

Mobile & Wired

Tweens In An Interactive Mobile World

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A thesis submitted in fulfillment of the requirements for the degree of Doctor of Philosophy
under the supervision of Dr Kirsty Young & Associate Professor Matthew Kearney.

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Anne-Louise Agnew, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of International Studies and Education, Faculty of Arts and Social Sciences at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis. This document has not been submitted for qualifications at any other academic institution.

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Begin at the beginning and go on till you come to the end; then stop (Lewis Carol)

So it is with this thesis — and finally, the journey is complete. This road less travelled is not done so alone, and to those who have journeyed with me, I am forever grateful. Your knowledge, encouragement and contributions have steered and sustained me along the way.

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GLOSSARY OF TERMS AND ABBREVIATIONS

ABS: Australian Bureau of Statistics

ITME: In Time Mobile Experiences

MEDS: Mobile Enabled Data Sharing

MESTA: Mobile Enabled Self-directed Think Aloud

MEMO: Mobile Enabled *Modus Operandi* (Methods of operation)

Mobile device: Includes smartphones, laptops, tablets and smartwatches

M&W: Mobile and Wired Study (this study)

Multiplicity: the quality or state of being multiple or various

Parent: Refers throughout thesis to parent/s and/or primary carer/s of a child

Polychronic: Individuals who can carry out multiple things at a time

Polycontextural: the different contexts where digital technologies might be used

Polymedia: The relationship between the social and technological

Polymediatic: Enacting polymedia interactions and relationship

Polyspatial: Functioning and adapting flexibly across different points of location

Polysynchronous: blending of multiple means of face-to-face and online; asynchronous and synchronous communication

Tween: child aged 9-13 years of age

ABSTRACT

This study has sought to deepen understandings of what is happening when pre-adolescent children aged 9-13 (tweens) use mobile technologies for intentional and/or unintentional learning as they participate in formal and informal activities in their everyday lives, exploring the skills and digital literacies that are cultivated during these interactions. The study considered the interplay between these experiences and concepts, and the impact this has on our understanding of the tweens' perception and use of time, place, and space.

The 'inside and outside' of tween use of mobile technologies has been examined, considering how pre-adolescents esoterically and inextricably engage with mobile devices across a range of activities, formal and informal, structured, and unstructured. The ways in which tweens view their digital lives and how they adapt to the changes that mobile technologies afford has been investigated in addition to exploring the impact on learning across a range of physical and virtual spaces. This study has encompassed the range of everyday mobile technology experiences of the tween from a person-first perspective considering the interplay between their different uses of mobile technologies as they navigate their digital lives.

Alternative methods for the collection of authentic data have been adopted, reflecting the changing nature of the research landscape in contemporary times. This study has implemented novel approaches to researching the mobile experiences of tweens, leveraging the technologies available to implement innovative strategies to enhance data collection instruments for interviewing, and investigating authentic practices of pre-teenage children.

1. Introduction

Technology signifies all the intelligent techniques by which the energies of nature and man are directed and used in satisfaction of human needs; it cannot be limited to a few outer and comparatively mechanical forms. In the face of its possibilities, the traditional conception of experience is obsolete...

John Dewey – What I Believe

Chapter One introduces the purpose of this study, exploring the rationale behind the need to understand the experiences of tweens with mobile technologies in their everyday lives. A definition of the terms *mobile technology*, and *mobile learning* is provided, in addition to exploring current trends for children's access to and practices with mobile technology. Finally, the rationale behind the focus of the study is presented, and shifting contemporary paradigms emerging from increased mobile technology access are discussed.

1.1. Exploring Tweens' Experiences With Mobile Technologies

In the 21st century, the ever-increasing presence of technologies and digital devices has impacted on the way adults and children pursue both learning and leisure time activities (Grimley, 2012). Children and adolescents have access to and ownership of mobile devices that change the way they live, interact, communicate, learn and access information (Nicholas & Ng, 2019). We might then, ponder questions that focus on understanding young people's digital experiences, examining the perspectives of how young people use mobile technologies and the impact this has on their personal and social environs (Rasi et al., 2019).

This study has sought to deepen understandings of what is happening when children ages 9-13 (tweens) use mobile technologies for intentional and/or unintentional learning as they participate in formal and informal learning activities in their everyday lives, exploring the potential for the cultivation of skills and digital literacies that might be mediated through these interactions. This study has also considered the interplay between these experiences and concepts, and the impact this has on our understanding of the tweens' perception and use of time, place and space.

1.1.1. Defining Technology

Technology, as a term, does not have a universally accepted authoritative definition, with various descriptions encompassing, historical and contemporary perspectives (Carroll, 2017). The origins of the word stem from Greek, with alignment between the words “logos” and “techne” referring broadly to the study of things being created (p. 2). Over time, the term has been synonymous with something that has been man-made as compared to things that occur naturally (Volti, 2009, as cited in Carroll, 2017), which is the general concept of technology accepted in this study. Hickman (2001) suggests that the term technology “seems to function as a kind of junk drawer” (p. 8) while Warner et al. (2018) present the view that technology is a type of digitised tool or device that can be applied to problem solving activities in either a cognitive or physical sense. Anderson (2016) includes the concept of environment as a necessary component in the definition, with suggestions presented by Swartz et al. (2019) that the integration of collective intelligence, transdisciplinary and antidisciplinary experiences may further contribute to an accepted understanding of the classification of the term (p. 355).

1.1.2. Mobile Technology

The term mobile technology has also encountered a range of descriptors over time, with Traxler (2005) describing it as “difficult to define, conceptualise and discuss” (p. 261), with the mobility of technology relating more to the device's portability than its alignment with new learning possibilities. Traxler quite specifically defines mobile technologies as “mobile ‘phones, smartphones, personal digital assistants (PDAs) and their peripherals, perhaps tablet PCs and perhaps laptop PCs, but not desktops in carts and other similar solutions” (p. 261). Over time, the definition of mobile technology has evolved to focus more on the opportunities enabled by different devices, with Al-Adwan et al. (2018),

describing mobile technologies as a range of tools and devices that enable accessible, flexible and ubiquitous connections for social interactions, and various learning exchanges and opportunities, offering “place independence” (p. 222). Persson and Nouri (2018) succinctly define mobile technologies as enabling “mobility, portability and usability” (p. 188). Broadly speaking, all contemporary definitions of mobile technology focus on the user being untethered from a fixed place or space, where pluralism and diversity are enabled, and connectivity is made possible across multiple social and personal contexts (Bernacki et al., 2020).

