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A critical evaluation of the effectiveness of digital devices used by young children to access media content and support ICT development

In the digital age, more children find themselves in positions where they have unfettered access to the world wide web, especially whilst at home (The Office of Communications, 2015). Television viewership is in decline and, due to increased units of smartphones and digital tablets being present in more households, children are increasingly using the internet as the primary means of entertainment. The rise in readily accessible technology has seen children's lives significantly impacted by the digital world. Digital childhoods are becoming an increasingly integral part of education in the early years and children that are without access to technological resources are at a clear academic disadvantage (Chassiakos et al., 2016; Kidron and Rudkin, 2017).

Replacing physical social interaction with virtual interaction too often can have a considerably detrimental effect on children's education in the early years and human communication in general may possibly have changed forever due to the recent rise of the digital age (Drago, 2015; Radesky, Schumacher and Zuckerman, 2015). Despite the negative effects that a more digital society can have on children and education in the early years, young people are more connected than they have ever been which can often lead to increased opportunities (Durkee et al., 2012; Gottschalk, 2019). Kardefelt-Winther (2017) takes the same positive stance, stating that technology can serve to enhance relationships between children as their primary socialisation is becoming rooted in the online digital space. The development of the socioemotional skills of children as young as two years old proves the importance of the support they must receive from adults in order to reach their full social potential (Chassiakos et al., 2016). These skills are still able to flourish in an increasingly digital world, but it does require the intervention and interaction of adults to be as successful as possible. By utilising noted theorist Lev Vygotsky's theory of the Zone of Proximal Development, which Mooney (2000) describes as the space between a child's ability when faced with a new task compared to the child's ability after learning from a More Knowledgeable Other, scaffolding can take place. Scaffolding is the term given to the assistance of a more knowledgeable other when supporting children's learning, serving to be the bridge in the gap of the child's learning. The more knowledgeable other, in this case the adults helping to teach the children, can engage in conversation with the children, discussing potential uses for technology and the wider web and its many downsides.

Research has found that many children in the early years have a greater understanding of the digital space than plenty of adults (Garside, 2014). Thanks to this research, pedagogues can engage with children in Sustained Shared Thinking, a term Siraj-Blatchford (2002) describes as the working together of two individuals to attempt to clarify a concept or find a solution to a problem. In the modern, digital world, where young children are ever confident in their abilities to navigate technology and the internet, it may well be the case that the child will assume the role of the more knowledgeable other (Dunn and Sweeney, 2018). Sustained shared thinking can still take place in this circumstance, where the adult can facilitate and continue to learn alongside the child. This shared time with one another on digital devices, helping each other to understand their many facets, is considered more beneficial than the activity itself. Moreover, it has been noted that technology was virtually intended to be used in conjunction with children's education, particularly in the early years. However, it is important to note that an adult should almost always be present in order to facilitate the scaffolding of a child's learning (Healy, 1998; Gottschalk, 2019).

Digital devices themselves can also serve to play the role of the more knowledgeable other and can aid in scaffolding a child's learning. Technology can often provide learners with tools to enhance the learning experience, often manifesting in ways that are individually tailored to each learner. Something as simple as autocorrect or an instant spell checker can aid in passively improving children's literacy when they are using the internet for recreational purposes, meaning that they are learning even when they do not think that they are (Sharma and Hannafin, 2007).

Technology has proven to be of great benefit to many educational settings, particularly in the early years, in aiding in the development of children's literacy skills. During the course of the 21st century, the meaning of literacy has altered to include keyboards and touchscreens as well as the traditional pens, pencils, and paper (Nutbrown, 2011). Children can tire of using pens and pencils as their writing instruments which can create hurdles in the development of their literacy skills. The digital world offers children alternative means of progression (Dunn and Sweeney, 2018). This alternative progression, by way of using technology such as tablets in school, can lend itself to learning at home. Children can use many of the same programs that are available to them in school on their personal tablets at home, offering a play like experience that is also facilitating a fantastic learning environment (Lynch and Redpath, 2014;

Neumann, 2016). It is important to remember, however, that these applications are typically one dimensional and thus do not foster open ended learning.

