

Aim, focus and purpose of the research.

This research project stemmed from the researcher's interest in the perceived negative impacts created by the increased usage of technology within the classroom. Since Graham Donaldson's 2015 review into education within Wales, there has been a heightened sense of urgency surrounding digital competency (Donaldson, 2015). This resulted in the introduction of the Digital Competency Framework during the subsequent year, with technology playing a large role within classrooms since (Curriculum Reform Division, 2018). The researcher was concerned about the reliance of technology as an educational resource, and its unsettling potential to replace traditional resources.

Research Context.

During the teaching placement, the researcher was based within a Year One class. The pupils would often individually use technology, to play topic related games online. Pupils would rarely use technology as a source of independent research, with research activities often being adult led. The placement school has been notably influenced by Donaldson's four core purposes, with the recent Estyn report drawing attention to the schools' effective practice in creating ethically informed pupils (Estyn, 2017). Taking both of the aforementioned factors into account, this aided the creation of the research question "Does the Digital Competence Framework assist pupils in becoming ethically informed citizens of Wales and the World?". The researcher would therefore be inspecting how pupils engage with traditional resources, such as pieces of literature, in comparison to digital resources.

Short overview of the relevant literature.

For the purpose of this research project, traditional resources will be classified as 'paper' or 'physical' resources. Such resources are often viewed as having a long-standing place within the classroom and provide individuals with a sense of familiarity (Wiethuchter, 2019), hence the definition 'traditional' resources.

There are many perceived benefits to using such resources. Research has shown that pupils are increasingly likely to sustain and recollect information gathered from traditional resources (Singer and Alexander, 2016, *cited in* Ross et al, 2017). Books can also be noted as providing content that has been 'tried and tested', and in other words, safe (Flynn, 2018). Alongside the educational benefits provided by books, they can also support the development of empathy, by naturally encouraging

pupils to reflect upon the various viewpoints held within the pages (Nikolajeva, 2014 *cited in* Wiethuchter, 2019).

Although books are often a source of familiar source of information and creativity for many, the resource is yet to 'significantly evolve' and match the up-to-date learning experience provided by technology (Flynn, 2018). Traditional resources often tend to be more expensive, in comparison to websites or apps commonly found upon their technological counterparts (McVicker, 2017; Zhang et al, 2014 *cited in* Domingo and Gargante, 2016). Chou (2010) has stated that pupils can often be disinterested and unengaged by the potentially monotonous learning experiences traditional resources provide, with nearly all pupils favouring the interactive aspects of digital resources.

Due to the increasing development of technology within the modern World, it comes as no surprise that digital resources are becoming the favoured choice in supporting pupils learning (Curriculum Reform Division, 2018; Arthur, Crick and Hayward, 2013; Craft, 2010). Pupils are now often coined as 'digital natives', with a vast experience of technology before they start attending school (Donaldson, 2015; Beauchamp, 2012). This has resulted in an increasing demand on a society which is fully able to participate within the modern, digital World (Donaldson, 2015). Such demands have led to the need for pupils to develop and nurture their digital skills, at an earlier age.

There are many perceived benefits of using technology within the classroom. Cox et al (2003, *cited in* Beauchamp, 2012) have noted the impact technology has, on improving attainment levels across subjects. Digital resources provides pupils with an almost continuous learning experience, enabling them to easily access resources at any given time (Kilmova, 2012). Furthermore, digital resources are in possession of a wider range of information, extending the potential available learning experiences (Flynn, 2018).

On the other hand, there are several disadvantages associated with technology. Cordes and Miller (2000, *cited in* Craft, 2010) warned of the potential implications technology has upon the physical, social and emotional development of children. Twenty years later, this viewpoint is still often a cause for debate. Haughton, Aiken and Cheevers (2015, *cited in* Wiethuchter, 2019) have argued that technology limits childrens creativity and the development of problem-solving skills. It can also be argued that the lack of personal contact, would result in few experiences

for children to confidently engage and socialise sufficiently within society (Grose, 2013, *cited in* Wiethuchter, 2019; Kilmova, 2012). Despite the awareness of the potential negative impact technology may have, the increasing need for a digitally skilled society has indeed far outweighed these.

Such demand has had an influence upon the current changes for education within Wales. Arguably, one of the most powerful reports into Welsh education, is Successful Futures (Donaldson, 2015). He stressed the importance of children developing and enhancing their digital skills, as opposed to them simply being passive consumers of technology (Donaldson, 2015).