1.1.3.Mobile Learning

The use of emerging mobile technologies has influenced learning processes since the early stages of the 21st century (Aguayo et al, 2017; Bernacki et al, 2020). Traxler (2005) presented the notion quite early in the new century, that “mobile learning is new. It is currently difficult to define, conceptualise and discuss” (p. 261). Mobile learning has been further defined over the years as “the way in which learning is untethered from a specific location as well as how students can learn by using a mobile device to connect to people and subject matter artifacts” (Crompton et al, 2017, p. 52), enabling new practices of learning both inside and outside of school (Erstad & Sefton-Green, 2013). Mobile learning is sometimes referred to as m-Learning (Kearney et al., 2012), with a focus on how the affordances of the technologies and devices available have the power to redefine and reshape learning theory and practices themselves (Mayer, 2014, as cited in Bernacki et al., 2020). Learners using a mobile device to support their learning are afforded greater potential to incorporate a range of new ways of connecting to learning interactions, have greater personalisation of their learning experiences, widespread social connectivity and the opportunity for the integration of authentic application in learning activities (Burden & Kearney, 2017; Persson & Nouri, 2018). Furthering this notion, m-Learning can be described as mobile devices being used for learning, seamlessly connecting from one point to another, and in-between, for a range of activities or implementations, without interruption (Oakley et al., 2018, p. 26).

1.1.4.Mobile Devices

The definition of mobile devices has also evolved and transformed throughout the last few decades. As existing technologies have changed and restructured, and new

technologies emerged, this has impacted on our understanding and definition of the mobile device. Pahl (2014) supported the notion of mobile devices being a range of technologies including “smart phones, screens, tablets and other complex digital literacy artefacts that spill into the ‘stuff’ of everyday life (as cited in McDougall et al., 2018, p. 265).

The devices considered as “mobile” in this study include laptops, smartphones, tablets and smart watches as these are not only used across a multiplicity of activities in everyday life, enabling the user to be untethered, but are also seen to be primary devices used by the wider population and therefore, conceivably, by the tween demographic (Deloitte Australia, 2019). The boundaries of this study incorporate consequently, all associated mobile devices that facilitate “untethered” possibilities for learning and social interactions in the tween population as the target group for this study.

1.1.5. Access To Technology

Access to the various technologies available for both children and adults in a range of geographic regions has been recorded and examined through the findings of a number of studies and other data gathering processes, such as the 2016 Australian Census (Australian Bureau of Statistics, 2019). The census data denoted that internet and technology access is extensive amongst Australian households. Responses show that 97 percent of households with children under the age of 15 have internet access at home, and the mean number of devices used to access the internet in these households was 7. The data reflects that smartphones, computers and/or laptops are used by 91 % of connected households in Australia, with 66% of households also/or connecting to the internet using a tablet device (Australian Bureau of Statistics, 2019).

An additional mobile consumer survey, completed in 2018 by Deloitte's Technology, Media Telecommunications (TMT) industry group as part of an Australian government study into mobile technology consumer behaviour, found that approximately 90% of Australians have direct access to a smartphone, which was more than three times the rate of smartphone access in 2008, and that Australians have some of the highest mobile device usage globally (Deloitte Australia, 2019). The World Bank has also collected global data focusing on internet access per capita demonstrating the penetration of mobile devices on a global scale (see figure 1.1). The inferences from these data sources, and

other studies (see chapter 2) are that there is a generation of children who are growing up, transitioning from childhood to adolescence, with high levels of access and ownership of mobile devices who are integrating technologies on a larger scale into the everyday life.

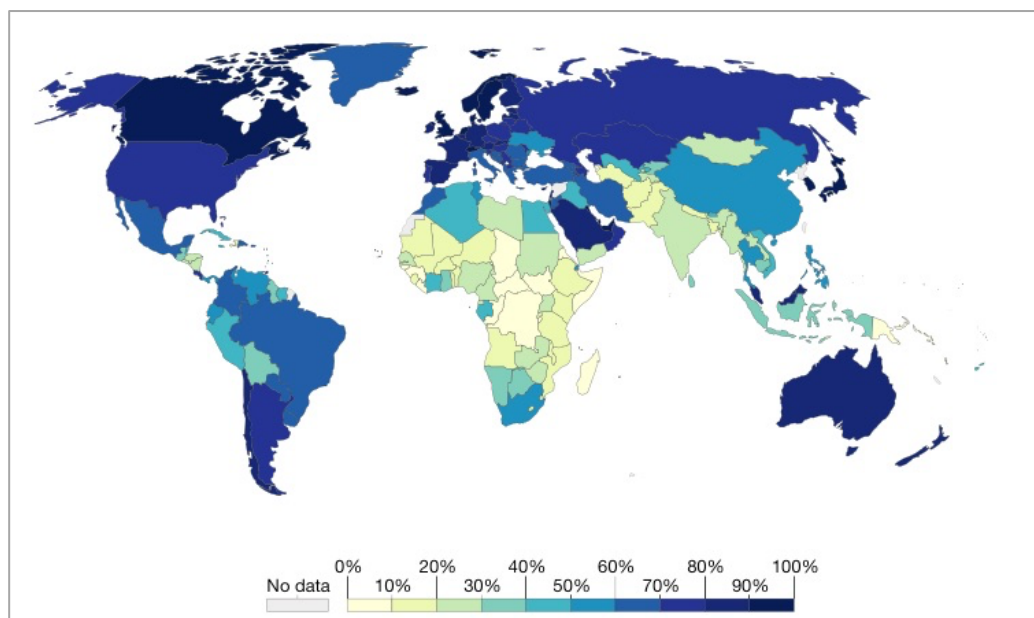


Figure 1.1 Global Population internet access (Deloitte, 2019)

The premise of this study acknowledges the ever-increasing levels of access and use of mobile devices in many countries, and therefore, it is conceivable that “along the way” children are developing proficiencies and behaviours that might have previously not existed to the same extent, or in the same manifestation, in a pre-mobile existence. There could be a correlating impact through the experiences children have on social interactions, the development of digital capabilities and practices and the ways in which formal and informal learning might occur. In general, while there is significant research available on the impact of mobile phone use for teenagers and the broader age group of children (Hefner et al., 2019; Homayoun, 2017; Kalnina, & Kalnins, 2020; Stonard, 2020; Venkatesh et al., 2019; Wright, 2020), we know little about how the frequency, range or quality of technology involvement is specifically impacting on tweens’ behaviours, actions and interactions.