Guarding children from online risk and teaching children how to identify risky behaviours online should be of the utmost importance in early education (Kidron and Rudkin, 2017). By 2022 the Successful Futures curriculum, which Donaldson (2015) states will have a focus on digital competence in order to develop children into young citizens of the twenty first century, will have begun to embed itself into schools all over Wales. The notion that technology is important and should be integrated into children's learning is not a new concept. Yu (2013) advocates for the inclusion of technology in early years education, though with the crucial caveat of adult monitoring and adult facilitation to ensure appropriate and effective use. As with all tools, technology must serve the purpose of supplementation within education and should not be allowed to dominate any learning environment (Education Endowment Foundation, 2018).

Despite the increasingly positive effect that technology has on modern education, it is important to explore how much exposure to the digital world is too much exposure at certain ages. According to The Office of Communications (2018), of children aged between three and fifteen years, ninety five point five per cent regularly use a television and sixty seven per cent regularly have use of a tablet. In Wales, children spend an average of six hours at school per school day, during which time they are embedded in classrooms which, as previously discussed, are making increased use of technology – such as interactive boards and wireless signal routers (Evans, 2016). It is theorised that the radiation emitted by so many electronic devices can, over time, cause harm to the ever developing children if they continue to be exposed to them for numerous hours throughout the school day. However, Evans (2016) does state that technology certainly has its benefits and in order to combat the issue of potentially harmful radiation, schools should substitute wireless devices in favour of wired resources, which will begin to see a considerable positive impact on children's health.

The adverse effects of technology are readily apparent in the modern world, with the World Health Organisation (WHO) stating that as much as eighty per cent of children and young people are nowhere near active enough to offset physical health detriments (Boseley, 2019). However, the digital landscape provides children with the platform to develop their social skills and build their social groups and does not outright inhibit

them from taking part in physical activity. Parents and guardians must be aware, however, that they must shoulder the responsibility of enforcing a maximum screen time in order to promote a balanced lifestyle (Huber, Highfield and Kaufman, 2018; Gottschalk, 2019).

There is a common misconception that technology will serve to ‘hijack’ and brainwash children as children’s neuroplasticity is far greater than that of adults, though this notion is not supported by leading neuroscientists. In reality, though, the effect that the increased use of technology has on the brain’s function is not known (Unicef, 2017a). It is generally accepted that a moderate use of modern technology does not, based on evidence, have a harmful effect on a child’s brain development. This is a sentiment shared by the Organisation for Economic Co-operation and Development (OECD) (2019), who state that incorrect notions regarding the harmful nature of technology have led to instilling fear and anxieties within parts of the general population.

George Gerbner introduced the theory that people who are regularly exposed to any sort of media for prolonged periods of time are more likely to perceive the world as it is presented by the media that they consume. This is known as the Cultivation Theory (Shanahan et al., 1999; Saedfudin and Venus, 2007; Mosharafa, 2015). Heavy television viewing and the overwatching of programming like daily news segments can cause the development of fear within viewers which can lead to a lack of social trust. These fears can be impressed upon children. Certain aspects of the cultivation theory pertain directly to children and their perception of the world – what is real and what is not. This thinking is called the Physical Actuality. Despite the risks imposed by the cultivation theory and how it can warp children’s perceptions of the world in which they live, they do indeed have the right to know about ongoing events which is protected under Article 17 of the United Nations Convention on the Rights of the Child (UNCRC) (Unicef, 2017b).

However, it is important to note that Shanahan et al. (1999) places great emphasis on the fact that the cultivation theory is a widely debated, and not unanimously agreed upon, topic. The Office of Communications (2018) state that, since 2017, the time that children spend watching television has steadily declined and would see less exposure to the cultivation theory. Despite this, with the use of technology on the rise, it is vital

that pedagogues and guardians remain vigilant against news sources on children's tablets and ensure that children are receiving only fact based information.

A Parental Guide to Digital Safety

Children can greatly benefit from the use of digital devices in today's modern world, helping to develop their social skills, their creativity and even their language. As with all things, there exist upsides and downsides – a factor of risk for the reward (Internet Matters, 2018). Parents should always be making informed decisions with regards to children's screen time (Huber, Highfield and Kaufman, 2018). The following is a guide to inform you of some of the dangers your child could face when using digital devices and what you will be able to do minimise and eliminate risks.

