historian'. I would suggest that this is an indication of the divisions between the disciplines narrowing. For the latter part of the study the children were making reflections on what they observed.

"These have two beaks [dinosaur and bird] ...and this dinosaur doesn't."

However, though they could describe what they observed, I'm not sure that there was much application being made to their findings. This, was I believe partly due to the activity presented to them. They were required to compare dinosaurs and birds at a quite complex level, comparing a variety

of images involving multiple levels of analysis; a skill that perhaps entails training and should perhaps not be introduced initially for a small case study. Upon reflection I would suggest that elements of this activity were not appropriately accessible to the age group I was working with.

2.2 Questioning

“Engaging students in thinking about Big Questions from the perspectives of more than one discipline helps them to position themselves within humanity as well as the natural world.” (Billingsley and Fraser, 2018) Using the ‘Big Question’ would, I hoped spark multiple questions to establish an answer. A lot of questions were verbalised during the study, but in honesty only by myself. Before my study began the children were awash with questions;

“What’s that camera for?”

“What are the foot prints?”

“Why is there a treasure chest?”

However once the ‘big question’ was revealed the children spent most of the time celebrating their prior knowledge with statements of perceived fact.

Reflexive Analysis

I was using the ‘Big Question’ to develop epistemic insight in both history and science, however, it became quite apparent during my study that the boundaries between both disciplines in this topic are quite easily amalgamated. I wasn’t sure how to arrange my activities. I wanted the children to act like palaeontologists, however for that I couldn’t decide between a history or scientists hat. Palaeontology is an environmental **science**. However, it is a science that looks at the **history** of the earth and evolution of life. When I had made my decision I suggested the children were to think like historians, *“someone who examines and investigates.”*

This was met with a fantastic response from a child in my class who replied

“like a scientist!”

I believe, this demonstrates an understanding of how to bridge the gap and develop epistemic insight across science, and the wider humanities (Billingsley, 2018).

Thinking about my future practice, this study has highlighted the importance of questioning and observation within an educational setting. My belief is that full epistemic insight is something that could be difficult for Key Stage 1 children to comprehensively understand, but conversely the lack of questioning and inquiry shows that we should almost certainly be building this skill set for future development. By introducing more questioning, investigation and dialogic teaching we can establish an epistemic climate to allow for adaptable and interchangeable thinking. Epistemic insight is ‘knowledge about knowledge’ (Billingsley, 2018), and I believe this knowledge is acquired and developed through arbitrary acts of trial and error.

Children and educators need to move away from the disciplined, previously accepted view that to be knowledgeable is to have the answers, and engage in the concept that to be knowledgeable is to know how to expand on and examine current observations. The fear of not having the ‘correct’ answer can be suppressing. Berlack and Barnes (Tripp, 2012 p 50.) suggest that education can be ambiguous. To enable children to develop into independent scholars, teachers are required to impart an endorsed curriculum with agreed outcomes. (Wolfe and Alexander, 2008).

“Typically, in practice, students are told the question – and how to address the question – and often indeed what answer they should expect to find.” (Billingsley, 2017). In contrast, I believe children need the freedom to develop and explore the opportunity to celebrate different ideas. Failing to

find a distinct answer is not always a wrong answer. Introducing a scheme of work through an open question can expose new avenues to develop epistemic insight and in Key Stage 1 certainly allows them access to the tools to nurture this for future use and development.

References

- Anderson, L et al. (2000) A taxonomy for learning, teaching and assessing. *A revision of Bloom's Taxonomy of educational objectives*. New York: Longman.
- Biesta, G (2012) *The future of teacher education: Evidence, competence or wisdom?* RoSE - Research on Steiner Education [Online] Vol.3 (Issue 1) p 8 – 21. Available at: www.rosejournal.com [Accessed: 25th March 2020]
- Biesta, G. (2010) *Good education in an age of measurement: Ethics, politics, democracy*. Boulder, Colorado: Paradigm Publishers
- Billingsley, B. (2019) *APPG on Diversity and Inclusion in STEM*. Inquiry submission: Equity in STEM education LASAR, Canterbury Christ Church University, Canterbury, Kent [Accessed via invitation 17th February 2020]
- Billingsley, B. (2019b) *Thinking like a scientist in a multidisciplinary arena*, LASAR, Canterbury Christ Church University, Canterbury, Kent: Unpublished
- Billingsley, B. (2016) Ways to prepare future teachers to teach science in multicultural classrooms. *Cultural Studies of Science Education*, Volume 11: p. 283- 291.
- Billingsley, B. (2017) Teaching and learning about epistemic insight. *School Science Review*. Volume 98 (Issue 365) p. 59-64
- Billingsley, B., & Hardman, M. (2017). Epistemic insight: Teaching and learning about the nature of science in real-world and multidisciplinary arenas. *School Science Review*, Volume 98 (Issue 365), p. 57–58.
- Billingsley, B., & Ramos Arias, A. (2017). Epistemic insight and classrooms with permeable walls. *School Science Review*, Volume 99 (Issue 367), p. 44–53
- Billingsley, B., Fraser, S. (2018) Towards an Understanding of Epistemic Insight: The Nature of Science in Real World Contexts and a Multidisciplinary Arena. [Editorial]. *Research Science Education* [online] (Issue 48), p. 1107–1113 Available at: <https://doi.org/10.1007/s11165-018-9776-x> [Accessed: 26th March 2020]
- Billingsley, B., Nassaji, M. and Abedin, M. (2017) Entrenched compartmentalisation and students' abilities and levels of interest in science. *School Science Review*, Volume 99 (Issue 367). p. 26-31.
- Billingsley, B., Nassaji, M., Fraser, S. et al. (2018) A Framework for Teaching Epistemic Insight in Schools. *Research Science Education* [online] (Issue 48), p. 1115–1131. Available at: <https://doi.org/10.1007/s11165-018-9788-6> [Accessed: 25th March 2020]
- Bloom, B (1968) Learning for Mastery. UCLA Evaluation Comment, Chicago, Volume 1 (Issue 2).
- Dewey, D. (1897) My Pedagogic Creed, *School Journal* New York: E.L. Kellogg & Co., vol. 54 (January 1897), p. 77-80,
- Eisenhardt, K.M. (1989) "Building theories from case study research." *Academy of Management Review*, 14(4), pp.532-550. Geertz, C. (1973) *Thick Description: Toward an Interpretative Theory of Culture*. The interpretation of Cultures. New York: Basic Books, Inc. p. 3 -30.

- Komal, K. (2016), The power of Free Thinking in education, Happy Horizon Trust. *St Stephen's College*, Delhi. Available at: <https://www.happyhorizons.org/the-power-of-free-thinking-in-education/> [Accessed: 4th April 2020]
- Markham, T (2012) Project Based Learning. *Design and Coaching Guide*. California: Heart IQ Press. p. x.
- Mulder, M, Weigel, T & Collins, K (2007) The concept of competence in the development of vocational education and training in selected EU member states: a critical analysis. *The Journal of Vocational and Educational Training* [online] Volume 59 (Issue 1), P 67-88. Available at: <https://doi.org/10.1080/13636820601145630> [Accessed: 6th April 2020]
- Piaget, J (1970) *Science of education and the psychology of the child*. New York: Orion Press
- Remmel E, Flavell JH. (2004) Recent progress in cognitive developmental research: Implications for clinical practice. *Handbook of mental health interventions in children and adolescents: An integrated developmental approach*. San Francisco, CA: Jossey-Bass; 2004. p. 73–97.
- Rowley, J. (2002). Using case studies in research. *Management research news*.
- Shulman, L (1986) Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher*, [Online] Vol. 15, No. 2. (Feb., 1986), p. 4-14. Available at: <http://links.jstor.org/sici?sici=0013-189X%28198602%2915%3A2%3C4%3ATWUKGI%3E2.0.CO%3B2-X> [Accessed: 6th April 2020]
- Stephenson, A. (2009), *Skirmishes on the border: How children experienced, influenced and enacted the boundaries of curriculum in an early childhood education centre setting*. PhD thesis. New Zealand: Victoria University of Wellington, p. 99.
- Tarlowski, A (2018) Ontological Constraints in Children's Inductive Inferences: Evidence from a Comparison of Inferences Within Animals and Vehicles. *Frontiers in Psychology* [online] Volume 9 Available at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00520/full?report=reader> [Accessed: 4th April 2020]
- Thomas, G. (2015). *How to do your case study*. Sage.
- Tripp, D. (2012) Critical Incidents in Teaching, *Developing professional judgement*, Oxon: Routledge. p. 50.
- Wolfe, S. and Alexander, R (2008). *Argumentation and dialogic teaching: alternative pedagogies for a changing world*. UK Department for Children, Schools and Families' Beyond Current Horizons project, led by Futurelab.
- Yin, R.K. (1994) *Case study research: design and methods*. 2nd edition. Thousand Oaks, CA: Sage.

CAN THE APPLICATION OF THE 'DISCIPLINE WHEEL' MODEL ENRICH STUDENTS' UNDERSTANDING OF EPISTEMIC INSIGHT WHEN STUDYING THE BLACK DEATH?

Claire Stockham

Introduction

Last Autumn I visited the Royal Collections exhibition of Leonardo da Vinci's drawings. There, laid out before us, was Leonardo's 'thinking on paper'(Clayton, 2019 p11). Unconstrained by the sharp distinctions between disciplines, concepts, processes and boundaries (Hawkey, 2015) Leonardo was free to use his drawings to 'attempt to understand the infinite variety of [his] experience'.(Clayton, 2019 p11) Aristotle, Ibn Hazm, Hildegard of Bingen, all remarkable thinkers, defying compartmentalisation and attempting to make sense of their world through whatever means available. All, instinctively, showing what today we might call epistemic insight.

Epistemic insight is defined by Billingsley et al. (2018) as 'knowledge about knowledge with a focus on knowledge about disciplines and how they interact'. My interest in focusing on this area for my research stems, firstly, from my own life-long, wide-ranging interests – influenced by my father's eclectic knowledge (and book collection). In addition, I believe that synergy is possible when subjects come together, revealing a deeper sense of connectedness and understanding, a view strengthened by my experiences both as a parent and through working within a primary setting. I had few doubts then, coming into this research, that broadening our study of the Black Death to encompass scientific as well as historical approaches would deepen students' understanding, or 'interdisciplinary knowledge'. (OECD, 2018)

What seemed less clear was how the students' epistemic insight or knowledge might be enhanced. The 'discipline wheel' suggested by Billingsley and Ramos Arias (2017) is a model through which teachers may invite students to consider how different disciplines might seek to answer the same question. In a school setting with limited opportunities for inter-disciplinary collaboration and where separate buildings create physical in addition to invisible barriers, this seemed an appropriate place to start. Although cross-discipline 'power days' at the school could potentially provide a space for the exploration of 'big questions' (Billingsley et al., 2018), such days have tended to focus on fulfilling 'personal development' curriculum goals not being met in subject schemes of work. In this competitive setting, I believe that school leaders would want to see a proven 'value' before devoting time and resources to epistemic insight. That 'value', within the context of what has been described as 'neo-liberalism' in education, (Ball, 2016) might be likely impact on student outcomes, (such as that implied by a 2018 Big History Project report (Big History Project, 2018)) or specific fulfilment of inspection requirements. With a new Ofsted framework in place as of 2019, this may become easier.

When planning this research, I had no way of anticipating that I would find myself teaching the science and history of a devastating pandemic at just the moment when another – Covid-19 – was knocking on our door. The challenges of teaching what was, swiftly, to become a highly emotive and resonant subject (Wrenn and Lomas, 2007) undoubtedly impacted significantly on both students' responses and my own reflections in relation to this research.

Literature Review

How can we educate today's young people for the future? At different times, this question has, of course, elicited different responses. Today we may enthusiastically subscribe to Einstein's reported assertion that 'education is not ...the learning of many facts but the training of the mind to think' (Frank, 1953). But think what? And how? The increasing presence of AI, robotics and algorithms renders young peoples' places in a future workforce more uncertain than ever and finding the right approach to prepare our students becomes an imperative which has prompted a number of responses; Billingsley's work on epistemic insight (EI) is one. Another is the development of metacognition as a means of developing students' thinking about their own thinking (Jaleel and Premachandran, 2016) – in many ways both a desired prerequisite and microcosm of epistemic insight. It is argued that when teachers 'make aspects of learning and problem solving visible' students begin to be more aware of their own thinking processes and learning becomes more embedded and easier to transfer to different situations (Jaleel and Premachandran, 2016). It is no great leap of the imagination to see just how beneficial such thinking processes might be as a precursor to developing epistemic insight.

Billingsley has worked with a number of collaborators to explore pupils' understanding of subject disciplines, with a particular emphasis on the power and limitations of science and its interdisciplinary relationship with religion (Billingsley and Nassaji, 2017);(Billingsley, 2016); (Billingsley and Fraser, 2018);(Billingsley and Nassaji, 2020);(Billingsley, 2017); (Billingsley and Nassaji, 2019). Her work is predicated on the belief that the answers to 'the real world problems of society' will not be found in one discipline alone and that when students consider 'big questions' it trains them to think from multiple perspectives, thus creating a 'populace able to reason and make decisions in the face of complexity and uncertainty' (Billingsley and Fraser, 2018). In the midst of the Covid-19 crisis, it is difficult to argue with the intended outcome. On the issue of 'big questions' however, one could perhaps query the basis on which the questions are chosen; how, for example, can educators ensure that the choice of question is not arbitrary, politically motivated or leading? Who decides where the important curriculum overlaps occur? Could poorly chosen questions lead to confusion rather than insight?

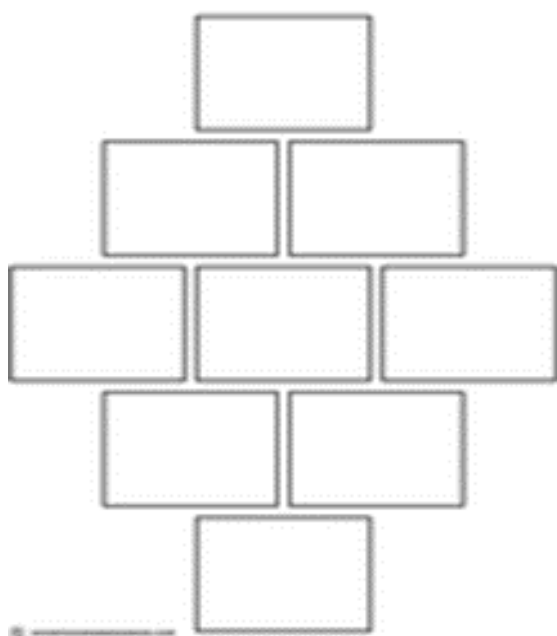
Billingsley's research suggests that science as it is reported in the media and taught in schools is leading students (and society) towards 'scientism' – an assumption that scientific thinking is the only valid way to answer our questions – something she wishes to challenge through consideration of 'big questions' (Billingsley, 2017). However, by positioning science as the invariable factor against which all other disciplines are measured, Billingsley, rather, reinforces this 'scientism'. Other disciplines (with the exception of religion) are relegated to just that – 'other disciplines'(Billingsley and Fraser, 2018); (Billingsley and Ramos Arias, 2017). If Billingsley's research hopes to level the playing field, as she perceives it, between science and other disciplines, the possibility must exist that science is not one of the disciplines under scrutiny. My own study of the Black Death, for example, could, I believe, have successfully increased students' EI through discussion of the disciplinary approaches of history, psychology, geography, RS, economics and art to the topic without reference to science at all.