Generally, in the studies available, the primary emphasis has been on how children *use* technologies (Crone & Konijin, 2018; Dong & Zu, 2020; Kim & Smith, 2017; James et al., 2017; Trumble et al., 2020). In these studies, much of the focus has been on the notion of children as a larger group, from birth to eighteen, or more focused on either very

young children (0-4 years) and/or teenagers (see Chapter 2). There appear to be few studies specifically focusing on the tween or preadolescent demographic, that is, children between the ages of 9-13, a relatively recently recognised, emergent and recognisable stage of development in children (Guthrie, 2005; Tomari 2008).

1.2. Focus on Tweens

The preadolescent, the *in between* childhood and adolescent ‘tween’, is not considered a child, and yet is not quite considered a teenager, but is increasingly seen as a separate recognisable stage of development as children transition from being young children towards adolescence (Guthrie, 2005; Tomari, 2008). In order to examine the identified gap in research for the tween demographic, the key focus of this particular study has explored mobile device access, experiences and perspectives in this specific group of children.

This study has considered how tweens view their digital lives and to what degree they adapt to the opportunities and experiences those mobile technologies afford. The implications of these adaptations and experiences and the potential impact on how tweens learn across the context of physical and virtual spaces has also been examined. This study has explored the “inside and outside” of tweens’ use of mobile technologies in their everyday lives, considering how they esoterically and inextricably engage with mobile devices across and within a range of activities, formal and informal, structured and unstructured.

The recognised age category for tweens is not specifically defined, with the range varying from 8 to 14 years of age, encompassing school grades from 4 to 8 (Faris, 2009 as cited in Fort, 2014, p. 7). However, for the purpose of this study the age range of 9 - 13 has been selected as it also represents the group of children transitioning from the upper years of primary (elementary) school to the beginning of secondary school, or middle school and yet still within the established age of this particular age sector that identifies the tween demographic (Eccles, 1999).

The research undertaken for this study has contributed to a better understanding of tweens’ transitions and adaptations as they progress from childhood to adolescence. Research has previously been done on tweens, “that measure their tastes, their desires, fears, dreams, and priorities” (Tomaz, 2014, p. 186), but not significantly on the impact that being immersed in a mobile world has on their communication, social functioning

and learning. The proposal for this study was based on existing research indicating that young children, tweens and adolescents are accessing and using technologies in an unprecedented quantity of interaction possibilities through apps and other device resources (Dudeney, et al., 2014).

1.3. Shifting Paradigms

The focus demographic for this study is children who are currently between the ages of 9-13 who are within the first generation that *could potentially* be defined as *digital natives* (Prensky, 2001) as they were immersed in the use of mobile technologies as infants. However, alternative views are presented by additional research suggesting that the concept of being born into a digital world does not necessarily make an individual able to *use* the technology productively (Bennett & Maton, 2010; Bennett et al., 2008; Dingli & Seychell, 2015; KIRSchner & Bruyckere, 2017). Bennett and Maton (2010) present the idea that while data is easy to obtain about the number of devices children have access to, interpreting the data for analysis on the implementation and use of the technologies is significantly more complex.

In this study, consideration has been given to exploring nuanced methodologies that enable investigation of the significance of behavioural and experiential aspects of young people using technology, across all aspects of their lives - inside and outside of school. Judd, (2018) suggests that the youth of today, are a “technologically adept generation”, (p. 100), with Yang et al. (2016) promoting the hypothesis of a *digital learner* in a technology rich environment.

The digital learner perspective considers the influence of immersion with and access to digital resources, rather than projecting capability in applying technology across a range of contexts merely through the pretext of being born into a digital world (Dingli & Seychell, 2015). Expanding on the concept of the user as a digital learner is the notion of *being digital* (Chaudron et al., 2018; Negroponte, 1995), where the focus is not on identifying or presenting a homogenous, digitally able generation through birthright (Dudeney et al., 2014), but rather on the relationships between the technologies available and associated behaviours and interactions of the tween demographic studied.

This study has further investigated the *notion* of *being* digital, exploring how this particular group of young people, (tweens) use and consider different technologies, endeavouring to understand the possibility of the development or acquisition of skills and

aptitudes through regular use of mobile devices. Investigations have probed into how and if tweens adapt and promote new ways of communicating, finding information and sharing things considered “important” as they weave their way through the day with mobile technologies at hand. The notion of potential new ways of constructing meaning and developing understanding through the integration and blending of information accessed via mobile technologies, has also been explored (Royce & German, 2019). Whilst many of the same skills and practices may demonstrated by technology users of any age, the tweens group is significant in that not only is this a largely understudied group, but it is also a substantial time of change for children in their social and educational mindsets (Eccles, 1999; Fort, 2014).

This study has focused on the child’s acquisition of a range of digital literacies, the agility of the user in adapting to new environments and how the tween user essentially, “goes about things” when they are using mobile technologies. The premise for this research is that if children are immersed in the use of mobile technologies and are using the devices and apps to communicate, take images, connect socially, use a range of apps to perform different tasks, then there is potential for them to be developing particular skills and behaviours (Yang, et al., 2016). Tweens, along with younger children and teenagers, represent one in three users of mobile technologies and the internet in the world (Rideout, 2017). Therefore, it seems relevant to learn more about what is happening when this age group is immersed in the experience of using mobile technologies across the wider spectrum of everyday life. See Chapter 2 for further discussion of these issues.

1.4. Significance Of This Study

In order to endorse the significance of this study, it is also pertinent to consider and recognise the findings from previous studies (Jensen et al., 2019; Kowalski, 2014; McCoy, 2016; McMahon & Pospisil, 2005; Twenge, 2017) and the American Association of Pediatrics (2016), that have explored potential issues associated with young children through to teenagers using mobiles technologies. Twenge (2017) explores the differences in social behaviours between the adolescents and children who were born before the internet became widely available, to those born after 1995 for whom the availability of technology and connection through the internet has been readily available throughout their lives. Of significance, is the underlying notion throughout the discussion by Twenge who proposes that the important aspects of adolescents and children to explore are the