What do the **facts** say?

Tablet devices are becoming increasingly popular among children, especially in the early years (The Office of Communications, 2015). The smaller screens can make supervision harder for a lot of parents.

Social networking websites were not as prevalent fifteen years ago. Now, it is reported children as young as the age of five have active social media accounts.

33% of young children report that they have experienced bullying online. As much as 20% of young people intentionally stay away from school because of this (Unicef, 2019).

Digital devices have proven to be able to enhance children's learning and aid in the development of key skills (Neumann, 2016).

What can **we** do to help?

Communication is key. Ensure your children are aware of age limits for websites and applications and, if appropriate, the reason(s) why.

Be mindful and ensure to supervise the screen time of children in the early years (Kidron and Rudkin, 2017).

Instil in your children the importance of being kind when using the internet and online services (Kidron and Rudkin, 2017).

Ask your child to work with you in order to establish fair digital rules that they will adhere to (Internet Matters, 2018).

Ensure everyone in your family is aware of what the expected behaviours are when using digital devices (Get Safe Online, 2013).

Parental controls

Children should feel free to explore the digital landscape with increasing curiosity, however parents must remember the importance of protecting them from certain content online. Parental controls serve as specialised settings in order to help filter out unwanted content from your child's digital device (Internet Matters, 2018).

Communication is key

Letting your child know that you are always there to support them is in fact the best way to support them (Young Minds, 2018). Protecting your children online is no easy feat, and with a rapidly changing digital landscape it can be hard to keep up! So, communicate often with your child and ask them questions about their activities in order to take a genuine interest.

*Do you know if they are **old enough**?*

Many parents do not know the minimum age required to use a lot of social media websites and applications that many children use anyway. Popular applications Instagram, TikTok and Snapchat require users to be a minimum of thirteen years old in order to use the services (NSPCC, 2019).

Who can help you out?

NSPCC – The official NSPCC website provides parental guidelines as well as help regarding how to set up parental controls on various digital devices (NSPCC, 2019). The NSPCC are also campaigning in advocacy of tighter restrictions on social media companies with the view of making social networking safer for young children.

Internet Matters – Internet Matters focus on bridging the gap between generations, acknowledging that children are growing up in a far different society to the society their parents grew up in. Internet Matters have established partnerships with leading broadband providers in order to facilitate the empowerment of caregivers to keep all children safe when online (Internet Matters, 2018).

Parent Zone – A predominantly online organisation, Parent Zone aim to provide support to everyone in the public regarding digital safety. By providing parents with information with which to help their children become digitally literate and responsible, Parent Zone want to help the whole family become model digital citizens.

Think U Know – This is an organisation that is operated by the National Crime Agency, who aim ensure children's safety by providing help and information regarding abuse, exploitation and similar incidents that take place in the digital world (Think U Know, 2019). The official website contains guides and information for parents as well as informative and child friendly videos regarding the topic of online safety.

UKCCIS

*The United Kingdom (UK) Council for
Child Internet Safety*

The UKCCIS is comprised of over two hundred organisations, all from different sectors, who work together for the purpose of keeping children safe online (UK Government, 2018). Notable achievements by the UKCCIS include ensuring broadband providers are legally obligated to offer parental controls; the creation of a 'friendly' wireless network logo that informs parents it is safe for children to use and that unsavoury websites have been filtered out; and carried out extensive research which has filled parental and professional guides regarding the importance and best implementations of digital safety. All guides are available to all on the official gov.uk website (UK Government, 2018).

So, what next?

Once you have done all you can to educate both yourself and your child(ren) regarding the topic of online and digital safety, you are ready to start enjoying the wonderful and educating place that is the internet! And don't forget 5 very important rules (My Safety Net, 2015)!

-NEVER post personal information online.

-EVERYONE can see pictures that you upload, so be careful before you can not take it back.

-Keep your privacy settings **ON**.

-NEVER share your password, even with friends.