As a result of Donaldson's review, the Welsh Government created the Digital Competence Framework. A focus was placed upon the development of important skills which enabled pupils to be more confident, creative and critical users of technology (Curriculum Reform Division, 2018). It enables these skills to be developed across the curriculum, instead of separating them into a separate subject matter (GWE, 2020; Curriculum Reform Division, 2018). The implementation of such a framework, has been regarded by Edwards (2019) as an essential factor in improving the digital skills of pupils within Wales. With digital competence skills being made a priority within Welsh education, one can begin to argue how this may affect other areas of the new curriculum, such as developing 'ethically, informed citizens' (Donaldson, 2015).

Ethically, informed citizens has been defined by Graham Donaldson as pupils who 'respect the needs and rights of others, as members of a diverse society', and who are therefore able to become 'citizens of Wales and the world' (Donaldson, 2015, pg. 30), and is one of the four, core purposes of the curriculum. There is a variation of ways in which this can be developed. Estyn has noted that an increased level of pupil participation, prepares pupils in becoming ethically informed citizens (Estyn, 2016). Donaldson (2015) has also stated that pupils can develop this skill by doing things such as, questioning various points of view, and evaluating the differing influences technology has had upon the world.

Overall, the literature implies that both technology and traditional resources can help develop ethically informed pupils. Technology would provide pupils with a wider range of information, to help them develop an insight into different viewpoints (Flynn, 2018). On the other hand, traditional resources can support this by its natural ability to provide diverse points of view (Nikolajeva, 2014 *cited in* Wiethuchter, 2019).

Explanation of the lesson study.

The methodology used within this research project, is lesson study research. Originating in Japan, lesson study research involves a group of educators who collaboratively investigate a certain aspect of education, with the aims to further enhance it (Giannakidou, Yoftsali and Tziora, 2013 *cited in* Kanellopoulou and Darra, 2018; Lewis et al, 2012). It has five phases, which ensures that the researchers collaborate together to plan, evaluate and reflect upon the lessons (Kanellopoulou and Darra, 2018). Lesson study also has the option to focus upon 'case study' pupils, which according to Dudley (2013, *cited in* Dudley, 2014) can provide researchers with information that may not have been noticed before. During this research project, three different pupils with varying ability levels from each class were focused upon, to provide the researcher with a vaster range of viewpoints and information. Such a research method has been known to improve the professional development of educators, as well as the levels of pupil attainment (Archer et al, *cited in* Kanellopoulou and Darra, 2018; Dudley, 2014).

A variation of data collection methods were used within this research project, with the pupils firstly being observed during the research lessons. Observations have been regarded as one of the most widely used methods of data collection (Cohen, Manion and Morrison, 2014).

During observations, the researcher has the option to become a participant or non-participant observer. A participant observation has been defined as an observation in which the researcher immerses themselves within the group, and therefore becomes actively involved within the research (McLeod, 2015). This particular kind of observation is associated with a number of challenges. Cohen and Crabtree (2006, *cited in* Takyi, 2015) has posed the issue of researchers potentially finding difficulty in detaching themselves from the research participants, which McLeod (2015) notes could lead to bias. Due to these limitations, this research project opted to use non-participant observations to collect the data. This has been defined as when the researcher focuses upon observing the research participants, and collecting data accordingly (McLeod, 2015; Cohen, Manion and Morrison, 2014). It also allowed the researcher to observe other phenomena that had taken place

during the lesson, that the class teacher may not have witnessed (Cooper and Schindler, 2001 *cited in* Cohen, Manion and Morrison, 2014).

The researcher was also aware of the potential disruption their presence may have caused within the class. To counteract this, they followed the advice provided by the National Education Union (2018) and observed the entirety of the research lessons. The researchers also opted to sit at the back of the classroom to ensure they caused minimal disruption, as suggested by Cohen, Manion and Morrison (2014).

Simpson and Touson (2003, *cited in* Cohen, Manion and Morrison, 2014) have noted the importance of the researcher noting down the gathered data. For the purpose of this research project, this shall be done through the means of observation notes, which will be gathered during the research lesson. The notes gathered will focus upon the three 'case-study' pupils, who will be randomly selected prior to the lesson taking place. These will identify their levels of engagement and participation during the lesson, alongside their progression in becoming ethically informed. The notes gathered will provide qualitative data, which has been defined as worded, descriptive data (McLeod, 2019).