impact of cultural and generational changes, rather than the negative differences. Twenge (2017) cautions about focusing on issues about the use of technologies from a blame viewpoint, for example depression and increased use of social media in adolescents (p. 22) while McCoy (2016) promotes the perspective that some of these behaviours may be seen as symbiotic, rather than causational. Jensen et al, (2019) explore the concept of the “displacement hypothesis” (p. 1417) where children are spending time interacting with technologies at the expense of real-life experiences. They also present an alternative “social compensation hypothesis” (p. 1417), wherein the focus is on time spent using technologies is a response to self-perceived social deficits in young people. The concept of “time-period difference” (Twenge, 2017, p. 24) relates to the notion that many of the changes observed may also impact other, older generations, but perhaps at a slower rate, as cultural changes inevitably impact on younger generations before older generations. In addition to the studies presented above, a range of other existing studies have identified that issues such as distractive behaviours, addiction to technology, social issues, cyber bullying and screen time access are of significance where children have access to mobile technologies, and that these issues must be considered by researchers, educators and the parents of today’s children (Christakis, 2019; Dalal & Basu, 2016; Hadlington et al., 2019; King et al., 2012). Young (1995) and Griffiths (1995) were some of the first researchers to suggest that individuals (not just children) could demonstrate social issues and addictive tendencies towards use of the internet (Young, 1995; Griffiths, 1995, as cited in Dalal & Basu, 2016). King et al. (2012) refer to the negative changes and addictive behaviours in young people as a response to the increasing access to technology and the internet both at home and at school, while more recent studies by Hadlington et al. (2019) and Christakis (2019) consider wider reaching issues, such as personal addiction, mental health issues and social disruption relating to children’s experiences with mobile technologies. Findings in these studies indicated the potential for cyber-bullying, increased risks from inappropriate exposure to material on social media, anxiety and a lack of understanding about the impact of an ever-increasing digital footprint. The potential and identified issues and/or complications of tweens using mobile technologies must not be ignored, however, there is also a need for research to be focused on exploring and understanding the possibility of new, dynamic literacies, multimodality and transdisciplinary capabilities that may be developed as tweens use the technologies in their everyday lives (McDougall & Potter, 2019).

Perspectives about the ‘impact’ of technologies on children for both personal interaction and education have also been presented by researchers, with consideration to the ways in which these tools and resources have enabled a greater range of possibilities in these areas (Falloon, 2016, 2017; Martin et al., 2018; McDougall & Potter, 2019; Pirani & Hussain, 2019; Potter, 2017; Sefton-Green & Erstad, 2017). Willis et al. (2014) draw a strong connection between access to technology and child-teacher relationships and learning (Willis et al, 2014 as cited in Pirani & Hussain, 2019, p. 56), whereas Martin et al. (2018) investigated the increased use of mobile technologies by middle school children, reflecting on the significance of developing digital citizenship, digital identity and social media use in this age group.

There is currently, a noticeable gap in the research specifically investigating the tween age demographic, with many studies including these individuals as part of the broad range of children under 15, rather than a distinct demographic of young people who are transitioning from childhood to adolescence and therefore with distinct needs, wants and daily experiences (see Chapter 2). This study focuses on exploring that gap, addressing the additional layer of research required as we navigate the third decade of the 21st millennium. This study has provided a foundational layer of the culture emerging from tweens’ experiences with mobile technologies, given the likelihood that access to and involvement with mobile technologies is likely to continue to increase if future trends reflect current patterns.

The need for such research in the tween demographic and their use of mobile technologies is supported by a change in focus in education across the globe, recognising the increasing use of digital technologies and how this needs to be incorporated into learning. In 2010, the Organisation for Economic Co-operation and Development (OECD) began the development of a concept, focusing on integrating digital technologies in education processes to redesign learning around the world (Groff, 2013), culminating in a vision statement that embraced transforming and reinventing learning environments. At that time, data generated by the OECD (2010) reflected higher use of technologies *in the home* than *at school*. Consideration by education experts and advisors was given to the ways in which children were immersed in the use of digital technologies outside of school to a much higher degree than was observed and recorded inside the school environment.

This study focuses on tweens in Australia, reflecting increasing access to technologies by pre-adolescents and the development of technology integration in classrooms and the

curriculum in recent years (Australian Curriculum, 2018). The Technologies, Digital Technologies component of the mandatory curriculum for Australian students includes the prospect for learning activities to incorporate computational thinking, digital solutions, transformation of data, communication and the development of analysis and predictions related to interactions using technologies (Australian Curriculum, 2018). Significantly, the focus across the national and state-based curricula is on learning *with* technologies, “developing knowledge, skills, understanding, attitudes and behaviours to assist students to live and work successfully in the future” (New South Wales Education Standards Authority (NESA) 2020, par. 1).

Embedded in the curricula in Australia are a range of integrated digital technology requirements and expectations. Learning experiences for children are necessitated to integrate activities that include the use of technologies to enable students to develop contemporary skills and effective, analytical, problem-solving proficiencies while developing digital capabilities and citizenship (Department of Education, Skills & Employment (DESE) 2020). Related studies by global researchers demonstrate how technologies can influence learning opportunities, impacting on the “learning lives” of children (Sefton-Green & Erstad, 2017, p. 246). Sefton-Green and Erstad presented the importance of understanding children’s learning lives, emphasising the need to examine every-day experiences placing significance on the need to “follow learners across spaces, timescales and trajectories” (p. 247), considering the children’s use of technologies in and out of school (p.248). This supports the notion raised by Ertmer and Ottenbreit-Leftwich (2013) about the need for focusing on technology enabled learning (p. 178) and cognitive factors that are possible in the learning environment through the individual’s experiences with technologies.

This study has considered curricula directions and existing studies, focusing on investigating the dynamic nature of digital literacies, multimodality and transdisciplinary interactions through tweens’ practices with mobile technologies, with a resultant new understanding of the learning lives of this particular demographic of children.

1.5. Research Question and Study Design

This research study has sought to extend existing studies on the benefits and concerns of using mobile devices to include an understanding of tweens’ developing competencies, literacies, practices and aptitudes through their experiences.

Therefore, the overarching research question that has been addressed for this study is:
How are tweens experiencing and constructing meaning as they interact with mobile technologies in their everyday lives?

The research question was intentionally broad, enabling this study to commence with an expansive lens that supported meaningful aspects of the findings to come to the forefront as the investigations progressed. The focus of investigation has been non-judgmental, that is, there is no emphasis or comment made on the ‘right or wrong’ of the activities and experiences being explored and shared by the tweens during the investigation. While the narratives shared by the participants have been essential to the study, the focus was on exploring ‘what is happening’ when tweens are immersed in their mobile technology experiences and activities, rather than the implications or appropriateness of the activities themselves.

The research undertaken was from a qualitative, interpretive paradigm, exploring the experiences of pre-adolescents using a range of data collection instruments to provide a rich, contextualized investigation into the mobile practices of young people. The methodology implemented utilised emerging technologies and novel approaches for data collection, focusing on the enablement of authenticity and voice of the participant, using a grounded theory framework to investigate and examine the – the digital environment in which they exist – the tween digital ecology (see Section 2.6).