-NEVER accept friend requests from someone you do not know personally.

Activity Plan promoting digital literacy and the competence of a group of young children when accessing ICT

Activity Plan		
Activity: Summer flower frenzy		
Number of children: 4	Age of children: 6-7	Number of adults: 1
Location: Local park and classroom.	Preparation time: 10 minutes	Activity time: 45 minutes
Resources: <u>Park</u> - 4 x Clipboards - 4 x Pencils - 4 x Sheets of A4 paper - 2 x erasers <u>iPads</u> - 4 x iPad - Data collected from park on A4 paper		
Aims of activity: - Each child to create an independent data collection sheet using any format they wish (tally chart, graph, sketches). - Use pre existing knowledge of park area to search for different flower species. - Use data collected to create a pictogram using iPad application. - Use the internet to find appropriate images of the flowers they have found on the Flower Frenzy, save the images and insert them into a pictogram. One image representing one unit. - Children to label their work with their own name and then save independently. - Speak freely within the group regarding their findings using appropriate mathematical language. - Support one another with collection of data or issues of technology if needed.		

Links to outcomes:***Foundation Phase***

- Extrapolate and interpret different information from lists, tables, diagrams, graphs or their favourite data collection device.
- Collect and subsequently record data from lists and tables, and pictograms where the symbol represents one unit.
- Decide on appropriate mathematics and techniques to utilise.
- Use common as well as mathematical language to discuss their own ideas and decisions.
- Interpret assorted information presented in charts and diagrams and draw appropriate conclusions.

(Welsh Government, 2015).

Digital Competence Framework***Citizenship***

- Submit their work with their name and the date added to it and give reasons why this is important.

Interacting and Collaborating

- Save their work using an appropriate name for their file.

Data and Computational Thinking

- Record collected data in an assortment of suitable arrangements.

Producing

- Create and edit multimedia items to establish text, picture, audio, animation, and video for a variety of tasks.

- Use text when conducting searches for relevant information/media (image, video, sound) and make use of an internet browser in an independent manner.

(Welsh Government, 2020).

Health and safety:

- Discuss risks of off-site area (park).
- Discuss risks the group may cause to the environment.
- Have to hand a basic first aid kit.

Role of adult:

Firstly, the adult will undertake the responsibility of briefing the children on what activity they will be taking part in and where it will be taking place. The adult will then explain the varying risks of the off-site park, being sure to include any and all risks that the group itself may cause to the environment.

While on site at the park, the adult should;

- Encourage the children to explore each area.
- Support the children with collection of data and discuss alternative methods in the event that they seem unsure.
- Discuss which flowers are being found and also where they are being found.
- Ensure children stick to the task and retain a degree of focus.

When returning to the classroom the adult should;

- Support the children with the operation of the iPads if necessary.
- Encourage the children to discuss their findings using appropriate mathematical language. Initiate conversation between the adult and children if necessary.
- Ensure children are in understanding regarding what a pictogram is and what exactly each symbol represents.
- Ensure children stick to the task and retain a degree of focus.

The activity:

The activity will begin with the adult taking time to explain to the children exactly what the activity will entail and the location at which it will be taking place. This will be followed by a discussion of the risks that the off site park presents and also the

many risks that the group may pose to the environment whilst undertaking the activity.

Next, the children will each be given one clipboard, one A4 piece of paper and one pencil. Following this, they will begin making their way to the off site park with the practitioner. 20 minutes are to be spent in the park. Once in the park, the practitioner will select an area of the park that the children will begin exploring first. By the end of the time in the park the adult will have ensured that the entire park has been explored.

The children will be given leave to explore each designated area independently and with the supporting adult present should they be in need of any assistance. As the children explore, the adult will be expected to ensure that they remain on task, encouraging them to look in different areas to locate a variety of different flower species. During the course of the activity in the park, the adult should discuss what flowers were found and in which location. Once the children have completed their exploration of the entire park and collected their findings, they will be guided back to the school to undertake the second portion of the activity.