The second method of data collection used during this research project, is the use of reflections. This is a phase of the lesson study format, that encourages all participating researchers to reflect upon the research lesson and consider potential improvements prior to the following lesson (Dudley, 2014). To ensure that a consistent reflection took place between both researchers, the Gibbs model of reflection was used. It provides six stages of reflection, which encourages the researcher to reflect what did and did not go well, alongside planning improvements for future lessons (University of Edinburgh, 2019). The reflections were captured after each lesson, with both researchers actively participating within this.

Thirdly, data was also gathered through the use of semi-structured interviews. Semi-structured interviews contain a mixture of open and closed questions and allows the researcher to gather a wider range of detailed answers from individuals (Adams, 2015). The researcher opted to use this method, as opposed to the alternate structured interview. The structured interview would have provided the researchers with little opportunity to adjust the questions in accordance to the participants response (Cohen, Manion and Morrison, 2014). The pupils who were observed during the research lessons, were chosen to participate within the semi-

structured interviews. Due to the potential anxiety the pupils may have faced during the interview (Alshenqeeti, 2014), the pupils were taken into a quiet, familiar room within the school, to limit the likelihood of the negative effects taking place. During the semi-structured interviews, two researchers were present, in order to avoid potential bias taking place, as suggested by (Kitwood, 1977, *cited in* Cohen, Manion and Morrison, 2014).

Ethical considerations.

Whilst conducting this research project, there are many ethical considerations that must be taken into account. The first being the emotional distress pupils could experience whilst being interviewed (Bera, 2018; Cohen, Manion and Morrison, 2014). To counteract this, the researchers reassured all the chosen pupils that they were able to withdraw from the research project at any stage (Bera, 2018). Another identified ethical consideration, is ensuring that the information provided by the pupils remains confidential and does not contain details which could identify the pupils (Bera, 2018; Cohen, Manion and Morrison, 2014). Due to this, the pupils within Key Stage 2 shall be referred to as Pupils A, B and C, with the pupils in Foundation Phase being referred to as Pupils X, Y and Z.

Lesson study 1.

The first research lesson took place within a Key Stage Two class. The pupils were tasked with creating a fact file about plastic, a subject which linked back to their current class topic. The pupils were able to use both iPads and a variation of pre-selected paper resources, enabling them to form an evaluation on which resource they believed allowed them to develop their learning. They were also provided with a set of questions, which provided both the researcher and class teacher, with an insight into which resource supported the pupils learning. As the lesson was focusing upon the impact plastic has upon the World, it facilitated the development of them becoming ethically informed citizens (Donaldson, 2015).

Three pupils were randomly selected to be focused upon during the observation, and to subsequently participate in the interviews. These pupils ranged from the varying attainment levels within the class. Pupil A was identified as having high levels of attainment, with Pupil B having middle levels of attainment. Pupil C was categorised as having low levels of attainment.

The pupils were shown a video to introduce them to the topic, with Pupils B and C showing continuous signs of engagement throughout the video (Appendix 1). Pupil A was observed as initially having focus at the start of the video but did begin to lose focus towards the conclusion. Once the video had been completed, the class teacher gathered the pupils' understanding through the use of whole class questioning. Pupil C participated in the questioning and provided several suggestions. This implied that they had high levels of engagement throughout the initial task. Pupil B did not provide suggestions but was observed as being focused upon the class teacher. Pupil A did not participate within the questioning and was observed as having varying levels of engagement (Appendix 1).

The pupils were then provided with the resources, to aid them in their learning. Pupils A and B firstly used the iPads, with Pupil C using the paper resources. Pupil B remained focused throughout using the iPad and was observed as using the resource to aid them in completing the questions. Pupil A initially was not engaged but was later on observed correctly using the resource. Pupil C was often distracted by others whilst using the paper resource, which led the researcher to question their levels of engagement (Appendix 1).

After twenty minutes, the pupils swapped resources. Pupil C was now using the iPad, with Pupils A and B using the paper resources. Pupil C was observed as having high levels of engagement and was using the online resources available on the iPad, to assist them in completing their question sheet. They were also often heard verbalising facts they found interesting, to their peers or to the class teacher (Appendix 1). Although Pupil B was initially observed as being disinterested in using the paper resource, however they were later observed accessing the materials and remained on task for the duration of the lesson. Pupil A was observed as having low levels of engagement whilst using the paper resource and was reminded by the class teacher to concentrate upon their task. As a lesson plenary, the whole class was asked to provide a fact that they had found interesting. Pupils B and C happily participated within this task, with Pupil A appearing reluctant (Appendix 1).