This study has sought to understand, through the stories shared, the breadth and depth of the tween mobile digital ecology, considering the literacies these young people use and develop, their evolving sense of independence and agency, and the manner in which they have used and re-shaped the spaces in which they interact during everyday experiences.

This study has explored the experiences of participating tweens in Australia, and in alignment with qualitative research parameters, does not propose that this is an attempt to generalise the findings as applying to all tweens, or to prove a hypothesis. The interpretations and conclusions are specific to this study and the information shared either in open survey responses or interviews by relevant, contemporary literature.

For the purpose of this investigation, the term mobile device includes a range of technologies that encompasses laptops, smartphones, tablets and smartwatches (see chapter 2). Other devices that are portable, but not previously considered capable of communication and connectivity, such as e-readers and game devices were not included in the main focus of this study but have been acknowledged during analysis of data as significant contributors to tween experiences with mobile technologies.

1.6. Overview Of The Thesis

In Chapter 2, an examination of existing literature that underpins and supports the research study has been presented. The literature that has been focused on demonstrates the development of research in the areas of children's access to and experiences with mobile technologies, explored the current understanding of digital literacies and examined the notion of the childhood, particularly the evolution of the sub-group of children explored in this study, the pre-adolescent tween. The literature review has explored the use of spaces and places when using mobile devices, the everyday experiences of the tween in their mobile environment and the notions of informal and formal learning. The literature has been critically examined, providing evidence of the gaps that exist, highlighting the significance and relevance for the research study undertaken.

Chapter 3 focuses on the study design. Grounded Theory has been presented as the qualitative study approach most appropriate for this study, in that it enables the expansion of what may already be known, while at the same time providing a framework for the investigation of a broad question, without the aspiration for proving a theory. The methods undertaken for data generation are presented, including new and novel approaches implemented for investigating mobile technologies, devices and participants, responding to the call from other researchers for the need to address this issue. The chapter demonstrates the application of methods to obtain authentic data from participants' everyday experiences, utilising emerging affordances of mobile devices. In chapter 4, the findings from the different aspects of data generation are presented, using an interpretive approach. The findings are based on the various components of this research, the survey, interviews and focus group discussions. In alignment with the chosen methodology, Grounded Theory, the chapter explains and presents emerging themes through constant comparison and reflexive analysis, coding and memoing. The chapter provides the basis for the emergence of this study's theoretical findings that became apparent as the data was analysed.

Chapter 5 brings together the results and findings to articulate the everyday experiences of the tween as they navigate their digital ecology. The connections between the overarching research question and the findings are explicitly examined and discussed, illustrating the concepts that emerged and their significance to an understanding of the implications of tween experiences with mobile technologies. The chapter also discusses

the efficacy of the methods undertaken for data generation in this study, presenting a framework for ongoing studies in this field.

The final chapter focuses on the conclusions and contributions of the exploration undertaken in this study. The findings of the thesis are re-affirmed, highlighting the ways in which the study has contributed to a deeper understanding of what is happening when tweens are immersed in their mobile experiences. The chapter demonstrates the significance of this study to the field of mobile learning and education, with implications for teaching and learning as well as the practices of researchers in this field.

1.7. Conclusion

This chapter has presented an overview of the understanding of mobile technology presented throughout this study, exploring shifting paradigms in contemporary times and the need for a focus on tweens as a separate group of children. This thesis provides a snapshot of the experiences of tweens as they experience mobile technologies in their everyday lives. In presenting the learnings from the data collected, the research provides an insight into the inside and outside of tween mobile experiences in contemporary times, exploring the connections with formal and informal learning and social connectivity. Chapter two explores and examines existing literature has informed this study, identifying the gaps, and highlighting the importance of this research and its contributions.

2. Literature Review

2.1. Introduction

The following literature review acknowledges research studies that have previously been conducted considering children's use of mobile technologies and the available range of mobile devices. The review has primarily considered research and literature that focus on the impact of the range of mobile devices that have been accessible since the introduction of the iPhone in 2007, the iPad in 2010 and the interactive smartwatch in 2015.

Exploration of existing studies has focused on the changing experiences of children when using mobile technologies, tween access to mobile devices, connectivity, global and local perspectives and the emergence of new social constructs. The literature review also explores the concepts of digital literacies, contemporary spaces for learning, agency in the emerging tween and other areas of interest raised in studies that have been conducted previously. In presenting this material, I am demonstrating sufficient evidence of an identifiable gap in the research that exists and argue that this study undertaken significantly addresses that gap.

2.2. The Pre-Adolescent Tween

The term, "tween" as applied to the stage of pre-adolescent stage of child development appears to have first been used in the mid 1960s (Guthrie, 2005; Tomari, 2008), gaining greater popularity over the ensuing years. The pre-adolescent demographic is broadly accepted as a period of child development, emerging as a definable sub-group of children as a result of informal changes in reference to different recognisable periods of child development. The term tween, as a reference to this period of development, was made popular through consumer marketing groups (Cardone, 2012). In 1987, 'tween' was "used in an article in the magazine *Marketing and Media Decisions*" (Tomaz, 2014, p. 180) to describe and separate a middle tier of children with distinct characteristics and capabilities (Hall, 1987, as cited in Tomaz, 2014, p. 180). 'Tween' is seen as a derivative of the word pre-teenager or from the word 'between' at other times presented as a derivative of subteen or preteen (Fort, 2014; Tomaz 2014). The tween, the pre-adolescent child is situated between the world of childhood and adolescence, aligned to the notion of

liminality Turner (1967) who described this as both a stage of reflection and an in-between space and/or state - “betwixt and between” (Turner, 1967, as cited in Bigger, 2009, p. 209; Klatzin, 2012). The idea of liminality was further explored by Britzman (1991) referring to this as part of the process of forming identity, “marginally situated between two worlds” (Britzman, 1991, as cited in Cook-Sather, 2006, p. 3), describing the transitional stage of development for the child aged 9-13.

This period of child development before adolescence, previously under recognised, is now acknowledged as a significant period of change for the developing child with fluctuations in behaviour and a growing need for autonomy (Kane & Morongiello, 2019). The emergence of the tween subculture and demographic can be viewed as a social construct emerging from interactions and responses to a specific social context of the time (Foucault, 2006, as cited in Tomaz, 2014, p. 181). This study refers primarily to the pre-adolescent as a tween, using the popularised term to recognise this significant sub-group of children. This study has selected the term in recognition of its popularity, identifying the focus of the target group as the pre-adolescent child.