One further difficulty with Billingsley's work is the relative lack of nuance in the accepted starting position for her work: that subject 'compartmentalism has become entrenched' (Billingsley and Nassaji, 2017) and 'most teachers remain reluctant to look at topics that bridge disciplines' (Billingsley, 2016). Whilst I absolutely accept that schools' timetabling restrictions, teachers' workloads and the pressures of assessment and exam results present serious barriers to real inter-disciplinary working across most schools; there is, perhaps, more willingness to consider ways of crossing subject discipline boundaries than Billingsley allows. In many cases, of course, this is very much down to individuals - something that she acknowledges in her paper on 'Secondary School teachers' perspectives on ...science and religion' (Billingsley et al., 2014). However, I doubt there is a history teacher in the country who has not discussed art as propaganda – thus employing the disciplinary skills of the art historian, or who has not encouraged students to use the inference skills they have learned in English.

It may, then, be a smaller leap than might be assumed for these teachers to explicitly name and discuss the discipline-specific approaches employed. In addition, there are signs that, perhaps, the new Ofsted framework with its emphasis on quality of education, and ‘broad, rich curriculum ... [not only] teaching to the test and exam cramming’ (Ofsted, 2019) will encourage some schools to look again at curriculum provision. Some, such as my contrast placement, are already beginning to look school-wide at when and how departments are teaching topics and skills, an initiative which, in time, could lead to more formalised collaboration. The increasingly practical and easily applicable strategies which are emerging from Billingsley’s work to help teachers bridge subject compartments will be very welcome when this becomes more commonplace (Billingsley and Ramos Arias, 2017).

Alongside Billingsley’s important work, other perspectives on inter-disciplinary teaching and learning reinforce some of the concrete benefits of EI, something which in Billingsley’s work can feel rather elusive. Jonathan Barnes argues that cross-curricular learning helps students to recognise ‘multiple viewpoints and seeks to build more knowledgeable, lasting and transferable understandings of the world around us’ (Barnes, 2015). He goes on to suggest ways that teachers might consider setting progressive objectives and assessing progress, something echoed in the Big History project’s ‘Practice Progression Placemat’ (Big History Project) which includes ‘disciplines’ as part of ‘essential thinking practices’ for each unit from ‘The Big Bang’ to ‘The Future’ with questions such as ‘Who knows what?’, ‘What do you know?’, ‘What do you ask?’. Incidentally, this worldwide project sponsored by Bill Gates is intrinsically epistemic, posing ‘big questions’ such as ‘How and why do individuals change their minds?’ and introducing students to cosmology, astrophysics, chemistry, geology, biology, conservation science, anthropology and archaeology to help them solve them. One might suppose that students engaging with this teaching may emerge with high levels of epistemic insight.

Other approaches to the question of how to educate students for the future have been influenced by the Pearson Report (2014) which identified a skills gap and called for young people to be equipped with ‘broad cognitive skills’ to solve ‘complex interdisciplinary problems’ through critical thinking, communication and collaboration and adaptability (Pearson, 2014). Little wonder then that ‘character education’ initiatives should have emerged, including Simister’s (2007) ‘intellectual character dispositions’, and influenced entire curriculum programmes such as the ‘Pre-Senior Baccalureate’ (with its identification of ‘old world’ and ‘new world’ skills) and culminated in the publication of government Character Education Framework Guidance (DfE, 2019).



Methodology

As an inexperienced researcher, aware of what I wanted to explore but indistinct about the right approaches to do so, deciding on and designing a credible methodology was particularly challenging. Specifically, the interpretivist nature of 'What happens if...?' (Cohen, Manion and Morrison, 2007) social science research felt extremely alien. Although aware of my own position - which favoured a positive response to my research question - and increasingly conscious of my own participation and influence in steering my pupils through the research (Thomas, 2010 p75-6, p110), my original design, nevertheless, determined a methodology that was relatively positivist in approach. I was interested, through my choice of a diamond 9 sorting activity and 'discipline wheel' activity in quantitative results (Thomas, 2010 p.83) through which I might examine students' thinking about disciplines before and after my inter-disciplinary teaching sequence.

The discipline wheel activity would, I hoped, give me an idea of how open (or closed) these young senior school pupils were to multiple disciplines as valuable to our particular study. The diamond 9 activity was designed around 'scholarly words' (Billingsley and Ramos Arias, 2017); (Billingsley et al., 2018) potentially common to both History and Science. Drawing on Billingsley's careful review of National Curriculum requirements for each subject and identification of 'scholarly' words (Billingsley and Ramos Arias, 2017), (Billingsley et al., 2018) such as 'enquiry', 'evidence', 'research', I was interested to see whether there were particular words which students associated more strongly with Science or History. I was careful to choose words which could be relevant to both disciplines, and hoped that any changes in trends between pre- and post- teaching might reveal something about the impact on pupils' epistemic insight.

However, even before the sudden closure of schools due to Covid-19 hampered the collection of 'post-teaching' data, it became clear to me that this data alone would not really help me answer my question. A considerable flaw in my original research design was that I had sought to find out what students thought but had not asked why. On reflection, for both the discipline wheel and diamond 9 activities, I should have asked students to explain their choices. This was not something I could easily go back and rectify; I judged that asking students to recollect the reason for their choices after the event may yield little useful data since their choices may well have been influenced by their immediate experiences on the day of data collection.

Following an action research model (Thomas, 2010 p 112-114) therefore, I recognised that I would need other more qualitative data to gauge students' responses. I therefore went back to collect relevant responses from students' writing in class; selected responses from their 'end of topic task' (a Black Death board game) and added an 'exit ticket' which asked students to state how useful they had found the scientific content of our lessons when completing their end task. However, due to time pressure, I did not have the opportunity to go back to the research in order to inform this and I wonder whether I asked the right questions and whether, again, asking students how and why they found scientific content useful would have yielded much more valuable data. Were I to plan the research again, I would draw on this experience of social science research to avoid a too narrowly positivist methodology and instead from the outset consider how a mid-way between positivist and interpretivist approach may be more appropriate to the question.

A necessary component in my methodology was co-planning the Black Death teaching sequence with a colleague from the science department. Whilst I was proactive about researching alternative perspectives on the Black Death (eg Shipman, 2014), (Willmott et al., 2020), (Antoine and Hillson, 2004) I ideally needed a science specialist to help understand how this could best be delivered to students using scientific methods. Billingsley has referred in her work; (eg Billingsley et al., 2014) to the difficulties of inter-disciplinary collaboration. I, however, found colleagues were very positive and interested in discussing collaborative planning of topics outside their 'natural' disciplinary domain. What proved far more challenging, however, was finding time and opportunity to sit down with the part-time science teacher who was keen to be involved, something further hindered by my absence at

my contrast placement school during a critical time. In the end my colleague's input was provided by email – not exactly the co-planning I had had in mind.

Similarly, unforeseen was the onset of the Covid-19 pandemic and the impact this would have on my research methodology, both in terms of practical data gathering and, more significantly, in the necessary reconsideration of ethics in the light of the analogous nature of the topic being studied.

The school closures on 20th March meant that the post-learning discipline wheel and diamond 9 activities had to be completed remotely. This highlighted the challenge of conducting remotely research that had been designed to be done face to face. The data set returned was significantly smaller than it would have been had it been conducted in class and in some cases was not completed according to instructions, making it difficult to compare with pre-learning data and draw conclusions.

In addition, as the sequence proceeded and fears about coronavirus increased, I was faced with a decision: to continue teaching a progressively emotive and sensitive topic but with additional safeguards or cease teaching the sequence altogether due to the potential for harm. At the planning stage, I had identified that discussing death and disease may have a negative emotional impact and therefore had made it clear to students that if they were uncomfortable they could withdraw themselves through the school's existing student support arrangements. This, of course, became potentially more likely as the death toll from Covid-19 first from China then Italy began to emerge. Turning to the literature for advice in how to proceed, I found little that was directly relevant; research seemed to focus either on teaching sensitive pastoral issues such as sexual exploitation or drugs, or on supporting students in the aftermath of a disaster (eg Regan, 2013). Even the Historical Association's guidelines on teaching emotive and controversial history (Historical Association, 2007), whilst acknowledging that some issues in history are 'emotive and controversial because they ... have ... contemporary significance or personal resonance' (Historical Association, 2007) define emotive and controversial history as 'where there is actual or perceived unfairness to people by another individual or group in the past' (Historical Association, 2007) – a definition which did not apply in these circumstances. Drawing, however, on the principle that emotive subjects should not be avoided even when 'certain history appears only too emotive ... because of the way it resonates' (Wrenn and Lomas, 2007) and confident that the robust enquiry of the sequence would avoid unhelpful comparisons, I continued to teach, albeit with renewed emphasis in class on arrangements for student withdrawal, amendments to lesson content and heightened alertness to any signs of emotional harm.

Critical Analysis and Discussion

Data discussed in this section comprises: responses to 'discipline wheel' activity; responses to 'diamond 9' activity; exit ticket responses; selected student writing; selected work from student board games.

According to the 'discipline wheel' data, teaching did little to change students' opinions about which subjects could help with answering the key question 'How deadly was the Black Death?'. We must, of course, consider that far fewer responses to the activity were received post-teaching. However, both pre- and post-teaching, most students chose 3 or 4 subjects with which to answer the question and these were most likely to include science, history and geography. This might be explained in several ways; in advising students about my research I had told them that I was interested in how different subjects could work together – they were primed then to assume that the 'right answer' was going to include multiple subjects (as girls in a selective environment, getting the 'right' answer and pleasing their teacher is important to many of them).

Furthermore, it is possible that these Year 7 students' choice of 3-4 subjects reflects the residual influence of primary school cross-disciplinary experiences. The choice of geography, alongside history and science, as the subject most likely to help perhaps also suggests that these young senior school students continue to group together 'humanities' as a result of how 'topics' are taught at primary schools. That so many chose science possibly reinforces Billingsley's belief in 'scientism' (Billingsley,

2017); when faced with a question, the number of students who believed that science could help them almost matched those who thought history could, despite the fact that they were in a history classroom, being taught by their history teacher.

In a small but possibly significant change between pre- and post-teaching data (and here, too, we must consider that fewer than half the number of post-teaching responses were received), following the teaching sequence more students than previously chose 8-10 subjects (10 representing the maximum). Perhaps we might infer that some students' awareness of the potential of different disciplines to contribute to a study may have been awakened as a result of the teaching.

Data from the diamond 9 sorting activity showed very definite differences in the words which students associate with Science and History and again, there were not significant differences in the data before and after teaching. For example, 'investigate' and 'research' remained in the top three most commonly chosen science words before and after, and similarly 'evidence' remained the word most strongly associated with history. Again, the data could support Billingsley's ideas about 'scientism' (Billingsley, 2017); one of the biggest differentials between subjects was around the word 'debate' which students associated strongly with history and much less so with science. Similarly, students' responses suggested that they considered, both before and after teaching, that history, but not science, was a discipline associated with 'interpretation'.

By contrast, the associated words which showed the smallest differential between science and history were 'complex' (both before and after teaching), 'balance', 'ideas' and 'proof' – where post-teaching responses did show a smaller differential than previously. Here, perhaps, might be a starting point to build on, and armed with some knowledge about students' associations we could begin to identify, for example, opportunities to point out to students that science too is a subject involving interpretations and debate and that history also involves investigation. We should, however, be cautious about extrapolating too much from this data; an analysis of a small sample of individual student's 'before' and 'after' responses proved inconclusive. One student had the same number of science and history words in common before and after teaching; one had fewer and two had more. This is certainly not enough to suggest that these latter two students' understanding of epistemic insight had been deepened; the lack of supporting qualitative data which might have explained their choices means that we might attribute the change just as much to young students answering differently because it was a different day as we can to awakened disciplinary knowledge.

Students' responses to the 'exit ticket' predictably suggested that they had found the scientific content of our lessons helpful in devising their 'end task' Black Death board game. I refer again to students' willingness to please and give the 'correct' answer – especially relevant here, since the students who returned these exit tickets did so electronically following the school closures, and so were more likely to be diligent students. However, it was undoubtedly the case that in some instances the influence of scientific content was evident both in students' written work and their board games.

In their written work, some students referred to the 'bubonic' and 'pneumonic' plague experiment which we undertook in class whereby the fleas carrying bubonic plague were represented by balls of paper thrown around the class and pneumonic plague by bubbles which, since they were 'droplets' in the air, were much harder to avoid. This teaching technique, drawn from the discipline of science, was apparently memorable enough to help embed in some students' minds the key difference between directly transmitted and airborne diseases. Without the EI focus, the terms 'bubonic' and 'pneumonic' might have been introduced into a history lesson as 'two types of black death' – but for some students the inclusion of this experiment resulted in a much deeper understanding of how the disease spread and, ultimately, why it was so deadly. This was also borne out by exit ticket responses to the question 'what was the most surprising thing you learned in this topic?' with several referencing 'pneumonic plague' and 'airborne diseases' even though the experiment had taken place some weeks prior to this. These terms were also used accurately in several students' board games for example 'Your disease is *thankfully* bubonic – go to hospital' (my italics).

Other students' work showed that they had responded to scientific content regarding climate change and understood the recent scientific work which has cast doubt on the pre-eminent role of rats in spreading the disease. It seems possible then to infer then that for at least some students the work that went into co-planning a lesson sequence with an inter-disciplinary focus paid off in terms of enriched understanding of the topic. However, it should be noted that the number of students' work who did demonstrate this understanding was relatively small as a proportion of the whole cohort and it is less clear that students' specific epistemic insight was itself enhanced.

Interestingly, answers to the exit ticket question 'What would you like to find out more about? Which subject could help?' were revealing in a rather different way and suggested strongly the influence of Covid-19 on students' thinking: students' questions included 'how did they cope with it?'; 'would they have to move out from a family who had the disease or would they have to stay?'; 'what was children's point of view of the Black Death?'; 'how did people feel and act after the Black Death had reduced?'; 'what about the aftermath and how much the world changed?' suggested the preoccupations of their own times. This was borne out too in a few notable instances in their board games: phrases such as 'quarantine', 'fit to work' and 'you isolated yourself' – not terms discussed within lessons – found their way into students' work, along with a lurid green representation of a virus. Clearly, despite my best attempts, I had not yet successfully explained the difference between bacterial and viral infection. However, I believe that widening out our studies to include scientific content was beneficial both in allowing students to see connections and, crucially, differences between the Black Death pandemic and the coronavirus outbreak and also in equipping me, as a history teacher, with enough scientific understanding and knowledge to be able to support students and to debunk the more outlandish and alarmist theories which began to emerge around this time.

Reflexive Analysis

When one student asked me on the day before schools closed due to Covid-19, whether people in hundreds of years would be learning about coronavirus, and responded to my affirmative reply with "Cool! We're going to be famous" I felt reassured that, despite some anxieties, I had managed to navigate a course through the tricky waters of a suddenly very relevant and resonant historical topic to provide the right level of support in the classroom. The particular timing and experience of this research project has, ultimately, been invaluable in preparing me for teaching sensitive and emotive subjects in the future, both within the history classroom and as a form tutor – an outcome I certainly did not anticipate when embarking on this research.

As a practitioner, I will continue to be interested in seeking opportunities to incorporate some of Billingsley's 'permeable walls' strategies (Billingsley and Ramos Arias, 2017) into my teaching, confident that the research I have undertaken suggests tangible benefits can come from focusing on epistemic insight. I will do so with a clearer understanding of the attitudes of students and a heightened awareness of the need to ask the right questions and apply the appropriate methods in order to elicit a quality response – helpful not only for future research but for teaching too. I will also be interested in the future in exploring opportunities for 'Big History' (Hawkey, 2015);(Spier, 2012)(Big History Project) as a possible springboard to blurring subject boundaries and preparing students for the world who believe, as I do, in Leonardo da Vinci's recipe for a complete mind: 'Study the science of art; study the art of science ... Realise that everything connects to everything else'.