Once the lesson had taken place, the selected pupils participated within a semi-structured interview, which aimed to identify their opinions on what they believed to be the better suited resource (Appendices 2 and 3). Pupils A and C appeared to happily participate within the interview, and at times appeared to dominate the conversation. Pupil B initially seemed comfortable in not providing

suggestions, with the researcher often aiming questions towards them, in order to grasp their opinions. The pupils were asked what resource they preferred using during the lesson. Pupils A and C stated that they preferred using the iPads to gather information, with Pupil B favouring the paper resources. The pupils were then asked what resource they believed helped them in completing the task, with all three pupils stating that they believed a mixture of both resources aided them in this.

Lesson study 2.

The second research lesson took place within a Foundation Phase class. The lesson focused around different houses around the World, with pupils being encouraged to draw comparisons between houses within their local area. This lesson linked to their current class topic, of Houses and Homes.

Three pupils were selected to be focused on during the lesson, and to take part within the subsequent interviews. They were randomly selected prior to the lesson, and similar to the previous research lesson, the pupils ranged in attainment levels. Pupil X had a high level of attainment, with Pupil Y being categorised as having middle levels of attainment. Pupil Z was identified as having low levels of attainment.

The pupils were shown a video, to introduce them to the lesson. This was a whole class activity, with all pupils being able to access this resource. Due to the age group of the pupils, and their lack of experience in using technology independently, it was decided that this would be the technology section of the lesson. All pupils were observed as initially having high levels of engagement during this task. Pupil Y was often observed as being distracted towards the end of the video (Appendix 6).

The pupils then watched the video a second time, with the class teacher pausing it in relevant places, to allow for class questioning. The pupils were asked to identify the kind of house they saw, and what made it suitable for the location. Pupils Y and Z did not provide suggestions during the questioning, with Pupil X responding once. The class teacher then asked the pupils their opinion on which house they would have liked to live in (Appendix 6). Pupil X responded with stating they would have liked to 'live in the jungle', with both pupils Y and Z opting to live 'in the sea'.

The pupils were then separated into their table groups, to engage with the paper resources. The pupils were provided with a selection of fiction and non-fiction

picture books, with pupils being able to choose which book they wanted to engage with first. Due to the age and varying ability levels of the pupils, an adult was required to assist them and read out their chosen book, in order for them to fully be able to access the learning (Appendix 6). Both Pupils X and Y were very easily distracted during this and were both observed as having low levels of engagement. Pupil Y was often observed as not being engaged during this and would often remove themselves from the table. Pupil Z was observed as having high levels of engagement and remained focused upon the book whilst it was being read.

Alongside the book, pupils were also provided with a set of questions, in order to gather which resource helped them develop into ethically informed citizens. Pupils X and Y were observed as initially being reluctant to provide suggestions during this, with Pupil Y eventually providing a suggestion once asked their opinion. Pupil X was observed as being engaged within the questioning but was not asked to provide suggestions. Pupil Z was observed as showing high levels of engagement during the questioning, and often provided responses. They were able to identify a treehouse and stated that it was suited for the area because 'it would keep the people safe'.

As a lesson plenary, the pupils were shown a selection of pictures upon the interactive whiteboard, which related back to the previously viewed videos and picture books (Appendix 6). Pupil Z had their hand up for all the pictures shown and was able to identify the majority of houses shown. Pupil X was observed as having high levels of engagement during this and was able to provide suggestions for some of the houses shown. Pupil Y was observed as not showing signs of engagement during this and was not focused upon the interactive whiteboard.

Once the research lesson had taken place, the observed pupils then took part in a semi-structured interview (Appendices 7 and 8). Pupil X happily participated within the interview, and at times dominated the conversation. Pupil Y showed varying signs of engagement, with Pupil Z often appearing reluctant to participate. The pupils were firstly asked which resource they preferred using and why. Pupil X stated that although they enjoyed using both resources, they preferred the video as 'it had lots of voices and pictures'. Pupil Y preferred using the video, because 'it had lots of facts'. On the other hand, Pupil Z stated that they preferred using the book, because they enjoyed looking at the pictures. The pupils were also asked which resource helped them gather the most facts. Pupils X and Y answered that the video helped them the most, with the book being chosen by Pupil Z. Upon being asked

how they would improve the lesson, Pupils X and Y recommended incorporating a game into the lesson, or being able to build a lego house. Pupil Z did not provide a recommendation, as they stated they enjoyed the lesson.

Discussion of research findings.