Existing studies focusing on pre-adolescence note that “few developmental periods are characterized by so many changes at so many different levels as early adolescence, when children face the biological transformation of puberty, the educational transition from elementary to secondary school, and the psychological shifts that accompany the emergence of sexuality” (Fort, 2014, p 15). This transitional period between childhood and adolescence is observed as a time of indifference, with new challenges and aspirations for independence, “sandwiched between childhood and fully-fledged teenage years” (Meyers et al., 2007, p. 311). The time can be fraught with biological and psychosocial changes, anxiety, drama and perplexion, with the young people themselves sometimes unsure exactly the group to which they belong (Carskadon, 2011; Foley & Weinraub, 2017; Fort, 2014). This period of childhood has also been referred to as “middle childhood” (Foley & Weinraub, 2017, p. 2). Morenzo et al. (2018) refer to the same demographic as Early Adolescents (p. 437).

There are significant changes perceptible in the social and cognitive development of the tween, with influences beyond parents and immediate family impacting on decision making, identity and individual validation (Meyers et al., 2007; Foley & Weinraub, 2017; Fort, 2014). Social relationships are significant to the developing tween, impacting social processes and interpersonal identity (Harter, 1999, as cited in Valkenburg & Peter, 2007). Skelton (2008) notes that children are social actors and agents who have rights and

abilities that need to be recognised, and that the construct of childhood is multilayered, defined social expectations, “historical and cultural contexts” (p.169). Developmental needs of the tween that will be of importance to this study are those described by Jones (2002) who claims that the early adolescent requires the opportunity to experience:

- **Physical activity:** Growing bodies need time to both move and relax.
- **Competence and achievement:** Tweens need a chance to prove themselves and receive admiration because they are highly self-conscious.
- **Self-definition:** Tweens need to explore a widening world and reflect on their roles and experiences.
- **Creative expression:** They need to express their interests, which help them understand and accept themselves.
- **Positive social interaction:** Tweens need support, companionship and opportunities to build relationships with adults and peers.
- **Structure and clear limits:** A system with rules they understand, security, and boundaries aids self-expression.
- **Meaningful participation:** Tweens need the chance to express their social and intellectual skills and a sense of responsibility.

(Jones, 2002, as cited in Meyers, Fisher & Marcoux, 2007, p 313)

Existing research shows, that aside from the physiological transitions occurring, other changes are occurring in tweens, including a drop off in interest in school, changed attitudes towards learning and teacher interactions (Maguire & Yu, 2014). It appears, from the Maguire and Yu study, which examined the transition from primary to secondary school in Australia, that children who enjoyed primary school and who achieved well during that time had a more positive and adjustable experience as they started secondary school. This information is of interest to this study as some of the factors that influence positive experiences both in and out of school may be, in current time, associated with the changes in social connections made possible through the use of mobile devices. Zeedyk et al. (2003) describe the child in this primary school to secondary school transition: “This period is regarded as one of the most difficult in pupils’ educational careers, and success in navigating it can affect not only children’s academic performance, but their general sense of well-being and mental health” (p. 68).

The tween brain is developing profound changes in both structure and function, with these changes continuing into adolescence (Blakemore, 2006). Pre-adolescence and adolescence are times when children are exposed to high levels of cultural susceptibility and social reorientation, with social cognition affected by a range of experiences (Blakemore & Mills, 2014). The notion of cultural susceptibility presents the potential for high levels of sensitivity to the social environment and how this might impact on the tweens' re-orientation as their focus shifts from family influence to peer influence (Crone & Dahl 2012, Peper & Dahl 2013 as cited in Blakemore & Mills, 2014, p. 189; De Lorme et al., 2013). The tween is highly sensitive, susceptible and responsive to positive and negative social interactions and cultural influences, affected by neurodevelopment that impacts on "self-regulation and cognitive flexibility" (Schreiber & Guyer, 2016, p. 6). In pre-adolescent tweens, social standing, acceptance and expectations are influenced by multiple dimensions of social construct, including likeability, sociological perspective and sociometric popularity (Lease et al., 2002; Tomaz, 2014). Hauge (2009) also explored the development of pre-adolescent sense of self across "shifting contexts and time" (p. 34), describing the process of "being and becoming" (p. 34) as children negotiate this transitional period. Social prominence is a sought after status for tweens, relying on a "multidimensional construct" (Lease et al., 2002, p. 512) of everyday experiences, interactions and social discourse.

Material possessions have also been identified in studies as being significant to preadolescents, and integral to their perceptions of social status (Shi & Xie, 2013) and that this period in childhood development is an "important stage for forming materialistic values and attitudes" (Chaplin & John, 2007, as cited in Shi & Xie, 2013, p. 65). For tweens, as for other children and adults, the perceptions, attitudes and values of the individual will vary, influenced by socio context, geo-location and cultural influences. Peer influence, perceptions of and desire for popularity, perceived benefits of material possessions and social influence appear to have a significant influence on the developing tween and their impact on social desirability (Vanden Abeele & de Cock, 2013). The period of transition to adolescence is marked by psychosocial adaptation, peer socialising influences and a range of reflexive interpersonal behaviours (Allen et al., 2006) that may influence tween choices and be manifested as positive and negative actions.

This period of transition from childhood to adolescence is complex, affected by social perceptions and a range of considerations outside the child's immediate family experience. The tween is experiencing changes in the need for and demonstration of

autonomy, problem solving, resourcefulness and emotional adjustment (Wang & Zauszniewski, 2017). These factors may also be influenced by the individual tween's interactions with their immediate and connected environment (Rosenbaum, 1990 as cited in Wang & Zauszniewski, 2017, p. 1165).

In the past two decades, the experiences of the tween have also been impacted by the emergence of mobile technologies to which they have increasing access (see section 2.3). The social construct of the pre-adolescents has altered along with the changing paradigms of media available, identifying tweens as being situated in a "participatory culture" (Jenkins, 2009, as cited in de la Fuente Prieto et al., 2019, p. 175), where they are "increasingly active both inside and outside the media" (de la Fuente Prieto et al., 2019, p. 175). Social capital for the contemporary tween has altered from pre-digital experiences, where their connections and social structures are enabled through increasingly available social networks along with expectations of reciprocity between individuals (Konieczny, 2019).

The contemporary tween is increasingly recognised as a significant consumer, with peer influence and delivering a major impact on parental purchasing decisions (Rahman et al., 2013). Consumer socialisation is developed in tweens through their technology enabled social connections, providing a conduit for the acquisition of sophisticated decision-making skills and attitudes (Chaudbury & Hyman, 2019).