References

- Antoine, D. and Hillson, S. (2004) 'Famine, the Black Death, and health in fourteenth-century London'
- Ball, S. J. (2016) 'Neoliberal education? Confronting the slouching beast', *Policy Futures in Education*, 14(8), pp. 1046–1059
- Barnes, J. (2015) 'An Introduction to Cross-Curricular Learning.', in Driscoll, Lambirth, and Roden (eds) *The Creative Primary Curriculum*. 2nd edn.
- Big History Project (2018) Summary of Big History Project. Available at: www.school.bighistoryproject.com.
- Big History Project* www.bighistoryproject.com.
- Big History Project *Practice Progressions Placemat*. Available at: www.school.bighistoryproject.com.
- Billingsley, B. et al. (2014) 'Secondary school teachers' perspectives on teaching about topics that bridge science and religion', *Curriculum Journal*.
- Billingsley, B. (2017) 'Teaching and learning about epistemic insight', *School science review*.
- Billingsley, B. et al. (2018) 'A Framework for Teaching Epistemic Insight in Schools', *Research in Science Education*
- Billingsley, B. and Fraser, S. (2018) 'Towards an Understanding of Epistemic Insight: the Nature of Science in Real World Contexts and a Multidisciplinary Arena. [Editorial]', *Research in Science Education*.
- Billingsley, B. N. M. C. A. and C. K. (2016) *Forty years of science and religion : looking back, looking forward*. Edited by L. Spurway, Neil and Hickman. Cambridge Scholars Publishing p196-203
- Billingsley, B. and Nassaji, M. (2017) 'Ways to develop students' appreciation of the power and limitations of science', in Straine, G. K. (ed.) *Are there limits to science?*, p. 154-165
- Billingsley, B. and Nassaji, M. (2019) 'Exploring Secondary School Students' Stances on the Predictive and Explanatory Power of Science', *Science and Education*.
- Billingsley, B. and Nassaji, M. (2020) 'Perceptions of the relationships between science and religion held by upper-secondary school students in Church of England schools', *International Journal of Christianity and Education*.
- Billingsley, B. and Ramos Arias, A. (2017) 'Epistemic insight and Classrooms with Permeable Walls', *School science review*.
- Clayton, M. (2019) *Leonardo da Vinci: A Life in Drawing*. Royal Collection Trust.
- Cohen, L., Manion, L. and Morrison, K. (2007) 'Research Methods in Education. Sixth Edition - by Louis Cohen, Lawrence Manion and Keith Morrison', *British Journal of Educational Studies*.
- DfE (2019) 'Character Education Framework Guidance', Department for Education, (November), pp. 1–28.
- Frank, P. (1953) *Einstein: His Life and Times translated by George Rosen*. Knopf Doubleday Publishing.
- Hawkey, K. (2015) 'Moving forward , looking back – historical perspective , " Big History " and the return of the longue durée: time to develop our scale hopping muscles.', *Teaching History*, 158(March), pp. 40–46.
- Historical Association (2007) 'Teaching Emotive and Controversial History 3-19', p. 48.
- Jaleel, S. and Premachandran, P. (2016) 'A Study on the Metacognitive Awareness of Secondary School Students', *Universal Journal of Educational Research*, 4(1), pp. 165–172. doi: 10.13189/ujer.2016.040121.

- OECD (2018) *Knowledge for 2030 Conceptual Learning Framework*.
- Ofsted (2019) *Education inspection framework 2019: a report on the responses to the consultation* - GOV.UK. Available at: <https://www.gov.uk/government/consultations/education-inspection-framework-2019-inspecting-the-substance-of-education/outcome/education-inspection-framework-2019-a-report-on-the-responses-to-the-consultation>
- Pearson (2014) *Making Education Work A report from an Independent Advisory Group chaired by Professor Sir Roy Anderson*. Available at: www.pearson.com
- Regan, M. F. (2013) 'A False Sense of Security: Managing the Aftermath of a Crisis', *School Administrator*, 9(70), pp. 26–29.
- Shipman, P. (2014) 'The Bright Side of the Black Death', *American Scientist*, 102, p. 410.
- Simister, C. (2007) *What does it mean to be Future-Smart?®*. Available at: <http://www.cjsimister.com/FutureSmart/Future-Smart.html>
- Spier, F. (2012) 'Polychronicon: Interpreting the history of Big History', (March), pp. 50–51.
- Thomas, G. (2010) *How to do your Research Project*. SAGE publications
- Willmott, H. et al. (2020) 'A Black Death mass grave at Thornton Abbey: the discovery and examination of a fourteenth-century rural catastrophe', *Antiquity*
- Wrenn, A. and Lomas, T. (2007) 'Music, blood and terror: making emotive and controversial history matter', *Teaching History*, 127(June), pp. 4–12.

LESSONS FROM HISTORY FOR THE SCIENCE STUDENT: DOES APPLYING HISTORICAL SOURCE ANALYSIS TO SCIENTIFIC WRITING PROMOTE THE INTERDISCIPLINARY INTERACTION OF WAYS OF KNOWING?

Stewart Spaul

Introduction

During a five-week period of term 3 (January and early February 2020) in my teaching practice, I carried out a research project to investigate whether applying historical source analysis to scientific writing would promote the interdisciplinary interaction of ways of knowing.

The setting for the research was a Year 12 A-level biology class in a selective secondary school, in a county in which selection at age 11 is operated. I was teaching there for my contrasting placement, and it contrasted with my base school, which was non-selective and admitted both boys and girls. Although the selective school in which I carried out the research admitted only boys from 11 to 16, both boys and girls were admitted to the sixth form. The participants in my research project were eight Year 12 pupils, of whom all but one were male.

The research question was chosen because I had become interested in epistemic insight, defined as “knowledge about knowledge with a focus on knowledge about disciplines and how they interact” (Billingsley et al., 2018) and was curious about how I might incorporate it into my practice as a science teacher.

The way that science tends to be taught in schools, in which there is a culture of “entrenched subject compartmentalisation” (Billingsley et al., 2018: 1119), may militate against pupils’ curiosity, excitement, and asking of questions as part of their engagement with science; the focus on core subject knowledge in the science classroom provides little scope for understanding science in wider contexts (Whitty et al., 1994) and its interaction with other disciplines (Billingsley et al., 2018).

As a discipline, history shares similarities with science (Billingsley et al., 2018). On that basis, I devised a research project in which participants were asked to read and analyse scientific literature firstly as a scientist would, and then as a historian would. Two separate scientific journal articles were selected for this purpose; both were about cystic fibrosis, a topic that the participants had already studied.

Data was collected in the form of participants’ analyses, as well as a survey that was distributed after the analyses were collected. Eight participants each provided two analyses, which constituted data to which grounded theory was applied (Auerbach and Silverstein, 2003) so as to generate codes, categories and an overarching theme. Five participants returned surveys.

In critically appraising existing literature, and devising, implementing and communicating the findings of my project – as well as critically analysing those findings – I am following a framework (Stone and Billingsley, 2019) that provides for the development of professional judgement and practice as a teacher. How this research informs such development is discussed in a reflexive analysis.

Literature review

Science is a core subject in the National Curriculum, which must be taught in “maintained schools in England...to pupils aged approximately 5 to 16 years old” (Roberts, 2019: 3). The science programmes of study set out what should be taught, and how it should be taught, throughout key stages 1 to 4, and GCE Advanced Level (DfE 2013a, 2013b, 2014a, 2014b). The development of “scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics” (DfE 2013a: 3, 2013b: 2, 2014a: 2) and “understanding of the nature, processes and methods of science” (DfE 2013a: 3, 2013b: 2, 2014a: 2) are fundamental throughout key stages 1-4.

At GCE AS and A-level, although the aforementioned specific disciplines may be studied separately, and psychology is added to the science curriculum, the fact that content for science subjects “must build on the skills, knowledge and understanding set out” (DfE 2014b: 3) at key stage 4 implies that these core principles underpin the study of science throughout and beyond compulsory science education.

Children begin studying science at Key Stage 1 by “experien[ing] and observ[ing] phenomena” (DfE 2013a: 5) before, at lower Key stage 2, “broaden[ing] their scientific view of the world around them” (DfE 2013a: 13) and, at upper Key Stage 2, “develop[ing] a deeper understanding of a wide range of scientific ideas” (DfE 2013a: 24). The Key Stage 3 curriculum “enables pupils to develop a deeper understanding of a range of scientific ideas in the subject disciplines” (DfE 2013b: 2), a focus that is continued through key stage 4 (DfE 2014a) and, as noted earlier, GCE AS and A-level (DfE 2014b).

That pupils study science by making observations and developing curiosity during their study of science is expected at primary and lower secondary school (DfE 2013a, 2013b); that their excitement about science be encouraged is expected at Key Stages 1 and 2 (DfE 2013a); that they ask questions is expected throughout Key Stages 1 to 4 (DfE 2013a, 2013b, 2014a). But does the reality of science teaching in the classroom match the principal foci and expectations of the National Curriculum?

From its inception in 1988, the National Curriculum was intended to prepare children for “adult life” by allowing for a range of “cross-curricular themes” (Whitty et al., 1994: 26) to be explored. However, exploring such themes as part of classroom teaching was militated against by the subject-based nature of both the National Curriculum itself and the approach employed in schools, with science teachers in particular being reluctant to address material deemed unrelated to the subject (Whitty et al., 1994). One result of such an approach on pupils is the dismissal of connections between core subject material and its applications, one example being that of a Year 10 pupil in a science lesson dismissing a connection between core subject material and an everyday health issue (Whitty et al., 1994: 33-34).

Year 10 pupils study the Key Stage 4 science syllabus, which prepares them for their GCSE examinations, and, being 14-15 years old, are in the “upper secondary” (Billingsley et al., 2018: 1111) age range, when they have experienced science having been taught both separately from other subjects - “entrenched subject compartmentalisation” (Billingsley et al., 2018: 1119) and in the form of discrete topics - “teaching science via fragmented topics” (Billingsley et al., 2018:1119)). These approaches constitute “pressures and barriers” (Billingsley et al., 2018: 1119) to students’ developing epistemic insight into the relationship between science and other disciplines, and result in their adopting a stance of “uncritical scientism” (Billingsley et al., 2018: 1120), in which “forms and sources of knowledge, evidence, enquiry, or reason” (Billingsley et al. 2018: 1120), unless scientific, are dismissed, which runs counter to the idea of pupils “appreciating the power and limitations of science and considering ethical issues which may arise” (DfE, 2014a).

In planning and teaching lessons that meet the Teachers’ Standards (DfE, 2011), then, it could be argued that the student teacher grapples with a particular problem: fulfilling the objectives of the National Curriculum in a setting that militates against their fulfilment. Might such barriers as those identified by Billingsley et al. (2018) be overcome by bringing in ways of knowing from another discipline? That is a more general version of this essay’s titular question.

As disciplines, history and science “share scholarly aims” (Billingsley et al., 2018). In summary, throughout key stages 1 to 3, and then at GCSE and GCE AS and A-level, the study of history is concerned with analysing evidence and making judgements (DfE, 2013c & d, 2014c & d), approaches that run parallel to that of observing phenomena and being able to explain them scientifically. Indeed, both disciplines address cause and effect, and are concerned with the presence of evidence (DfE, 2013a, b, c & d; 2014a, b, c & d). In GCSE science, trends are identified in order to aid interpretation (DfE, 2014a) and in GCSE history, they are analysed to aid understanding (DfE, 2014c); criticality is applied to thinking and investigating in history (DfE, 2014c), and analysis in science (DfE, 2014a).

At key stages 1 to 3 in both disciplines, pupils’ curiosity is embedded in the purpose of study and the idea of asking questions is fundamental (DfE, 2013a,b, c & d). During these first three key stages, the study of both science and history is compulsory (Roberts, 2019), so even those upper secondary level pupils who have chosen not to continue studying history should at least have a grounding in the discipline’s principles.

Notwithstanding these disciplinary parallels, some questions arise. Firstly, would the barriers to epistemic insight and consequent uncritical scientific tendency in students identified by Billingsley et al. (2018) make it difficult for pupils to evaluate scientific subject material in the way that a historian would? Secondly, would the degree of distance between disciplines affect the extent of barriers and depth of scientism – in other words, might a pupil who did not choose history at GCSE but intended to continue studying science beyond GCSE be more scientific than a pupil who chose to study history at GCSE and intended to continue studying both a science subject and history beyond GCSE level? Thirdly, would evaluating scientific subject material using an approach from history teaching identify and overcome barriers and/or scientism, even though such an exercise might be unusual in a subject-based culture, and deemed pointless by someone holding a scientific stance? This set of questions forms the overarching titular question, and thereby the basis of the research I carried out.

Methodology

To investigate my research question, it was necessary to carry out school-based research, an approach practised by Billingsley et al. (2018) and Whitty et al. (1994). Such a setting would necessarily involve children, and therefore consideration as to their role in the research was vital. In the case of this research, it would not be possible for participants to be fully “active participants” (Alderson, 2005:3), or researchers, which would involve their devising and directing the research project (Kellett, 2005). Since the aim of this project is the improvement of my practice as a teacher, it was, arguably, necessary for me to direct the project, even though young people were to be involved in the collection of the data necessary for the project’s aim to be realised. Participants might therefore be best described as “aware subjects” (Alderson, 2005:3), in that, notwithstanding my directing the research, they were informed about what would happen, and consented to participate.

The research was carried out in accordance with “Ethical Procedures for the Conduct of Research Involving Human Participants” (Canterbury Christ Church University, 2007), sections 4 and 5 of which I read before submitting an ethics form (see Appendix 6) that addressed all aspects set out in section 5, demonstrating that the research would be valuable to my teaching practice and the pupils’ learning; describing the research design (described in detail in the following paragraph); and demonstrating that informed consent conditions were fulfilled (as discussed in the previous paragraph). Regarding point 5.4, it was necessary to withhold my hypothesis (provided below) initially, so as not to influence the way in which participants approached the task. However, the hypothesis was provided to the participants in the debriefing information.

The research carried out might be best characterised as mixed methods, a paradigm that draws on methodological elements from both qualitative and quantitative research (Johnson and Onwuegbuzie, 2004). In designing my case study, I had formed a hypothesis to be tested and devised a survey, both

of which are approaches associated with the quantitative paradigm (Holliday, 2007). However, much of the research was qualitative, in that it utilized a bounded setting, and I chose to carry out the research because of my interest in epistemic insight beyond the narrow confines of the hypothesis; furthermore, I expected that participants' responses in the analysis exercises and open-ended questions on the survey would yield unanticipated themes, the interpretation of which might not lead to firm conclusions (Holliday, 2007).

My hypothesis was that upper secondary students of science would be likely to have adopted an uncritically scientific stance and would experience difficulty in applying another discipline's ways of knowing (Billingsley et al., 2018).

A particularly fruitful set of conditions under which to test my hypothesis presented itself in my contrasting placement, in as much as I was assigned a Year 12 biology class. This is beyond the "upper secondary" age (Billingsley et al., 2018) so the pupils would have chosen to continue studying science beyond key stage 4; they might therefore be even more likely to have adopted an uncritically scientific stance (Billingsley et al., 2018).

Upon my commencing the placement, the group were completing a topic entitled "Genes and Health", during which they had studied cystic fibrosis; as part of this, they were expected to "be able to identify and discuss the social and ethical issues related to genetic screening from a range of ethical viewpoints" (Pearson, 2018: 11). As part of their examination the following year (Year 13), they would be supplied with a scientific article to read – for example, the 2017 Paper 3 involved reading "The Energy of Life" (Marlow and Amend, 2015) – in advance of being examined on it.