After reviewing the learning of the six case study pupils, it became clear that no resource was able to individually support the pupils in becoming ethically, informed citizens, and that instead, incorporating both had more of a positive effect. Beauchamp (2012) has highlighted that merely using technology, does not necessarily result in an improved learning experience. Both the research and literacy has also highlighted the importance of using technology across the curriculum. Donaldson (2015) has stressed that both literacy and digital competence should be developed across the curriculum, and not be separated into stand-alone subject areas. This is supported by the viewpoints of the pupils, gathered during the semi-structured interviews. All six pupils from both year groups stated that they preferred using a mixture of both paper resources and technology.

There was also evidence to suggest that the engagement levels whilst using the resources, varied with the age groups. It was particularly evident whilst observing Pupils A and Y during the research lessons, with both pupils displaying inconsistent levels of engagement. This could be due to the significantly expected learning outcomes for each year group. At the end of Year 1, the Foundation Phase states that 'accessing technology would include some independent use of a mouse and touchscreens' (Early Years Team, 2017). The Digital Competence Framework has also noted that pupils often work in pairs, or small groups, in order to develop their skills (Curriculum Reform Division, 2018). On the other hand, the expectations for year 6 are vastly different, with pupils having a larger level of independence (Curriculum Division, 2008). It could also be argued that the high attaining pupils may not have been provided with challenging enough resources. Chou (2010) has noted that this is an issue commonly associated with paper resources, such as books.

There were limitations associated with using the lesson study. Dudley (2015) recommended using three cycles, or three research lessons. In regards to this research study, there were only two researchers, which limited the amount of detailed information that could have been gathered. Carroll (2013) has also indicated

that lesson studies may not always have a positive impact upon the pupils learning achievements. This relates back to the information gathered during the research lessons. It could be argued that as the pupils were already familiar with Donaldson's four core purposes (Donaldson, 2015), that the research lessons did not benefit them in becoming ethically informed.

Conclusion.

In conclusion, the use of both traditional and technology resources both complement each other, and encourage the development of 'ethical, informed citizens' (Donaldson, 2015). By ensuring that both resources are readily available for pupils, it would therefore ensure that any cross curricular requirements are satisfied (Curriculum Reform Division, 2018; Donaldson, 2015). This is a recommendation that has also been supported by the research evidence, with the majority of the observed pupils stating that they believed both available resources helped them in becoming ethically informed. The research has also indicated that if the pupils stated that they preferred a singular resource, their work has suggested that there is not a distinct resource which clearly encouraged aided them.

In order to ensure that the results could be generalised, the researchers opted to choose pupils from the three different ability groups within the classes. Generalisation has been defined by Yin (2013, *cited in* Wikfeldt, 2019) as the researchers attempt to associate a small amount of research findings, with a larger group or population. Alongside including pupils from the high, middle and low levels of attainment, the researchers were also placed in classes with two contrasting age groups. This not only allowed the researchers to identify any differences in using technology with the varying age groups but has also allowed them to generalise the research findings.

Although the researchers did not pilot any research methods prior to the research lessons taking place, the researchers were able to both witness and plan for the use of ICT in the Year One and Year Six classes. This enabled the researchers to understand the need for independence within the Year Six class (Welsh Government, 2019), alongside the contrasting Year One class, who needed a larger amount of adult-led support (Curriculum Reform Divison, 2018).

Despite the clear results the research project provided, there are several alterations that could be made, if the research lessons were to be repeated in the

future. The researchers had initially made the decision to link the research lesson to the current class topic, with the aims of solidifying the pupils learning. This unfortunately created some difficulty for the researcher, in finding age appropriate resources for the Year One class which also related to their topic of 'Houses and Homes'.

The lack of age appropriate resources and the vastly differing ability levels also discouraged the use of independent working within the Year One class. Independent working has been noted by Meyer et al (2008) as being beneficial to pupils learning, as it enhances their motivation. Bruner (1961, *cited in* McLeod, 2019) was also of the opinion that pupils need to independently develop their own learning. This has also been backed up by the evidence collected during the research lesson. Pupil A was observed as showing increased levels of engagement, whilst independently using the ICT resources. This can also be applied to Pupil Y within the Year One class. It can be assumed that if Year One was provided with more independent activities, then Pupil Y would have shown higher levels of engagement towards the task.

To conclude, despite the potential implications associated with using ICT, it is evident that it is absolutely necessary to incorporate this within lessons, in order for pupils to develop the skills they need for the future (Curriculum Reform Division, 2018; Donaldson, 2015; Kilmova, 2012). However, in order for technology to encourage the development of ethically informed citizens, it cannot be relied upon as a standalone resource. Simply using ICT does not necessarily achieve the intended learning outcomes (Beauchamp, 2012), and therefore must be incorporated across the curriculum to support all areas of learning.

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