The pre-adolescent tween is seen as an increasingly significant period in child development, an emerging youth culture, defining the transition between childhood and adolescence (Tomaz, 2014). The social capital and culture, growing need for independence, 'voice' and autonomy are all significant aspects of the tween of significance for this study, as these factors impact on and are impacted by the tweens' access to mobile technologies and devices. The interplay between the transitional nature and development of the tween and their experiences with mobile technologies is valuable to an overall understanding of this emerging sub-group of childhood development.

2.3. Children's Access To Mobile Technologies

Research from the United Nations demonstrates that globally, access to the internet has continued to increase in recent years, with approximately one third of users under the age of 18 (McDool et al., 2020, p. 1).

Globally, research shows that there are over 4.5 billion users (from a total population of approximately 7.8 billion) who access the internet with around 4.2 billion users accessing the internet using mobile devices and 3.75 billion actively involved in using mobile social media (see Figure 2.1).

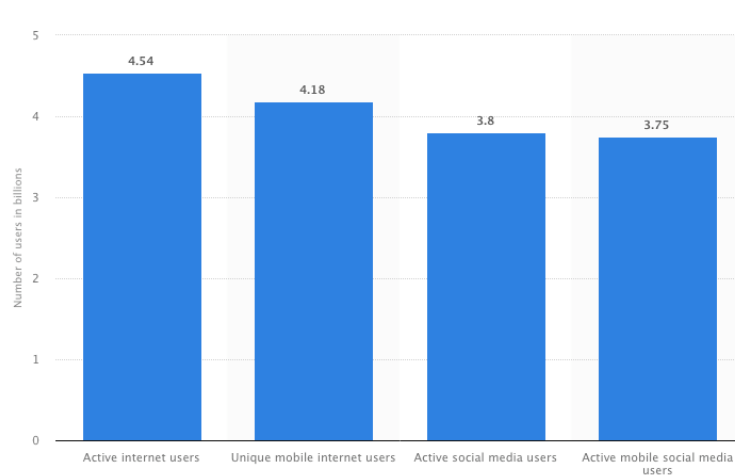


Figure 2.1 Global digital population as of January 2020 (in billions) (Statistica, 2020)

Worldwide data collected late 2019 (see Figure 2.2), indicates that the majority of people use a range of devices to access the internet, with mobile phones being the most common, followed by laptops/desktops and tablets (Hootsuite & We Are Social, 2019).

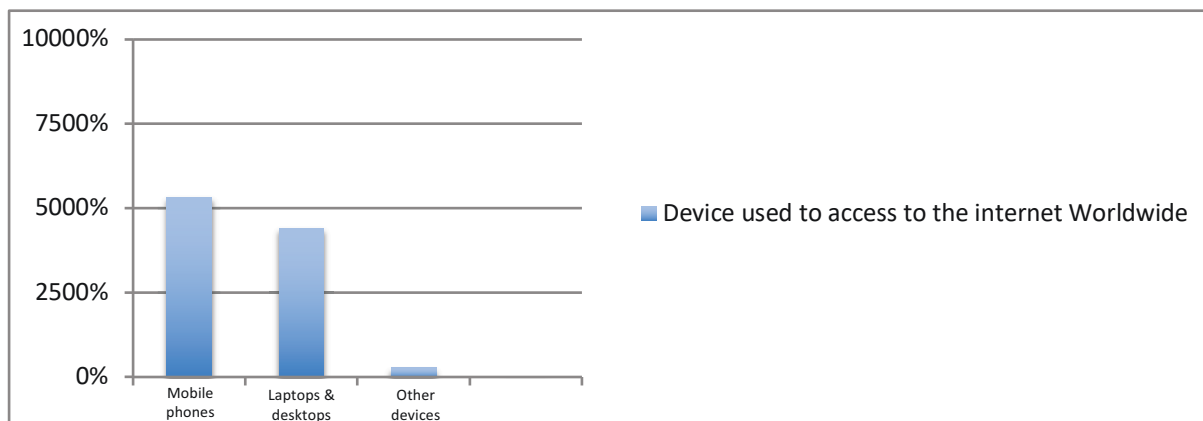


Figure 2.2 Global access to the internet per device type (Hootsuite & We Are Social, 2019)

Data from the United States (US), specifically considering mobile technology access in younger children, indicates that in 98% of homes there is at least one mobile device (Rideout, 2017). Children aged three to eighteen, including those in the 9-13 years age range show an overall increase in access to the internet since 2010, with the majority

doing so either directly through mobile devices or via high-speed internet (National Center for Education Statistics (NCES), 2019). The data from the US Center for Education Statistics (2019) also indicates that children from higher income families are more likely to have higher levels of internet access with other studies indicate that over half of all children in the US own their own smartphone by the age of 11 and around 72% by the time children are 13 years of age (Rideout & Robb, 2019). The current figures representing pre-adolescent tweens' access to and ownership of mobile devices can be viewed in Figure 2.3 with the data clearly showing the continuing increase in smartphone ownership across all ages in the highlighted tween demographic (Rideout & Robb, 2019).

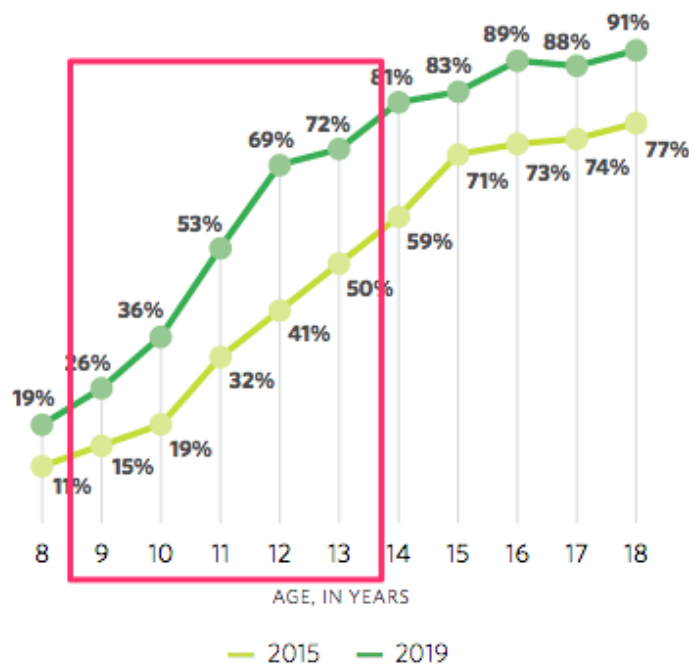


Figure 2.3 Adapted from Smartphone ownership by age 2015 vs 2019 (Rideout & Robb, 2019, p. 7)

Time spent using mobile and fixed media by tweens in the US indicates immersion in some form of media interaction for between four hours each day for those at the younger end (9-10 years of age) to over seven hours by the time the children are into their teenage years (Rideout & Robb, 2019).