In bringing ways of knowing associated with history into the science lessons that I taught, the pupils would need to know that a historical source analysis framework was to be used but also be unaware of my hypothesis, in case it influenced how they approached the task. To test my hypothesis and allow for richer data – in the form of written responses – to be collected, participants were to be provided with reading material and asked to analyse it under test conditions using a scientific analysis framework (based on Gatsby Technical Education Products, 2008) and, subsequently, a historical source analysis framework NACHOS which breaks the source down into the different sections, with appropriate sentence starters to ensure that students are looking at the whole source (CBHistory2015, 2018). Two journal articles were sourced for this purpose, one to be used for each of the analyses. Both were about cystic fibrosis and were similar in length (Brown and Flume, 2018; Foil et al., 2019).

Participants were provided with written information about the project and a consent form to be signed and returned. Per examination procedure, participants were provided with a copy of the first of the two journal articles (Brown and Flume, 2018) and instructed to read and annotate it during private study. They were informed that, in the subsequent lesson, they would be answering questions on the article, and would be provided with a fresh copy of the article for reference (in the real examination, they would also not be permitted to use their annotated copy).

For the "examination", participants were given 30 minutes to analyse the paper in terms of its scientific reliability using the scientific analysis framework. Upon completion, participants were provided with the second article (Foil et al., 2019) and the same procedure was repeated but this time, with the historical source analysis framework. Following this, participants were provided with a survey to record their experiences of the activity. It featured questions about the students' prior experiences of studying science and history, and offered them the opportunity to write more detailed responses.

This process yielded data in the form of written responses. While there were some questions from the survey that involved ticking a box (e.g. yes or no) or providing the name of a subject studied, the majority of the data was qualitative. Using a grounded theory approach (Auerbach and Silverstein, 2003), the data was read and coded, and from the codes assigned, it was possible to identify categories and an overarching theme.

Critical Analysis and Discussion

The overarching theme that emerged from participants' analyses using both the scientific and historical frameworks was "scientific and nonscientific stances" (Billingsley and Nassaji, 2019: 97), which may be divided into three categories and 12 codes, as in table 1 below.

Theme	Category	Code	Code Description
Scientific and nonscientific stances	Reliability	AC	Author Credentials
		PC	Publication Credentials
		QR	Quantity and quality of references
		SD	Sufficiency of data (quantitative and qualitative)
		PR	Peer Review
	Limitations	AS	Author's acknowledgement of shortcomings/limitations
		BB	Bias vs Balance
		ET	Ethics addressed or not
		FE	Patient effect addressed or not
	Characteristics of article	US	Useful to the reader, whether scientist or not
		LE	Length of article
		PE	Persuasive writing

Table 1 – Theme, categories and codes

The number of occurrences of statements, phrases or references in participants' analyses (1 and 2) that were assigned the above codes. Most code assignments in an analysis were single (observed 41 times). The same code being assigned twice in the same analysis occurred 15 times; three code assignments occurred four times; and four code assignments, only once.

Reliability

The code "author credentials" is in this category. It was the second highest frequency code, being assigned 14 times in total: nine in paper 1 and five in paper 2.

The participants tended to hold the view that the authors' characteristics, such as the nature of the work they do, or the fact that they work at a university, indicated that the paper was a reliable source. This point of view, repeatedly demonstrated in both analyses, may be characterised as an appeal to authority, which is fallacious (Sadler, 2006), but might not necessarily indicate that a scientific stance is being taken, because it is possible that the same fallacy might present itself in other subjects.

"Sufficiency of data" is also in this category, and was the third highest frequency code, being assigned 13 times in total: 10 in analysis 1 and three in analysis 2.

Several participants considered the data sufficient for the paper's findings to be reliable, but some considered the sample size too small, with one participant noting that this might lead to bias, and another stating that a larger sample size would increase reliability. In analysis 2, limitations were noted in terms of omission of data (again, linked to bias) and different professionals having different ways of working with patients. Sadler (2006) notes the lack of emphasis on the conceptualisation, collection and interpretation of data in the classroom, so sufficiency of data being viewed merely in terms of quantity is not surprising; the addressing of data-related issues beyond sample size might be indicative of epistemic insight.

Limitations

This category covers codes assigned to phrases or statements that referred to potentially limiting aspects of the studies that the participants were analysing. “Bias vs balance”, a code in this category, was the most-assigned code across both analyses: 21 times in total (12 in analysis 1, in which it was also the highest frequency code, and nine times in analysis 2, in which it was ranked second). It was also the only code to be assigned four times to one participant (in analysis 2), who considered that the article’s contents lacked neutrality, the benefits of a particular treatment were overstated, and the results were potentially skewed – but also noted that other forms of genetic therapy were available, and some issues were addressed. There were further statements from other participants addressing both bias and balance throughout the two analyses. Such considerations may be a strong indication of epistemic insight, since, in scientific research, bias, in various forms, including in relation to how results are communicated, is problematic (Wilholt, 2008).

Ethics-related statements occurred only four times: twice for each analysis, with one participant accounting for an occurrence each time. This seemed surprising, since the participants had recently covered cystic fibrosis and were supposed to address ethical considerations as part of the topic. However, it might be surmised that they considered the presence of bias towards a particular treatment unethical, and in addressing that, they had addressed ethical issues.

Participants’ mentions of the presence or absence of authors’ acknowledgement of limitations within the study occurred three times (once each for three different participants) in analysis one but not at all in analysis 2. This finding is included because I would have expected the presence or absence of such acknowledgement by the authors to be more noticeable when using a historical source analysis framework. That it did occur when using a science-based analysis framework, however, might indicate epistemic insight in the form of an appreciation of the “power and limitations of science” (Billingsley and Nassaji, 2019: 87).

Characteristics of article

This category covers statements assigned the code “usefulness to the reader, whether scientist or not” – statements concerning whether an article’s findings were of significant importance, for example, or how long ago the article had been published. Assigned only once in analysis 1 but 11 times in analysis 2, this code was the one with the largest difference between frequencies per analysis. This could demonstrate that consideration is being given to scientific research in a wider context, which may be indicative of epistemically insightful thinking (Billingsley et al., 2018).

“Length of article” and “persuasive writing” were assigned once each to different participants, in analysis 2. These particular codes were assigned because they related to aspects that could be considered to demonstrate judgement being made about elements beyond the core features of the article. Length might be seen as an accessibility issue; an assessment of writing as “persuasive” is something that could be viewed as epistemically insightful, because the development of judgement is part of the purpose of studying history (Department for Education, 2013d, 2014c).

Survey responses

Of the five participants who returned surveys four were studying another A-level science subject (three were studying chemistry and one, psychology) in addition to biology, and all had studied Triple Science at GCSE, thereby gaining separate grades for biology, chemistry and physics. However, three of the participants had also chosen to study history at GCSE, with one participant attaining grade 8 and two attaining grade 6, which suggests that they were able to demonstrate an understanding of the discipline’s ways of thinking and knowing. However, although one participant had previously applied exam technique from geography in biology, no participants had ever used a historical source analysis approach in a science lesson before.

This may indicate that these participants have largely experienced a culture of entrenched subject compartmentalisation, which may have contributed to their adopting an uncritically scientific stance (Billingsley et al., 2018). On whether a historian's ways of thinking are as valid as a scientist's ways of thinking and knowing, only one participant – who, incidentally, had not studied history beyond key stage 3 – agreed explicitly:

“I think so. Both ways have valid points and reasoning, as shown by the project I participated in”

Apart from one qualified response (“Yes, however, scientists are more valid sometimes and there is more evidence”), the rest disagreed, with one participant mentioning that, unlike a scientist, a historian “may have to believe things that are not 100 per cent fact” and another stating that “a scientist knows why and how diseases and infections spread and what causes them”. While these responses, in denying the validity of a historian's ways of thinking and knowing, demonstrate a scientific stance, that stance has been elicited by direct questioning. Might a different stance be demonstrated in an exercise such as analysing articles, as was employed in this research? Billingsley and Nassaji (2019) note that someone might say something that differs from their true belief, or they might accept a scientific explanation but prefer an alternative view for their own purposes – so when looking at the results of this research, it should be kept in mind that someone's true stance might not necessarily be clear.

In contrast with Billingsley and Nassaji's (2019) use of statements, my research methodology involved using frameworks to prompt participants to analyse articles. However, Billingsley and Nassaji (2019) found that scientific statements elicited stances more effectively than nonscientific statements. A parallel might be drawn between that and my findings, in that there were 10 references to the sufficiency of data (mentioned at least once by all but one participant) when using the science framework, but only three such references when using the history framework.

Reflexive analysis

While survey responses might not be the most reliable indicator of pupils' stances, and considering participants' analyses alone does not render it possible to determine the level of difficulty that pupils might experience in applying a different discipline's ways of knowing in the science classroom, it is my view that my research demonstrates that an interdisciplinary approach may be valuable in assisting pupils to appreciate the “relevance, power and limitations” (Billingsley, 2017: 62) of science – and that such an approach is one to which pupils are more likely than not to be agreeable (Billingsley, 2017).

Applying a historical source analysis framework to a science journal article is suitable for Year 12 pupils, who would be expected to read and understand such an article in preparation for being examined on it. However, the method might need to be modified for different age groups and ability levels, to ensure that teachers' standard 5 is met (DfE, 2011). For example, extracts from news reports on a science-related issue could be used instead of journal articles, and pupils might discuss an issue in pairs or groups rather than writing an analysis under examination conditions. I used this very approach with a Year 10 group studying diabetes diagnosis and treatment, and found that discussing news articles set pupils' scientific knowledge of blood glucose control in a wider context, encompassing issues such as healthcare provision and legislation in relation to high-sugar foods; it also enabled them to appreciate that news headlines may be exaggerated (Billingsley et al., 2018).

An understanding of what approaches do and do not work for the particular classes I teach will develop as I become a more experienced practitioner, and this research project has provided me with a foundation upon which I can explore multidisciplinary approaches in my classroom, notwithstanding the barriers that militate against this being done (Billingsley et al., 2018). I now understand that pupils may form a particular stance on science's power and limitations before they begin secondary

school (Billingsley et al., 2018); it is part of my role to encourage pupils to develop an appreciation for alternative stances, and foster their curiosity and creativity in a school setting, notwithstanding the obstacles that might be present.

References

- Alderson, P (2005) Designing ethical research with children. In: Farrell, A. (ed). *Exploring ethical research with children*. Buckingham: Open University Press, pp. 27-36 Available at: https://www.researchgate.net/publication/303768019_Designing_ethical_research_with_children (Accessed: 30 April 2020)
- Auerbach, C., and Silverstein, L. (2003) *Qualitative Data: an Introduction to Coding and Analysis*. New York: New York University Press.
- Billingsley, B. (2017) Teaching and Learning About Epistemic Insight. *School Science Review* 98 (365), pp. 59-64.
- Billingsley, B., and Nassaji, M. (2019) Exploring Secondary School Students' Stances on the Predictive and Explanatory Power of Science. *Science & Education* 28, pp. 87–107.
- Billingsley, B., Nassaji, M., Fraser, S. and Lawson, F. (2018) A Framework for Teaching Epistemic Insight in Schools. *Research in Science Education* 48, pp. 1115–1131.
- Brown, K. and Flume, L. (2018) Pediatric and Adult Recommendations Vary for Sibling Testing in Cystic Fibrosis. *Journal of Genetic Counseling* 27, pp. 1049–1054
- Canterbury Christ Church University (2007) *Ethical Procedures for the Conduct of Research Involving Human Participants*. Canterbury: CCCU.
- CBHistory2015 (2018) *GCSE Edexcel History Source analysis with NACHOS*. Available at: <https://www.tes.com/teaching-resource/gcse-edexcel-history-source-analysis-with-nachos-11885412> (Accessed: 22 April 2020)
- Department for Education (2011) *Teachers' Standards: Guidance for school leaders, school staff and governing bodies*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/665520/Teachers__Standards.pdf (Accessed: 28 April 2020)
- Department for Education (2013a) *Science programmes of study: key stages 1 and 2, National curriculum in England*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/425618/PRIMARY_national_curriculum_-_Science.pdf (Accessed: 20 April 2020)
- Department for Education (2013b) *Science programmes of study: key stage 3 National curriculum in England*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/335174/SECONDARY_national_curriculum_-_Science_220714.pdf (Accessed: 20 April 2020)
- Department for Education (2014a) *Science programmes of study: key stage 4 National curriculum in England*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/381380/Science_KS4_PoS_7_November_2014.pdf (Accessed: 20 April 2020)
- Department for Education (2014b) *GCE AS and A level subject content for biology, chemistry, physics and psychology*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/593849/Science_AS_and_level_formatted.pdf (Accessed: 20 April 2020)
- Department for Education (2013c). *History programmes of study: key stages 1 and 2, National curriculum in England*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239035/PRIMARY_national_curriculum_-_History.pdf (Accessed: 23 April 2020)

- Department for Education (2013d) *History programmes of study: key stage 3 National curriculum in England*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239075/SECONDARY_national_curriculum_-_History.pdf (Accessed: 23 April 2020)
- Department for Education (2014c) *History GCSE subject content*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/310549/history_GCSE_formatted.pdf (Accessed: 24 April 2020)
- Department for Education (2014d) *GCE AS and A level subject content for history*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/302102/A_level_history_subject_content.pdf (Accessed: 24 April 2020)
- Foil, K., Powers, A., Raraigh, K., Wallis, K., Southern, K., and Salinas, D. (2019) The Increasing Challenge of Genetic Counseling for Cystic Fibrosis. *Journal of Cystic Fibrosis* 18, pp. 167–174
- Gatsby Technical Education Products (2008) Assessing the Reliability of Information Sources*. Available at: https://www.stem.org.uk/sites/default/files/preview/elibrary-resources/legacy_files_migrated/19160-01_Activity1_3-TN-BioChemPhyApp.pdf.jpg (Accessed: 29 April 2020)
- Holliday, A. (2007) *Doing and Writing Qualitative Research*. 2nd edn. London: SAGE.
- Johnson, R., and Onwuegbuzie, A. (2004) Mixed Methods Research: a Research Paradigm Whose Time Has Come. *Educational Researcher* 33 (7), pp. 14–26
- Kellett, M. (2005) *Children as Active Researchers: a New Research Paradigm for the 21st Century?* ESRC, UK. Available at: <http://oro.open.ac.uk/7539/1/MethodsReviewPaperNCRM-003.pdf> (Accessed: 29 April 2020)
- Marlow, J. and Amend, J. (2015). *The Energy of Life. The Scientist*. Available at: <https://www.the-scientist.com/features/the-energy-of-life-36017> (Accessed: 27 April 2020)
- Pearson Education Limited (2018) Edexcel Level 3 Advanced GCE in Biology A (*Salters-Nuffield*) *Specification: Issue 4, November 2018*. Available at: https://qualifications.pearson.com/content/dam/pdf/A%20Level/biology-a/2015/specification-and-sample-assessment-materials/9781446930885_GCE2015_A_BioA_spec.pdf (Accessed: 27 April 2020)
- Roberts, N. (2019). *The school curriculum in England: Briefing Paper Number 06798*. House of Commons Library. Available at: www.parliament.uk/commons-library (Accessed 23 April 2020)
- Sadler, T. (2006) Promoting Discourse and Argumentation in Science Teacher Education. *Journal of Science Teacher Education* 17 (4), pp. 323-346
- Stone, P., and Billingsley, B. (2019). *Framework for Integrating Teaching and Research*. Unpublished paper. Available at: https://learn.canterbury.ac.uk/bbcswebdav/pid-2306591-dt-content-rid-3527882_1/courses/E19MTETT4PRE4SRE/Stone%20and%20Billingsley%20%282019%29%20%20Framework%20for%20integrating%20teaching%20and%20research.pdf (Accessed: 29 April 2020)
- Whitty, G., Rowe, G. and Aggleton, P. (1994) Discourse in Cross-curricular Contexts: Limits to Empowerment. *International Studies in Sociology of Education* 4 (1), pp. 25-42
- Wilholt, T. (2009) Bias and Values in Scientific Research. *Studies in History and Philosophy of Science* 40, pp. 92–101.