Upon returning to the classroom, the children will be given twenty minutes to undertake and complete the digital portion of the activity. This part of the activity will allow the children an opportunity to develop their digital literacy and independence. The children will sit around a table accompanied by the results they had gathered in the park and the adult will issue each of them an iPad. The adult will then issue instructions to the children regarding the application that is to be used and proceed to give a demonstration on the workings of the application. This will also include a short demonstration going over how to conduct an image search. The children will then be expected to complete the remainder of the activity as independently as they can, with the adult present to provide support if necessary. While the children conduct their work on the iPads, the adult should promote the use of mathematical language and talk with the children using phrases such as “more than”, “less than”, “most”, “least”, and include the general use of numbers. As the children use the iPads, the adult must ensure that all children stick to the task. Once the children have completed the activity, they are each to label their own work with their name and save it in an appropriate location, assisted by the adult.

Critical evaluation of activity plan making specific links to the Digital Competence Framework strands, curriculum requirements and to research based sources

The planned activity was divided into two separate parts with the aim of being child led and fun for the children. Child led, play based activities are an essential component to a child's education and the way in which children learn (Welsh Government, 2018b). The first part of the activity involved exploration of the local off site park to find different species of flowers and recording how many of each were found. The second part of the activity was based in an indoor setting where each child was provided with iPads in order to create digital pictograms of their findings.

Part one of the activity was designed to encourage the children to take their learnings to the outdoor environment and engage with nature wherein they can experience an environment other than the classroom they have grown accustomed to. The outdoors can have lasting positive impacts on the development of children in the early years and there exists mounting concern regarding how much access children have to nature (O'Brien, 2009). In a shared sentiment by the Institute for Outdoor Learning (2017), the outdoor environment has significant social and cognitive benefits. An additional purpose of the activity was to allow the children to utilise their preferred method of data collection, fostering a sense of independence which Practice (2018) state is imperative for a child's development and maturity. Developing digital literacy was the driving force behind the second part of the activity, achieving the desired outcome by utilising iPads, which Donaldson (2015) notes is a vital component to their personal skillset in the future and for the rest of their lives.

Benefits of this activity, overall, include the utilisation of the outdoors as a learning environment for children in the early years. The outdoors affords children the opportunity to partake in physical activity, as well as offering opportunities to develop their executive functions and risk taking understanding (McCarthy, 2018). In addition to these widely accepted benefits, a child's right to play and experience the outdoors is protected under Article 31 of the UNCRC (Unicef, 2013). Furthermore, Article 29 states that children have the right to learn in an educational setting that is optimal for them – whether it is indoors or outdoors. However it is important to remember that

the second part of the activity involved the children sitting at a table and completing a task in a sedentary manner. Despite not being of benefit to children's physical development, the second part of the activity directly supports the development of children's digital literacy and competency. In the modern age, where society is almost becoming defined by technology, providing children with a digital competence will allow them to thrive in a technological world.

The development of mathematical prowess was also a benefit to the planned activity. The opportunity for children to use mathematical language alongside choosing a personal favourite method of data collection will provide them with a foundation of mathematical knowledge and experience to carry through the rest of their time in the curriculum (Welsh Government, 2015). The screen time children are subjected to in educational settings must be considered as they may return home and after school and face exposure to further screen time. According to Rosen et al. (2014), children are recommended to have limited screen time. Including a twenty minute time limit on the digital portion of the activity allows the school to monitor the children's screen time whilst in school.

The Welsh Government (2018a) emphasised the importance of skills that underpin a competence in the use of technology and as such released the Digital Competence Framework in 2016. The Digital Competence Framework has become a requirement within schools in Wales as Donaldson (2015) wanted to introduce a cross-curriculum skillset in order to serve to set up future generations for success. These digital skills are to be learned by children between the ages of three and sixteen and will be set across four different strands: Citizenship, Interacting and Collaborating, Producing Data and Computational Thinking. The activity laid out in the previous activity plan meets the requirements of this framework across each of the four strands. The Citizenship strand was met by the children adding their name and the date to their piece of work; the Interacting and Collaborating strand was met by the children saving their work under appropriate file names; the Producing Data strand was met by the children creating their own piece of digital media including the editing of text, images and even using the internet to search for images; and the Computational Thinking strand was met by recording collected data.

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