CAN THE USE OF THE 'QUESTION BOX' AID MY PUPILS IN DEVELOPING THEIR EPISTEMIC INSIGHT WITHIN HISTORY?

Lauren Smith

Introduction, Context and Rationale

Based on the current interest in research grounded in epistemology within the educational setting, I have undertaken an action research project to cultivate my understanding of epistemic insight and its place within the classroom. Through the use of the question box, I have sought to introduce epistemic thinking amongst my pupils within a set of history lessons. This research piece is an interpretative enquiry using the constant comparative method, which is an approach based on grounded theory, to analyse my observations and reflections (Thomas, 2009).

I first came into contact with epistemology while studying for my masters, as a portion of my grading was for how reflexive I was in my academic writing. This meant that I had to show an awareness for history as a discipline and its relationship with other disciplines, specifically the arts and social sciences. Therefore, when planning for this action research project I felt that I had a good understanding of how history can lend itself to other disciplines and vice versa. Due to this underlying understanding, I decided to base my research project on my specialist subject knowledge: American slavery. I decided to focus on this historical topic as I have studied it extensively and am consequently able to apply other disciplines to the lesson content that I needed to cover with the class.

This research project took place over a five-week contrast phase as part of my initial teacher education. The school in question is a mixed, voluntary aided, catholic secondary school. It received a rating of 'Good' in the last Ofsted inspection, and pupils make good progress in their subjects, despite their low starting points (Ofsted, 2014). Ofsted also stated that all groups of pupils make good progress, this includes pupils with Special Education Needs (SEN) and 'disadvantaged' pupils (Ofsted, 2014). My focus group for this project was a low ability year eight class. The class consists of twenty pupils, 75% are registered as having SEN and 40% are classified as disadvantaged. The pupils that fall into these classifications tend to find learning and understanding history challenging. A few issues arise from this struggle, as pupils often find it challenging to engage with work and completing some of the more basic tasks. However, the pupils in this class always strive to complete their work to their best ability. Therefore, this project was undertaken to explore the introduction and practice of epistemic insight being integrated into history lessons and to investigate the impact on pupils' engagement and deeper thinking.

Literature Review

Epistemic Insight

Epistemic insight refers to knowledge about knowledge, but in particular, knowledge about disciplines and how they interact (Billingsley and Nassaji, 2020). It is within this interaction of disciplines that pupils can really start to understand and engage with Big Questions that can only be answered by looking at multiple disciplines, such as 'Why did the Fire of London spread so quickly?' (Billingsley et al., 2018, p.1124). It is through questions such as the one above that epistemic learning enables creativity to happen within the classroom, as pupils are able to think and engage with knowledge in new and stimulating ways (Billingsley, 2017). Billingsley (2017, p.61) goes on to argue that by identifying epistemic insight as important to pupil learning, teachers are able to address 'gaps,

confusions and misconceptions' about knowledge through the pupils experiencing 'multidisciplinary and real-world' situations. Thereby, the main goal of epistemic insight is to break down the 'permeable walls' that subject compartmentalisation has caused (Billingsley and Ramos, 2017, Billingsley et al., 2017). Billingsley and Ramos (2017) suggest that this can be done by first engaging and stimulating pupils' intellectual curiosity, which will then enable them to recognise the value in both single and multidisciplinary questions. From this point, a teacher will be able to equip pupils with the 'best ideas and strategies' that will help them make decisions 'rationally and compassionately', which will in turn enable pupils to develop 'scholarly characters and self-esteem' (Billingsley and Ramos, 2017, p.45).

However, there is current evidence to suggest that there are 'pedagogical pressures and barriers' within secondary school classrooms that prevent sufficient teaching and learning about epistemology from happening (Billingsley et al., 2018). This means that pupils are unable to explore Big Questions or think deeper about disciplines due to the fact that many of the pupils' focus in lessons are currently too narrow and they are not wanting to ask questions that relate to either ethics or values (Billingsley and Nassaji, 2020). Due to this barrier, the pupils' opportunities to build an understanding for how subjects interrelate is limited (Billingsley et al., 2018; Billingsley, 2016). One important issue that comes from these barriers is the prevention of pupils' curiosity about their learning. The term 'inspire pupil's curiosity' appears in the National Curriculum for History, Geography and Music, just to name a few (Department for Education, 2014a; DfE, 2014b; DfE, 2014c). Therefore, it could be argued that we are not fulfilling our roles as teachers if we are limiting our pupils' curiosity by preventing epistemic thinking from happening. One of the biggest obstacles that teachers need to overcome to enable pupils to think epistemically is subject compartmentalisation. Billingsley and Nassaji (2020, p.20) argue that this historic division of subjects reduces access to 'opportunities or spaces' where pupils can encounter and develop reasoning about 'cross-disciplinary questions and relationships'. Another obstacle that teachers face is the lack of time available to them to incorporate epistemic tasks within their lessons, as scholars such as Billingsley are often having to call for time to be allocated to epistemic insight within schools (Billingsley and Nassaji, 2020). These two obstacles often make it difficult for pupils to engage with deeper thinking and understanding about these Big Questions within their subject specific lessons. Therefore, I have taken the time to plan multidisciplinary lessons that will enable pupils to think deeper about history and its relationship to other disciplines. These lessons should also stimulate pupil curiosity about issues in the wider world and how history, alongside other disciplines, can help them to understand their experiences.

Cross-Curricular Learning

While this research project focuses predominately on the impact of epistemic insight on pupil engagement and thinking, there is also an aspect of cross-curricular learning present. I have decided to include some literature around this topic to further ground and deepen my research as the literature for epistemic insight is fairly new and not extensively written about presently. Cross-curricular learning is the 'application of skills, knowledge and attitudes' of different disciplines to a single idea (Billingsley et al., 2019, p.2). Barnes (2015) develops this definition by stating that it incorporates the interdisciplinary linking of subjects to develop 'conceptual insight' into a particular topic. This is very similar to epistemic insight; however, this approach focuses more on a powerful experience rather than a Big Question. Barnes (2018) argues that multi-disciplinary methods, and therefore cross-curricular learning, can be used for almost any reaction to an experience, such as a visit to the school pond. A great example of this is represented in McKay's article *Active Remembrance*, 2017, by which the school tried to make the act of remembrance more meaningful to the pupils. McKay (2017, p.20) argues that remembrance offered a 'strong conceptual vehicle' for structuring cross-curricular learning around. In a whole school cross-curricular activity day based upon the First World War, the PE department created an assault course, computing offered a code breaking class, and history created an artefact-handling session (McKay, 2017). McKay (2017) concludes that the result of this day was that the pupils became

active participants in the world around them, and this further increased their engagement with their learning. Therefore, it could be argued that cross-curricular learning is a means to first introduce pupils to epistemic learning. My research project focuses on bringing an experience into the classroom, such as engaging with slave music, as a way of introducing epistemic thought into the lesson.

Methodology

The primary purpose of research is to add to or generate new knowledge. Action research is more specific, in that it involves people actively developing their own knowledge and understanding, thereby also improving their own practice (McNiff and Whitehead, 2010; Sharp, 2009). Research has historically fallen under two paradigms, with the first of these being the scientific or positivist approach, which relies on 'normative' or 'quantitative' methods. The second is the anti-positivist or naturalistic method, which instead relies upon 'interpretative' or 'qualitative' research. These two paradigms define themselves in direct opposition to one another, where the normative is inclined to look 'in from the outside' whilst the interpretative approach endeavours to create 'events from within' (Sharp, 2009, p.5).

The interpretive, or qualitative, approach focuses on the researcher being active within the research. The central aim of these approaches is to understand 'the subjective world of human experience' and 'individuals' interpretations of the world around them' (Cohen et al., 2007, p.19 & 21). My own research falls under this approach. The research I am undertaking includes an action of involvement, and the impact of this is being measured in relation to pupils' engagement and deeper thinking. This outcome fits within the 'subjective world of human experience' as it focuses on observing pupils' attitudes and thinking when it comes to their learning. I will be observing and interpreting these human experiences through my data analysis.

My data collection technique was the keeping and subsequent analysis of a compilation of observations, reflections and pupils' work in the form of a bundle. An ethnographic approach supports this research piece, as I am conscientiously observing and recording the pupils' actions and reactions, as well as recording my own experiences, which I shall examine with the aid of literature. Cohen (2007) states that ethnographic data is accepted as a valid method of data collection in the study of human experience. In addition to this, I also included two other methods of data collection to further develop my enquiry. Before teaching the lessons that I had created, I first observed the class for a week with their class teacher. This enabled me to form a pupil comparative to deepen my own knowledge about the pupils prior to teaching them, as to better comprehend their current understanding. Secondly, I was able to gain a pupil-formed evaluation comparative, which was completed at the end of the scheme of work. This enabled me to further reflect on my own observations and self-evaluations on how well the pupils engaged with my lessons. This method aligns with Wolcott's three approaches of ethnographic data collection, which is experiencing, enquiring and examining (cited in Gibson and Brown, 2009).

This style of data collection provides an immediate, eye-witness account of pupil response, which is a strength of using this method (Sharp, 2009). The observations were completed during every lesson in which I led teaching and learning with the year eight class. This was to ensure a reasonably trustworthy measure of pupils' engagement and deeper thinking was gathered. However, it is important to acknowledge that observations and their reflections can be value led and selective. Therefore, the interpretations formed from these observations will have a measure of subjectivity attached to them. To counteract this issue, a final pupil-formed evaluation was completed to deduce the level understanding about epistemic insight the pupils had gained. This was done to maximise the 'validity and reliability' of my own interpretations and self-evaluations that I had gained from reflecting on my data collection (Sharp, 2009).

Due to the fact that I have also identified my project as having an interpretivist approach, I have decided to incorporate the use of the constant comparative method based on Glaser and Strauss' 'grounded theory' (Thomas 2009). The frequent and repetitive reviewing and comparison of my self-evaluations and observations enabled me to identify common themes that summarise the content of my data. As is common with this approach, it was at this point that theory 'grounded' in the data produced from my research began to develop (Cohen et al. 2007). Additionally, the choice of analysing my data in this format meant that I could interpret its meaning and importance with regard to my project's aim to a greater extent (Schreier, 2012).

However, this method could be described as a 'haphazard methodology' as this structure was not originally evident until the constant comparative method was applied to the data, which then enabled the clarity needed for this project to become apparent (McNiff & Whitehead, 2010). To further validate this research, I asked an impartial party to analyse the data by asking them to highlight common themes they found. By doing this, it enabled the data to be analysed more carefully and provided a more detailed and truthful analysis of the data (Burla et al., 2008).

Ethical considerations were of vital importance through this action research project. This project was discussed in detail with members of the school's senior leadership team and written permission was obtained prior to the research taking place. Extra care was taken to ensure that all pupils were anonymised within any of the data gathered, as is the requirement stated in the British Educational Research Associations guidelines (Hammersley and Traianou, 2012). Therefore, I shall use pseudonyms to protect individuals' identities, which is in accordance with the Data Protection Act (Great Britain, 1998). My role within the project was to teach my class new ideas by introducing and practising epistemic thinking, although it did not stray too far from a standard history lesson as I was still covering the content required for that terms learning. Therefore, I undertook the project without the pupils' consent deliberately, as I did not want to influence the pupils or stimulate bias in terms of engagement or deeper thinking as this would impact the outcome of my project.

Presentation of Data and Analysis

The analysis of the data collected shall be highlighted by two collections of pupils' work that best shows their engagement with epistemic insight. This evidence will be supported with reference to observations, self-evaluations and relevant literature. Throughout the data collected, the development of common ideas and their identifications can be found. The two most common themes present were that of pupil engagement and deeper thinking, which shall be examined and evaluated throughout the analysis. However, I should first like to address the use and importance of the question box in regard to this project. Billingsley and Nassaji (2020, p.1125) contend that in the lower secondary school it is important to 'retain subject boundaries', and that we should make lessons more 'explicit and permeable' so that the pupils can still access the teaching and discussions about epistemology. They recommend that to create these discussions the question box should be used to carry 'questions and insights' between lessons (Billingsley and Nassaji, 2020, p.1125). It was because of this reasoning that I chose to integrate the question box into my lessons. At the beginning of every lesson I showed the class the question box and explained what disciplines they would be using to aid them in answering the question. In doing this, I found that the pupils were able to understand the expectation for that lesson from the start. Additionally, they were more engaged and were able to apply themselves to thinking about the set question in an epistemic manner.

The first collection of work that I am going to evaluate is the pupils' responses to a 'diamond nine' task that was completed as part of the lesson focusing on 'What factors led to slavery beginning in Colonial Virginia?'. This task required the pupils to form judgments about nine factors and place them in order of most to least important; from this they were asked to justify their pick for the most important factor. Pupils gave responses such as 'owners didn't have to pay for their children because he already owned them,' (Pupil A, social), slaves were 'easier to get' (Pupils B, economic) and 'it became more

easier to buy and sell slaves' (Pupil C, economic). The responses produced by these pupils showed that they had an understanding for the complex argument surrounding American slavery. Additionally, they were able to justify their judgement with knowledge learnt within the lesson and were able link back to previous knowledge, too.

The knowledge learnt within this lesson was grounded in a historical debate that I critically explored while at university, which looked at economic and racial factors for enslavement. Perry (1970) argues that by drawing pupils' attention to questions explored in scholarly debates and making it accessible to their intellectual reach, it is possible to enable pupils to think epistemically. Billingsley (2015, p.9) furthers this by stating that with an introduction to a 'range of scholarly positions' pupils will be able to see that there is not just one view by which to examine knowledge or evidence. This idea was achieved in the diamond nine task as the pupils were able to argue that it was not just economics or racism that led to enslavement but a combination of the two.

Through the reflection of my observation and self-evaluation, I was able to comment on pupil engagement and deeper thinking for this lesson. The observer commented that the 'learning of difficult concepts took place' and that all pupils make 'satisfactory progress', which showed their ability for deeper thinking. In my self-evaluation, I also comment on the pupils being able to understand the difficult concepts. This was evident through them being engaged throughout the lesson, as they were able to verbalise thoughts, ask insightful questions, and use 'two disciplines to answer our lesson question' as part of the summary task. Additionally, the observer commented on the pupils being able to 'make judgement', 'interleave knowledge' and 'build conceptual understanding' through the information learnt, which was adapted for lower ability pupils. The ability of the class was always at the forefront of my planning, as ability can impact pupil performance and their engagement with epistemic insight. Baines (2012, p.49) argues that the system of ability grouping creates an 'educational rut', which is challenging to get pupils out of. Baines (2012, p.52) goes on to argue that there is need for 'new and creative ways' for instructing these types of pupils. This can be done by setting expectations that are higher, and instructional strategies that are motivating and engaging (Baines, 2012). The setting of these high expectations, alongside motivating and engaging the pupils, enabled the class to engage with their intellectual curiosity and form judgements about the past. This collection of pupil work demonstrates that pupils were starting to see the value in both single and multidisciplinary questions, and therefore, were starting to engage with epistemology within their history classroom through the use of the question box.

The second collection of pupil work that I am going to evaluate is a sample of homework that the pupils created after a lesson on runaway slaves. The lesson focused on the 'How did slaves rebel during slavery?' and required the pupils to employ geography skills, such as push and pull factors and map reading. The lesson required pupils to engage with runaway slave advertisement sources to assess why, and also where, slaves would run away to during slavery. At the end of the lesson, the class put together a success criteria for their homework, which was to create their own advertisements. An aspect of the criteria was to include push and pull factors, as this would highlight a reason for why their slave was running away and also link back to thinking epistemically. Pupil A produced some good examples of geography within their work, which shows their understanding for the task and how geography could help explain how slaves rebelled in history.

Reflecting on the lesson observation and self-evaluation, it is clear to see that the pupils were engaged and starting to think deeper about this topic. In my observation, the observer wrote that the pupils were 'interested and learning' throughout the lesson. I also commented upon this within my self-evaluation, although, I did note that the peak of engagement occurred when the class was discussing the criteria for the homework. In both pieces of data there is reference to the geography skills that were integrated into the course of the lesson: 'push and pull factors were highlighted' and 'track one of the slave's journey'. A final comment from the observation that I should like to highlight is that of 'developing deeper questions', which showed that I was encouraging pupils to think deeper about

this topic. I asked them questions such as: 'Why do you think this slave would risk running away?' and 'How important do you think family was to them?' By the end of this lesson the pupils had used skills learnt in geography to develop their knowledge about slaves and add deeper meaning to their understanding, which is reflected in their homework.

I believe that this epistemic lesson allowed for a creative moment to happen, which was the pupils' homework. Billingsley (2017) argues that epistemic learning enables creativity to take place within a classroom, as it enables pupils to think and engage with knowledge in different ways to a normal structured lesson. Additionally, creativity is a useful tool to teach low ability groups as it helps them to achieve in an environment that is more proactivity and seemingly less academic (Baines, 2012; MacBlain, 2014). This enables the pupils to feel more comfortable discussing ideas or present work to the class. In terms of epistemic insight, creativity stimulates the pupils' 'natural curiosity' and allowed them to develop their own cross-disciplinary understanding (Billingsley and Ramos, 2017). This collection of work demonstrates how creative a group of low ability pupils can be when taught epistemically, as all pieces of homework had push and pull factors present and the majority included geographical locations. Therefore, it can be argued that this lesson successfully answered the question box through the use of history and geography.

Finally, I am going to discuss the responses to the pupil-formed evaluations that I conducted at the end of this research project. In the last lesson I had with this group, I gave each pupil a slip of paper with the question 'Do you think other subjects can benefit (help) your understanding of history?'. All of the pupils within this class concluded that yes, other subjects can help us understand history. However, only four pupils went on to elaborate this view, although they are not very detailed or insightful. However, Pupil B wrote 'we are able to understand the past life', which, while vague and simplistic, does offer a valid argument to the use of epistemic insight within history. From this data, I have concluded that while the pupils understood and could work epistemically within the classroom, I believe that they could not always truly reflect and expand upon their multidisciplinary experience. This could be due to the fact that this data was collected over a short period of time, with a class that have not been taught in this manner before. However, I believe that the question box did aid the pupils in developing their epistemic insight within history.

Reflexive Analysis

This action research project has been a journey, not only for me, but also the pupils and even their class teacher. In reflection of this journey, I feel that I can confidently put forward that the epistemic lessons that I delivered did have some impact on my understanding of teaching and learning, and how epistemology can help develop pupils' knowledge about knowledge. The outcomes for each lesson were positive with the pupils being able to answer the question box by using history and another discipline, and thereby answering this research's focus question. However, I should like to suggest that for epistemic insight to be used to its full it will need to be further integrated into the everyday running of the school, whether the school sets a lesson a side each week for a multidisciplinary workshop or each department dedicates one lesson a term to this pedagogical approach. This project had taught me that teaching is always changing, and as teachers, we need to change with it, especially if epistemic insight becomes more widely used. Moving forward, I believe that an epistemic approach within classrooms will enable the pupils to develop into young adults that will be more equipped with dealing with the ever-changing world in which they will have to be a part of. Epistemic insight enables them to develop decision making skills that are more rational and compassionate, which I started to see while completing this research. In conclusion, I will be including more epistemic tasks within my lessons to engage the pupils' natural curiosity and to help develop their decision-making skills. I hope that by starting to integrate epistemology into my lessons on a small scale, I can eventually get other members of my department to do the same, and ultimately other disciplines too. As Pollard (2008, p.11) states reflective professionals should be able to 'draw on' many sources of evidence and use them

to 'inform their teaching practices'. I feel strongly that this is what this research project has achieved in developing my own pedagogy.

References

- Abbott, J. (1994) *Learning Makes Sense: Re-creating education for a changing future*. Letchworth: Education 2000.
- Adey, P. (2012) 'From Fixed IQ to Multiple Intelligences', in Adey, P. and Dillon, J. (eds.), *Bad Education: Debunking Myths in Education*. Berkshire: Open University Press, pp.199-214.
- Baines, E. (2012) 'Grouping Pupils by Ability in Schools', in Adey, P. and Dillon, J. (eds), *Bad Education: Debunking Myths in Education*. Berkshire: Open University Press, pp.37-56.
- Barnes J (2018), *Applying Cross-curricular Approaches Creativel*. New York: Routledge.
- Barnes, J. (2015). *Cross-curricular learning*. London: Sage.
- Biesta, G. (2009) 'Good Education in an Age of Measurement: On the Need to Reconnect with the Question of Purpose in Education', *Educational Assessment Evaluation and Accountability*. 21(1), pp.33-46.
- Billingsley, B. (2016) 'Ways to prepare future teachers to teach science in multicultural classrooms', *Culture Study of Science Education*. 11, pp.283–291.
- Billingsley, B. (2017). 'Epistemic insight Teaching and learning about epistemic insight', *School Science Review*, 98(365) pp.59-64.
- Billingsley, B., Abedin, M., Chappell, K. and Hatcher, C. (2019). 'Developing a cross-curricular session about evolution for initial teacher education: findings from a small-scale study with pre-service primary school teacher', in: Harms, U. and Reiss, M. (ed.) *Evolution Education Re-considered: Understanding What Works Switzerland*: Springer. pp. 41-57.
- Billingsley, B., & Nassaji, M. (2020). 'Perceptions of the relationships between science and religion held by upper-secondary school students in Church of England schools.', *International Journal of Christianity & Education*. 0(0), pp.1-26.
- Billingsley, B., Nassaji, M., & Abedin, M. (2017). 'Entrenched compartmentalisation and students' abilities and levels of interest in science.' *School Science Review*, 99(367), 26–31.
- Billingsley, B., Nassaji, M., Costa, A., & Chappell, K. (2016). 'What do teenagers believe about the soul? Findings from a survey and interview study with upper secondary school students'. In N. Spurway (Ed.), *Science and Religion Forum 40th Anniversary Book*. Cambridge: Cambridge scholar publishing, pp.141-151.
- Billingsley, B., Nassaji, M., Fraser, S. et al. (2018). 'A Framework for Teaching Epistemic Insight in Schools'. *Research Science Education* 48, pp.1115–1131.
- Billingsley, B., Riga, F., Taber, K. S., & Newdick, H. (2014). 'Secondary school teachers' perspectives on teaching about topics that bridge science and religion'. *Curriculum Journal*, 25(3), 372–39.
- Billingsley, B., & Ramos, A. (2017c). 'Epistemic insight and classrooms with permeable walls'. *School Science Review*, 99(367), pp.44–53.
- Burla, L et al., (2008) 'From the text to coding: Intercoder reliability assessment in qualitative content analysis.' *Nursing Research*, 57, pp113-117.
- Cohen, L., Manion, L. & Morrison, K. (2007), *Research Methods in Education*, 6t. edn, Routledge Ltd.

- Department of Education (DfE) (2014b) *The National Curriculum: Geography Programmes of Study: Key Stage 3* Available at:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239087/SECONDARY_national_curriculum_-_Geography.pdf(Accessed: 13th April 2020)
- Department of Education (DfE) (2014a) *The National Curriculum: History Programmes of Study: Key Stage 3*. Available at:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239075/SECONDARY_national_curriculum_-_History.pdf(Accessed: 13th April 2020)
- Department of Education (DfE) (2014c) *The National Curriculum: Music Programmes of Study: Key Stage 3* Available at:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239088/SECONDARY_national_curriculum_-_Music.pdf(Accessed: 13th April 2020)
- Gibson, W. (2009), *Working with qualitative data*. 1st ed: Sage, Thousand Oaks, CA.
- Great Britain. (1998). *The Data Protection Act*. London: Stationary office.
- Hammersley, M. and Traianou, A. (2012). *Ethics and Educational Research*. British Educational Research Association on-line resource. [online] Available at: <https://www.bera.ac.uk/wpcontent/uploads/2014/03/Ethics-and-Educational-Research.pdf> [Accessed on:13th April 2020]
- MacBlain, S. (2014) *How children learn*. Los Angeles: SAGE.
- McKay C, (2017), 'Active Remembrance: The Value and Importance of Making Remembrance Relevant and Personal', *Teaching History*. 166, pp.20-27.
- McNiff, J. (2010), *You and your action research project.*, 3rd ed: Routledge, London: New York.
- Ofsted (2014) *School Report*. Available at <https://files.ofsted.gov.uk/v1/file/2338041> (Accessed: 13th April 2020).
- Perry, W. G. (1970). *Forms of intellectual and ethical development in the college years: a scheme*. New York: Holt, Rinehart & Winston.
- Pollard, A. (2008) *Reflective Teaching in Schools*. 3rd edn. London: Continuum International Publishing Group Ltd.
- Schreier, M. (2012). *Qualitative content analysis in practice*. Thousand Oaks, CA: Sage
- Sharp, J. (2009), *Success with your education research project*. United Kingdom: Learning Matters Ltd.
- Thomas, G. (2009), *How to do your research project : a guide for students in education and applied social sciences*. SAGE Publications Ltd, London.
- Watkins, C. (2000) *Learning About Learning: Resources for supporting effective learning*. London: Routledge.

HOW USING THE EPISTEMIC INSIGHT DISCIPLINE WHEEL TO ANSWER A BIG QUESTION ('HOW DO WE DETERMINE MORALITY?') CAN DEVELOP MY SKILLS AS A TEACHER?

Benjamin Robinson

Introduction

Being introduced to the Epistemic Insight Initiative fascinated me from the onset, not only as a teacher-in-training, but as a scholar. I have often thought about the methods in which we learn and why we learn what we do, stemming from my own English teacher at school, who also taught History at all key stages, and often said that the two subjects "go hand-in-hand". At the time I did not think much of it, but looking back I have realised that his lessons were not only well-developed, interesting and enriching, but he developed my thinking in every text that we studied, by often linking texts to religious education and history contextually, but by also making reference to music, drama and even languages on occasion.

I have always considered English to be cross-disciplinary by default, not only because the language is the medium in which most British students receive their education, but because I think that by studying English Literature, many other disciplines or subjects at least, are included in your study. For example, the study of "at least one play by Shakespeare" (DoE, 2014) is included in the National Curriculum at Key Stage 4 level. Shakespeare's works are historical by nature, due to being written centuries ago, but also because Shakespeare himself based his plays on history. Because they were written with intention for the audience, there are also many links to society at the time, some of those still resonate with us today.

The assessment objectives demand contextual reference in students' responses, even at this early stage of my teaching career I find that many pupils often write detailed responses to questions on literature but often made little to no contextual references. The school that is the setting for this research uses AQA for GCSE English examinations, the AQA mark scheme calls for "understanding of the relationship between texts and the contexts in which they were written" (AQA, 2014:7).

This is what led me to my research focus, incorporating the answering of 'big questions' into my classroom, not only to develop my own teaching skills and further my own study, but I could also use my research to develop the skills of my students, and provide them with extra contextual knowledge they can use to develop their own responses in examination setting, and therefore help them to achieve higher marks. I also liked the idea that pupils in the class would too be fascinated by how we study and begin to independently apply cross-disciplinary elements to their own learning. For this reason, I decided early on to give the participating students significant control, due to their top-set status, as I felt the freedom of study would maintain interest and benefit the pupils most.

Literature Review

Prior to preparing for my research, I partook further reading to not only develop a further understanding of my interest, but I wanted to clarify what the current English literature curriculum suggests about cross-disciplinary learning, and how our school system as a whole reflects this. I also wanted to look at what research has been achieved by the Epistemic Insight initiative have achieved so far, and how this can benefit, but perhaps hinder my own research.

Being more familiar with the National Curriculum (2014) in regards to English Language and Literature,

I began my research by looking at how the curriculum paints subjects and the requirements of their disciplines, and considered the common ground they may or may not already share with English. I focused my reading on the “aims” of subjects in the curriculum as a way to develop my own thinking around their disciplines, and their relationship to English.

The aims for science call for “conceptual understanding” (DfE, 2014:56) which is something that exists in English, in conversations with my mentor we often talk about the requirement for pupils to write ‘developed’ responses, and this can be achieved through conceptualising their responses, leading and structuring arguments by ideas. Although science varies greatly from English in many other aspects, no matter how comparable science experiments may be to a group of students ‘dissecting’ a poem - there are obvious differences in the disciplines. Although both poetry dissection and scientific experiments both share the purpose of looking for ‘answers’, their methodology could not be further from each other.

Like science, the study of foreign language shares similarities with English. In fact, I would argue that it echoes English in almost every aspect. The language curriculum aims for pupils to “express their ideas”, “learn new ways of thinking” and to “read great literature” (DfE, 2014:98) all central aspects of studying English. However, there is a variable in each discipline, Modern Foreign Languages require more vocal exercises and promotes oracy, whereas in English, there is currently no oral examination requirements – it is often argued that there should be.

Throughout my reading I became intrigued at how the National Curriculum (2014) does not explicitly advocate cross-curricular teaching despite it making so many links between subjects, as I discovered above. It compartmentalises subjects into umbrella terms, such as “the arts... the humanities (comprising geography and history)” (DfE, 2014:7). This creates a suggestive link between these subjects and their disciplines, especially if they are organised by a governing body. It also reinforces the links already ingrained in our schooling system; we often find that several subjects are paired up. In the school where I work, the head of history and the head of geography both teach each other’s subjects, yet no science teachers are expected to teach geography, despite the obvious links; it is often considered an ‘earth science’.

The encouragement of passion is something that I did find universal across the curriculum. English calls to “develop their love of literature” (DfE 2014:13) just as science calls for “excitement about natural phenomena” (DfE, 2014:56). This reading really made me consider just how closely linked subjects are in their methodology, despite the subject differences.

Although the National Curriculum (2014) could be construed as a rigid set of rules or guidelines, what drew me to the Epistemic Insight Initiative was its fluidity when the idea of asking a ‘big question’ was involved. I liked the idea that to further our understanding of a topic, we could look at it from several different angles. In my short teaching career, I have noticed just how compartmentalised subjects are, not only organised by department in staff resources – it has never occurred to me as an English teacher to look for usable resources within other disciplines in the school.

The idea of asking a ‘big question’ fascinates me, first of all as a way to frame the lesson in an interesting way. I take issue with the use of learning objectives, although due to school policy I have to use them, I think learning an area of study or topic with a question to be much more passionate and driven way to learn. Berry et al. state that their research when used in practice “encourages students’ expressed interest in big questions and develop their understanding” (Billingsley et al. 2018) suggesting that by leading learning through big questions will keep pupils interested and engaged with their own learning echoing various aspects of the National Curriculum (2014), as well as the teaching standards, “promote a love of learning” (DfE, 2011). I found this particularly interesting as I figured that if you teach a child a genuine love of learning, you will encourage them to continue throughout life, rather than teaching them in an off-putting way which discourages their intellectual growth.

(Billingsley et al. (2018), define big questions as being “about human personhood and the nature of

reality" which led me to think about what big questions I could implement in my own teaching. They also state that "pressures and barriers are particular to topics that have a religious aspect" (Billingsley et al. 2018) I found this particularly beneficial due to the fact that due to the nature of religion, it can be avoided when analysing literature, or perhaps go unnoticed by an individual raised without organised religion, a common theme in modern classrooms. At this point I knew that I wanted to direct my big question towards morality, and how we determine it. Although perhaps difficult to provide a direct answer, I found it applicable to many great texts, such as *Of Mice and Men*, and to Shakespeare's works.

Roach (2006) in a *New Science* article series based around 'big questions' refers to questions like this as "floaty" and uses an example of 'What happens after we die?' to concur that "finding out is easy – reporting back is the challenge" (Roach, 2006) This brings to light the problem with big questions, especially those concerning science and religion – can they truly be answered? In our classrooms this is a problem, not only do we have the issue of asking too many questions and have no answers, but in today's society our education system depends on the end results, whether it be an examination, coursework, or a presentation, we grade pupils on the answers they give, not the method they used. Their method is often taken into consideration in disciplines such as mathematics or science, however it is the end result – often in its simplest form – that the examiner is after. English is perhaps much more fortunate in this instance, where thought processes in writing are encouraged, and the AQA mark scheme is laid out to move answers through bands at the marker's discretion.

It appears that the curriculum often calls for solid answers to questions, whereas it could be considered that epistemic insight cares more for the thought process, and the journey in looking for the answer, than the answer itself.

Methodology

From the onset of my research, due to the fact that I was engaging with the Epistemic Insight Initiative, I wanted my research to remain 'open' to the pupils. For ethical reasons they were made aware of what my research intention was, but I wanted to include pupils in my thinking and give them significant control over our study. I was inclined to do this by reading what the Epistemic Insight Initiative had achieved so far, with their research with students they have been open and inquisitive about what disciplines were and how the pupils understand them. The Initiative is "interested in their perceptions" (Billingsley 2017), and likewise I am too.

I followed this example for the reason that I think that opening pupils minds up to a more cross-curricular style of study would benefit them most. Once they understood how disciplines interact, they would then be able to use it to their benefit, perhaps thinking of their own questions, and what departments of the school they can use to achieve their answer.

The pupils in question were to be taught two lessons by me, one about epistemic insight, what it is, how we can use the discipline wheel, and finishing the lesson by deciding what disciplines to use to answer the question. The second and follow-up lesson is to consist of me teaching the class how to answer the question, but by using subjects of their choice. My purpose was to not only test my skills as a teacher, but to ascertain whether the pupils are interested in this style of teaching, and if it was of benefit to their written responses.

Initially I intended to gather data from the class in question in a more quantitative format, with the use of a survey or a multiple-choice style to collect information. However, responding to feedback from my tutor, I was made aware of the difficulty to achieve this in an accurate way for English. Due to its nature, English is a largely written subject, based on interpretation of texts. I realised that it would not be true to the subject to assess or ascertain pupils understanding in a format that is different that the norm. This led me to think about how I could collect data qualitatively. Schreier defines qualitative data as "rich data that requires interpretation" (Schreier,2012:3) This cemented my decision as I felt that

my findings would be restricted by the use of multiple-choice questions, would pupils merely select random responses to pass the time? I chose to adhere to my discipline and create a questionnaire for pupils to use as a 'workbook' in one lesson. This workbook gathered pupils' opinions on what subject disciplines were and what they thought

I decided that to assist with my research I would analyse my findings thematically. This guided my research as before I had even included the pupils in my research, or introduced them to epistemic insight, I had an initial idea of how I would code pupils' responses to our big question, and then narrow them into themes. This would require me reviewing their work and determining whether their notes were detailed, how their written response was, and what elements of other subjects they included.

My reading led me to Braun and Clarke's 'phases' of analysing data thematically. Their description of codes as "identify[ing] a feature of data" (Braun & Clarke, 2006:18). I found their phases to be ideal framework when analysing my data, as like my own, their framework explicitly mentioned questions and their use in research. Their mention of an "overall research question that drive the project." (Braun & Clarke, 2006:14) and then "narrow questions" which would "provide answers to the overall research question" (Braun & Clarke, 2006:14). This led me to refine my research question from "How do we determine morality" which still remained the 'big question' that led the focus of my research, but it created a refined version: "why is the killing of one king in Macbeth accepted by Shakespeare and his audience, but the killing of the other consider immoral?" This sub-question became the lesson focus, and a simplified way for the pupils to understand the content as it was. It also served as a tool to 'ground' a big question, so that it didn't become unanswerable or without definite answer, or indeed a "floaty question" as put by Roach (2006), a concern I had embarking on this research.

During the teaching of my epistemic lesson, my intention was to provide a lecture style of teaching, mixed with activities for the class to do, then ask the above question for the pupils to answer solely. As part of my teacher education I am often observed in-lesson by my mentor, who will ascertain the learning of the pupils in setting, and provide feedback when I can implement new strategy or focus on another aspect of my teaching. For this reason, I decided to include her in my research, with the purpose of observing my lesson as she normally would, as a secondary method of gathering data and understanding what benefit my research is, and what learning took place.

Critical Analysis and Discussion

During my research lesson, the pupils partook in activities, took notes in a mini-lecture style, and then finished by attempting to answer our big question regarding morality in Shakespeare's time. The pupils had unanimously selected the history and religious education as disciplines to further their understanding, and I taught them with examples from both the bible and from history to support their learning.

As advised, I first read through the work they produced beforehand, as per Braun and Clarke's recommendations in phase one of thematic analysis, and on my second reading I began to apply 'codes' to the pupils work. These included the following predetermined codes:

MR	Mention of Religious Education source
MH	Mention of History source
DN	Detailed notes
SN	Simple notes.

In regards to themes, I discovered that perhaps using themes to analyse my data was not the best way to record findings. Because the question was narrow, there were limited answers, therefore my themes, to me, appeared very weak in comparison to the examples recorded by Braun and Clarke.

My 'themes', although perhaps mere glorified codes, became 'developed response' and 'simple response' in regards to each pupils answer. Perhaps a mere simplified version of a standard mark scheme in hindsight it might have made sense to use a fully qualified English teacher, as a third party, to mark the responses to determine my findings accurately, though this may have been counterproductive as my goal is to develop my skills, not that of my peers. I found that the themes I recognised in the pupils' response mirrored the band system used in the AQA mark scheme (AQA, 2014), where I placed the work whether I deemed it to be developed, containing a point backed up by the new learning, to simple, which I deemed a basic response, often with one or two lines and containing no depth. Perhaps I could have included more inter-disciplinary methods here, and have shown examples and sought a qualified history teacher's interpretation of their subject's curriculum.

What I did discover is that although seventy percent of the class took what I coded as 'detailed notes' including mention of Religious and Historical sources; only fifty percent of the class achieved the theme of 'developed response' – which I considered to be inclusive of religious and historical content, as well as a confident and detailed response. This gap may have been time related, because my research was confined to two lessons, and the answering of the big question was the final task in the final lesson, it appears that pupils were restricted by time, and were I do attempt this again I would most likely incorporate it into an assessment, and expect an essay style response rather than a fifteen minute answer.

My mentor observing the lesson felt that progress was at least expected and stated that I had demonstrated "strong subject knowledge" and that the students were "considering the value of knowledge." also noting that pupils enjoyed the lesson, and that it had an effective structure. With my goal of developing my teaching skills, this information was beneficial, as she was also able to suggest improvements, which included "adapting tasks to allow all students to access ideas". It is my consensus that the higher ability in this top-set class benefited the most, whereas the lower were less engaged, perhaps by their misunderstanding of the ideology of Epistemic Insight.

Although the subject disciplines from the wheel were selected by the pupils, who unanimously chose religious education and history, as I had expected, for my research to truly reflect the Epistemic Insight study should my disciplines not have included a wider range? Billingsley et al. reflect on big question as "questions on which both science and religion seem to have something to say" (Billingsley et al. 2018). There was very little to no use of the science discipline within the lesson that I was consciously aware of, though on hindsight it could be argued that by looking at primary sources or 'evidence' could be considered a scientific method, in a roundabout way. Perhaps the restriction of the discipline wheel to 'the arts' and 'science' were problematic here, could I have provided the pupils with a more detailed wheel and broken these disciplines down to a simpler form?

The disciplines chosen by the pupils, which were religious education and history, could also have hindered the developing of my own skills as a teacher. I prepared for their disciplines by looking at lesson plans online, and by looking at the expectations of the National Curriculum to introduce these into the classroom. However, as pointed out by my mentor in my lesson observation, could I have discussed my intention and ideas with a history/RE colleague prior to my lesson? If attempting something on this scale again, this would definitely have a benefit, but perhaps incorporate the colleague within my lesson, or if they teach the same class, we could link our scheme of work to reflect similar topics of study, such as the Elizabethan/Jacobean Era to coincide with the teaching of Shakespeare. Likewise, with a teacher of RE. This seems to me the intention of Epistemic Insight, to open up study in this way,

The main point of my research was to determine my own skills as a teacher. Although it can be argued that a teacher by default should have the ability to teach anything, there is a large focus on Subject Knowledge, especially during my training year, yet I taught aspects of history and religious education with limited knowledge. Although having been taught in a Roman Catholic convent for seven years, I was very confident in the religious aspect of the teaching. History on the other hand, I myself achieved

a C at a GCSE level, and being educated in another country, I had rarely studied British history; if I had applied to become a history teacher instead of an English teacher, I doubt I would have got on the course. However, although I had not studied anything about the English Civil War, nor Charles II's beheading prior to teaching this lesson, it made me realise that being able to continue learning and expanding your knowledge in preparation for lessons is one of the fundamental parts of being a teacher.

Another point in regards to my research, that I continually thought about – was there a point of introducing pupils to epistemic insight? Did it benefit the students in any way? A minority of the pupils who could be deemed 'passive' in lesson, or did not take detailed notes may not have instantly displayed understanding in the lesson, but throughout their careers of study they just might recall an inkling of epistemic insight, and it could benefit them in ways later in their career, whether it be in my lessons, or in their own future study.

Reflexive Analysis

Although this research project had a focus on epistemic insight, and answering big questions, it certainly made me reflect and think about my own teaching practice. The experience of attempting to introduce other disciplines into my classroom has made me continue to think about methods of developing my own practice, and incorporating further learning into my teaching. By leading learning through the answering of a big question also provided me with experience I feel I can use to further the learning of pupils I teach in the future. Using my same model, I can alter and change elements of it to encourage learning in key stage three, perhaps using big questions to frame group work or class projects.

This research project has allowed me to be more fluid in my teaching as I continue to teach lessons and that it is necessary to keep channels open with the rest of the subjects on the curriculum in order to continually develop my subject knowledge as per the teachers' standards. It also developed my teaching skills, as for a lesson I had to learn elements of two different subjects out of my comfort zone and be able to confidently rely the information to the class. It pointed out aspects of my teaching that I now realise I need to continue to develop, throughout the rest of this year and my NQT year, such as my ability to challenge and encourage higher ability, and in my intention to do so, I sometimes leave the lower ability behind. However, now that this is brought more to my attention, it allows me to focus on ensuring that my lessons are differentiated so that all knowledge is accessible for all the pupils in the room.

References

- AQA. (2014). *GCSE English Literature Mark Scheme*. Available: <https://filestore.aqa.org.uk/resources/english/AQA-87021-SMS.PDF>. Last accessed 6 Apr 2020.
- Billingsley, B., Nassaji, M., Fraser, S. et al.(2018) *A Framework for Teaching Epistemic Insight in Schools*. *Res Sci Educ* 48, 1115–1131 (2018). <https://doi.org/10.1007/s11165-018-9788-6>
- Billingsley, Berry. (2017). *Epistemic insight Teaching and learning about epistemic insight*
- Braun, V & Clarke, V (2006) *Using thematic analysis in psychology*, *Qualitative Research in Psychology*, 3:2, 77-101, DOI: 10.1191/1478088706qp063oa
- Department for Education. (2011). *Teachers' Standards*. Available: <https://www.gov.uk/government/publications/teachers-standards>. Last accessed 10th Apr 2020.
- Department for Education. (2014). *The National Curriculum* . Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/840002/Secondary_national_curriculum_corrected_PDF.pdf. Last accessed 6 Apr 2020.

Roach, M. (2006). *The Big Questions: What happens after you die?* Available: <https://www.newscientist.com/article/mg19225780-075-the-big-questions-what-happens-after-you-die/>. Last accessed 6 Apr 2020.

Schreier, Margrit (2012). *Qualitative Content Analysis in Practice*. California: SAGE.

HOW CAN INTRODUCING CULTURAL UNDERSTANDING IN LESSONS HELP MOTIVATE STUDENTS TO LEARN SPANISH?

Shirin Hosseinzadehrahvar

Introduction

In a narrow view, learning a new language helps students understand a literary text. But probably more important is for students to be able to go beyond the meanings and structures, and to understand the culture behind the language. I would like my students to know how learning a new language helps them to communicate with people from other countries with different interests and culture in a natural way. In this assignment, I discuss how the Epistemic Insight initiative could guide students to see foreign languages in the context of history, geography, RE, sociology, etc.

My research took place in Key Stages 4 and 5. My learning objectives focused on: Why language is important? And the intention of the activity was for students to understand how learning a new language helps them to learn about other cultures and different ways of life. On the other hand, I wanted to show my students how the historical, geographical, and religious factors have shaped the culture and language. Sometimes, there are pressures in schools that dampen students' expressed curiosity in Big Questions about the nature of reality and human personhood (Billingsley et al., 2018). Some policies also limit their developing Epistemic Insight into how science, religion and the wider humanities relate (Billingsley et al., 2018). In this research, I use the EI framework to develop pupils' understanding of the ways that science interacts with other ways of knowing, which means different cultures in my case. The framework is organised into three categories. Firstly, the nature of science in real world contexts and multidisciplinary arenas; secondly, ways of knowing and how they interact; and thirdly, the relationships between science and religion.

During my lessons, I used videos on YouTube as my realia resources to bring the attention of my students on what they have learnt in the class is relevant to the Spanish culture and lifestyle. I have communicated with History, Geography and English departments to find out what subjects they are covering in these years to give me a view to lead my activity inside pupils' knowledge zone. Although I did not find out any concrete Spanish concepts, I was able to choose the most suitable terms to fit them in my lesson plans. From my own experience, learning activities regarding festivals, famous historical characters and events attracts more interests from students.

My main activities focused on watching videos regarding a cultural aspect of a Spanish speaking country. I designed some comprehensive questions to be answered by the students to bring their attention to:

1. The reason of the lifestyle of the people of a specific region
2. What would they do in the same situation?

My reason to ask the second question is to show the students how we all could be like each other under similar conditions in order to support my Big Question of EI framework: "How can we make the planet a better place to live by mutual understandings and respecting cultures".

Literature Review

There is a growing body of literature that discusses how understanding culture is essential to learning a new language. Placing language learning within a cultural context makes both the target language and the target culture more accessible and understandable. Pachler and Field (2009) argue that

through learning about different cultures, people are better able to communicate with people from other countries and understand that there are other ways of life and to tackle negative stereotypes.

Based on the National Curriculum (2013) for Modern Foreign Language (MFL), students should develop their ability and ambition to communicate with native speakers in speech and writing. However, memorising new words and grammar rules is not enough to communicate with a native. Understanding their culture creates a context that allows students to give the right meaning to each word and structure. Knowing the sociocultural background, they will be able to think in the foreign language rather than translating the phrases from their native language to the target language. It also helps prevent misunderstanding their culture.

Cultural backgrounds can help to motivate students to learn foreign languages as well. In his seminal work, Churches (2013) dedicates a theme to show how better intercultural understanding improves pupils' experiences of language teaching. He argues that if children are given the chance to apply their language skills to real-life situations, this will enthuse and inspire a love of learning a language and motivate them to have a positive approach to learning a language. In one experiment, children were in contact with Canadian students to practise French. Through their communications, they have shared resources and enjoyed experiences about other subjects as well. Looking through an epistemic insight lens, it is a big step for students to understand how learning languages makes them able to communicate and discover new ways of life. Another interesting finding was the enthusiasm of the students to establish links with other countries and, maybe, to learn more languages.

However, Humphrey (2012) argues that although the intercultural understanding work is entirely feasible and is enjoyed by the pupils, there are few obstacles such as limits in schools' as well as teachers' timetables and ineffective differentiation practices. Bergmann and Sams (2012) introduce a novel strategy to deal with time and differentiation. They train teachers how to dedicate every individual student enough time and suitable pace they need to learn. They also show how trusting pupils' choices and priorities improve their behaviour and sense of responsibility. On the other hand, as a beginner teacher, I would have enough time to create and revise my educational videos, critically analysing and discussing them with my experienced colleagues.

Although influential sources of evidence, such as the Education Endowment Foundation's Teaching and Learning Toolkit, often indicate that teaching metacognition in schools can have a very positive effect on pupils' outcomes, there is a neglected area of school policy and practice metacognition (Perry, 2019). It is not easy for some teachers to challenge the tradition and their own authority. The National Curriculum for MFL also demands the study of a modern foreign language at GCSE should broaden students' horizons and encourage them to step beyond familiar cultural boundaries and develop new ways of seeing the world. The reading texts should include authentic sources involving some complex language and unfamiliar and authentic material addressing a wide range of relevant contemporary and cultural themes.

David Spence (2012) discusses the difficulties that schools might face regarding the NC demands. There, he declared: "pupils' engagement has been good, and the material has provided an extra cultural dimension for which there is often not enough time in the curriculum... There is the issue of difficulty of access versus authenticity. If a text must be adapted very considerably, clearly the risk will be that the authenticity is lost. The scaffolding and teaching process then become critical and this is an area we will have to explore further, as well as how to differentiate within a group so that all are sufficiently supported and challenged. We recognize that the texts have taken a long time to create..."

In my opinion, despite these limitations the current literature is trying to overcome these obstacles and to exploit more systematically the opportunities that intercultural understanding provides to develop thinking skills and personal learning.

Cross curricular teaching and CLIL (Content and Language Integrated Learning) are other examples worth a mention. "CLIL refers to situations where subjects, or parts of subjects, are taught through

a foreign language with dual-focused aims, namely the learning of content and the simultaneous learning of a foreign language.” (Marsh, 2012). In my Year 13 class, CLIL is happening since we needed to study history in Spanish for a better understanding of a theater play.

In my own practice, I put the big question “How can we make the planet a better place to live by mutual understandings and respecting cultures” in the middle of the Discipline Wheel. I chose other disciplines such as History, Geography and Sociology to study how each one would help us with answering the question. In my lessons, we have talked about the strengths and limitations of different ways of knowing (cultures) and noticed how much is lost if we only use one lens to investigate and explain reality. When we understand why some customs are adopted, e.g. under special geographical demands, the reason would help us to reduce prejudgments and hegemony of cultures.

I wish to apply the teaching strategies proposed by Billingsley (2016), to encourage my students to call on multiple ways to address questions in multicultural classrooms, and to make them familiar with a range of worldviews and religious beliefs. This way, I would be able to practise “Extraordinary Pedagogies” (Falitis and Abedi, 2013), which seek to humanise educational practices through the examination of issues such as racism, classism, agency, sexism, poverty, community, and language.

Talking to my pupils, especially those less interested in learning languages, I found out that they don’t feel any need to learn a foreign language. Therefore, practising epistemic insight would help me to show them why languages are important. Because, for understanding the real-world context, we need to communicate meaningfully with each other, and this is the main tool needed is learning languages. Later in my critical discussion, I talk about Paulo Freire’s view regarding how needing something creates the motivation.

Methodology

My research has been carried out in Years 9, 10 and 13 classes of a co-educational non-selective school with 1414 pupils on the roll. I have decided to cover the whole class as my focus group for three reasons. Firstly, because there are only three students in the Year 13, and for Year 9 and 10, I had the opportunity to use my subject mentor and another experienced teacher as research assistants. Some activities were led by the teacher, so that I could fully concentrate on observing and recording the pupils’ responses without being distracted by leading the activity.

Secondly, an experimental design was my chosen methodology in Y10. One difficulty in assessing the effectiveness of a new methodology in educational studies is that each class and school is significantly different from others. An experimental design can remove the possible difference in different classes by having an experimental and control group. One group (i.e. the control group) receive the usual teaching, while the second group (i.e. treatment group) are exposed to the new teaching methodology. To measure the effectiveness of a new methodology, we can then compare the performance of the control group with the treatment group. Thus, I have tried to keep my classroom environment in a normal as possible since some children may change their behaviour under specific circumstances which might bias the findings.

Thirdly, it was pragmatically more achievable to fit in to the routine patterns of the life of the school and reduce any ethical concerns that may arise during the research.

My school’s scheme of work (SOW) in the current module is the same for year 9 and year 10. I used my year 9 class as my control group. This group served the base line to compare my final findings with later. And the year 10 class was the treatment group; therefore, I gave children opportunities to explore and find out about the culture of Spain. I played some videos on YouTube to show them how to apply their language skills to real-life situations. Before showing the videos, I asked the pupils some comprehension questions to bring their attention to the lifestyle of the people who live in different cities of Spain. They were asked to think individually first and write down their opinions on Post-it

notes. Then, they shared their notes in groups of 3 or 4. I asked them to sort their notes in columns under titles of History, Geography, Religion and/or a title of their own choice. I also have prepared a sheet for a customised dictionary, so that they could write their ideas in Spanish. Then, they watched the video and were given another 3 minutes to work on their answers. At the end, we had a class discussion when I had the opportunity to share with pupils the points that were missed in my opinion.

The backbone of the whole discussions in my lessons was the Big Question. During the activities, I always tried to guide my students toward different methods and norms of thought without being distracted from the learning objective. Children sometimes asked some questions that, not only is not possible to be answered in the limited class time, they may never be answered by one discipline alone.

As I mentioned before, the control group of my research was a Year 9 class. For this group, I showed a factual video and changed my comprehension questions to a list of True/False statements, however, the lesson objective, my PowerPoint and all other class activities were the same.

Through my careful observations, I tried to assess pupils' improvement of language learning experiences as well as their engagement with the activity in both classes. I had in mind all the time that my research environment is not 'controlled' since I was studying young people whose behaviour may change at any time.

I have planned to collect both qualitative and quantitative data. Any data collected was handwritten and no photographs, videos or audio recordings of the participants were made throughout the process. As a main requirement of my methodology - experimental design my project has been designed with the intention that almost all of it will be classed as routinely occurring circumstances. I have monitored the students during the activities and had normal chats with them about their work. In my handwritten notes, I interpreted the students' reactions and general behaviour.

Regarding my quantitative data, I was waiting for the final module assessments which haven't been done due to school closures. However, as a plenary, I have asked my students how satisfied they were with their learning experience at the end of the session. They have also been asked how confident they are to use what they have learnt during the session in the real life.

For my Year 13 students, I have decided to create an evidence-base methodology. They are a small group of 3 students who study a Spanish theatre play written during a very critical moment in Spain. I have observed this group for few months before starting to teach them and I was aware of their learning barriers and misunderstandings. They could not build relationship with the content of the play since they did not know the history, the culture nor the Spanish society in which the author had lived, and the play was written. They refused to participate in lessons and did not do their homework properly. They did not like the play. I have decided to teach Epistemic Insight to this group. My chosen discipline to work with my language class was History. Drawing on Paulo Freire's critical pedagogy, which posits that education functions as an instrument which is used to facilitate the integration of generations into the logic of the present system and bring about conformity to it (Mayo, 1999). Also, inclusion of the arts-based pedagogy in and out of schools expand critical awareness of an increasingly diverse world (Chappell and Cahnmann-Taylor, 2013). In my opinion, that is why we study literature: to humanise our educational practices! From the beginning, I have assumed the epistemic insight as the best practice available and I will keep studying the research to re-evaluate my practice.

Finally, I am aware of the limitations of my small study carried out only in three classes during a short time. Findings would be more reliable if I could choose randomly small focus groups in different classes, different schools, different cities, etc.

Critical analysis and discussion

As I have already discussed in the literature review, understanding culture is essential to learning a language. In addition, it will enthuse and inspire a love of learning a language and motivate children. Also, it is one of the aims of the National Curriculum (2013) for MFL.

My observations as a beginner teacher showed that very often, teachers dedicate no more than 20 minutes at the beginning of a new module to present the basic cultural points. I did not notice practical references to the culture during teaching the module. Specially in KS4, the focus of the class is usually learning the 'right answers' for GCSE exams. As if the students only learn to 'play school' (Bergmann and Sams, 2012) which means to know the tricks to get the best marks in exams when they miss out the essential understanding that is mentioned in the curriculum. In my opinion, it is one of the most important reasons that the students easily get lost when you put them in a different context. Because understanding culture is the context that allows pupils to give the right meaning to each new word and structure. Research revealed that gaining a B in GCSE does not guarantee any ability to communicate with native speakers in speech and writing. (Vanderplank, 2013)

For my research, I have decided to apply the common task-based strategy in a year 9 class as my control group. The first session's learning objective was to learn about the food culture and time of eating in Spain. At the beginning of my lesson, I showed a relevant video on YouTube and I asked them to answer some True/False questions to make sure they have learnt the main points. Teaching them the new vocabulary and grammar rules, I have used lots of Conti activities (Smith and Conti, 2016) which are so creative and engaging. However, there were reading and writing tasks available which were the focus of my qualitative measurement. This group had a session with another teacher observed by me. They have done some regular reading comprehension activities in that session. Then, in my new lesson, I have decided to dedicate a large percentage of my lesson to a writing activity.

Meanwhile in a year 10 class as my treatment group, I have showed the same video on YouTube in the second session. This time I have designed some comprehension questions to be discussed in the class. From some casual references to culture in the first session, I have noticed that it seemed strange to the children why the Spanish people eat lunch and dinner late, which to them was not healthy, or the concept of "siesta" was not understandable. Thus, I tried to prepare an environment to show my students how we all could act like each other under similar conditions. I have used The Discipline Wheel model and my big question was: "How can we make the planet a better place to live by mutual understandings and respecting cultures". We looked at the culture through the lens of Physics and Geography and found out that although Spain is situated in the same longitude as the UK, the time zone of the country coincides the European Union. So, while we are living the same time of the day the clock is set one hour forward in Spain. It also has impact on the sunset hour, so the days are so long that people need to take a nap during the day.

Monitoring my students in year 9 during the writing activity, I needed to encourage pupils individually to use their class time and be engaged with the task. They were allowed to work in pairs or ask their peers questions, but it didn't seem that they took the responsibility of independent learners and they abused the opportunity to chat with each other. They expected me passively to show them the answer or where exactly to refer to get help. They were largely off task. Marking the books after the session did not show any special sign of interest.

The Year 10 'treatment' group enjoyed a very productive dynamic lesson. Understanding the context, the students were engaged in fruitful discussions. The general environment of the class was a bit loud and noisy, however, there was not any need to manage the behaviour. Students were calling out and moving around the class to share their points with each other. They took the responsibility of making sure what they have remembered from other subjects' knowledge is correct before relating it with the current issue. They referred independently to the support sheets, board and their dictionary to find the necessary words and structures. At the end of the session, 17 children out of 20 showed confidence to use their knowledge in real-life situations. All of 20 were happy with their learning. During the writing

activity in the third session, pupils were engaged with their work independently. They felt so confident to use their knowledge and they used their books and dictionaries meaningfully. Therefore, I had time to help weaker students and support the whole class based on their individual needs. (metacognition strategy)

For my Year 13 class, I have dedicated a whole session to present them what the playwright had lived and was experiencing when he was writing the play. During my presentation, I brought their attention to the specific parts of the book and asked them to compare the contexts. We have also discussed what we would do in the characters' place. I have received excellent feedbacks after the lesson. The students started to like the play and my mentor believed that my teaching has enabled the students to make good progress.

From my observations I understood that the students don't like the play because they don't know it. They saw themselves in front of a very unknown and therefore confusing world. Through some short videos on YouTube, we have discussed the history of the author's era and the challenges of the society, which make the culture of the people. Once the context was familiar, students could understand the reasons and could reasonably analyze the play's characters and happenings.

Reflexive analysis

Communication and making connections are essential life skills for children to succeed inside and outside school. Clearly, language is a communication tool and depend on my literature review, intercultural understanding is essential for learning language and making meaningful connections based on mutual respect. As a teacher, it is crucial for me that my students are aware of the importance of learning a language. I believe if I can convince my students that they need to learn languages, then I could train independent learners with a clear learning objective. In addition, I will become a facilitator rather than a teacher. Being a facilitator, I would have enough time to build relationship with pupils and be aware of their individual needs, not only the subject barriers but also their life challenges as part of my safe-guarding responsibility. In my career, I wish to practice constantly researches and then critically analyse my pedagogy. Only a critical teacher can teach critical thinking and develop critical students.

Extraordinary pedagogies, like epistemic insight, should not be just about the best method for teaching to the students' learning needs. They should be able to engage families and communities and involve the teachers' sociocultural experiences. I would like to take greater responsibility for understanding the historical, societal complexities that come into play each school day (Faltis and Abedi, 2013). I believe intercultural understanding in a language class can expand to deal with racism and classism as well.

At this point in my training, I keep my task-based teaching strategy to respect my subject mentor's demands, trying to apply metacognitive approaches in my lessons. I wish to learn more about the ways to teach Epistemic Insight and I feel I could practise them better in a Flipped Learning Classroom.

References

- Bergmann, J. and Sams, A., 2012. *Flip your classroom: Reach every student in every class every day*. International society for technology in education.
- Billingsley, B., 2016. Ways to prepare future teachers to teach science in multicultural classrooms. *Cultural Studies of Science Education*, 11(2), pp.283-291.
- Billingsley, B., Nassaji, M., Fraser, S. and Lawson, F., 2018. A framework for teaching epistemic insight in schools. *Research in Science Education*, 48(6), pp.1115-1131.
- Chappell, S.V. and Cahnmann-Taylor, M., 2013. No child left with crayons: The imperative of arts-based education and research with language "minority" and other minoritized communities. *Review of Research in Education*, 37(1), pp.243-268.
- Churches, R. ed., 2013. *The quiet revolution: transformational languages research by teaching school alliances*. CfBT Education Trust.
- Faltis, C. and Abedi, J., 2013. Extraordinary pedagogies for working within school settings serving nondominant students.
- Marsh, D. and Frigols Martín, M.J., 2012. Content and language integrated learning. *The encyclopedia of applied linguistics*.
- Mayo, P., 1999. Gramsci, Freire and adult education: *Possibilities for transformative action*. Palgrave Macmillan.
- Pachler, N., Barners, A. and Field, K., 2009. Class-work Methods Teaching Languages. New York: *RefineCatch Ltd*, pp.228-230.
- Perry, J., Lundie, D. and Golder, G., 2019. Metacognition in schools: what does the literature suggest about the effectiveness of teaching metacognition in schools?. *Educational Review*, 71(4), pp.483-500.
- Smith, S. and Conti, G., 2016. *The Language teacher toolkit*. CreateSpace Independent Publishing Platform.
- Vanderplank, *The Guardian*, Tue 15 Oct 2013 14.36 BSTFirst published on Tue 15 Oct 2013 14.36 BST, <https://www.theguardian.com/education/2013/oct/15/modern-languages-grading-tip-of-iceberg>
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Epistemic Insight