Similar studies from Germany have reflected comparable patterns of ownership and use of mobile technologies in children. The International Central Institute for Youth and

Education study (vom Orde & Durner, 2019) reflects that 98% of households with children 3-13 years of age have at least one smartphone, 94% a minimum of one laptop and 59 % at one or more tablet device. 51 percent of children have their own smartphone, with a range of other mobile devices personally owned. Data gathered shows similar patterns of interaction to the studies done in the US with increasing use of mobile devices for media access demonstrated by children as they transition into the tween demographic and then into teenagers (see figure 2.4).

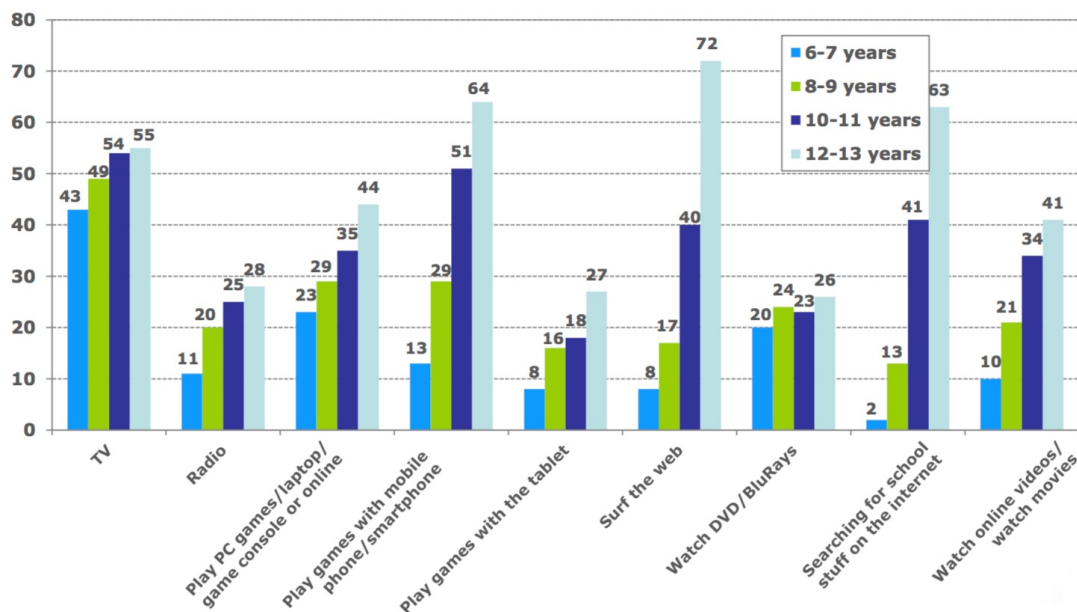


Figure 2.4 Media Use by German Children on their own (vom Orde & Durner, 2019)

Data provided by similar studies and surveys about young people's access to mobile devices in Russia, the United Kingdom (UK) and the United States (US) reflect comparable patterns to those generated by this study. The study from Russia was selected to include because of the differences that would be expected culturally from the studies done in Australia, the UK and the US, where it could be expected to find greater levels of similarity due to greater cultural alignment. Statistics about Russian tweens (Figure 2.5) indicate that a higher number of children own smartphones, followed by tablets. Laptops and desktop figures have not been included in this analysis as the data was not available in all studies considered.

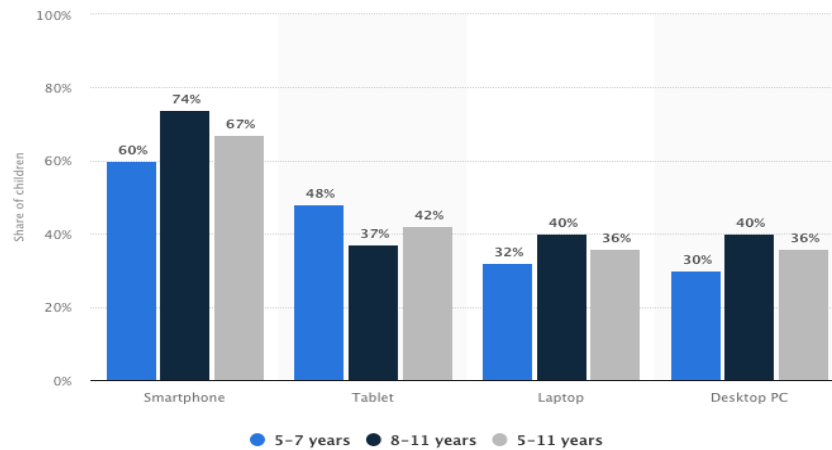


Figure 2.5 Mobile device ownership Russian children 2018 (Statista, 2019)

The data presented in Figure 2.5 represents the ownership of smartphones and tablets for children in the UK in 2018/2019. The preferred device for online activities in this age group, overall, was the smartphone, with laptops coming in second in most data returns. Smartphone ownership appears to increase with age as the children transition from tweens to adolescents. Comparative data for tablet and smartphone ownership was not available for US tweens, however, the information demonstrates similar rising levels of ownership of smartphones in this age group in the US and other countries.

Additional studies completed in recent years have continued to explore the increasing access to and ownership of mobile devices by children and the impact of this access. Reid Chassiakos et al. (2016) investigated how children and adolescents are using mobile devices at increasingly high proportions of the day – and at increasingly younger ages. In addition to statistical data, they document that 24% of adolescents feel constantly connected to their smartphones, with the bulk of communication amongst these children “shifting from face to face to screen-to-screen interactions” (p. 3). They state that whilst the rates of use are recorded, and patterns of use are identified, what children are actually doing on mobile devices has not yet been studied in great detail, because “mobile device usage is relatively recent and methodologically difficult to assess” (p. 2). This is significant for the desired outcome from this study, as the questions around ‘what’ children are doing and the acknowledgement of the need for new methods of gathering the data to assess device usage are a key focus of this study.

In Australia, the Australian Bureau of Statistics (ABS) has recorded that households with children under 15 years of age, had a mean average of 7.8 internet connected devices in 97% of (Australian) homes (ABS, 2018). Nearly all households (99%) with children under 15 were recorded as using a mobile or smart phone to access the internet (ABS, 2018, par. 7). Overall mobile devices, including tablets, smartphones and laptops used for accessing the internet, demonstrated growth in ownership in Australian households from the previous data generated in 2014 (see figure 2.6).

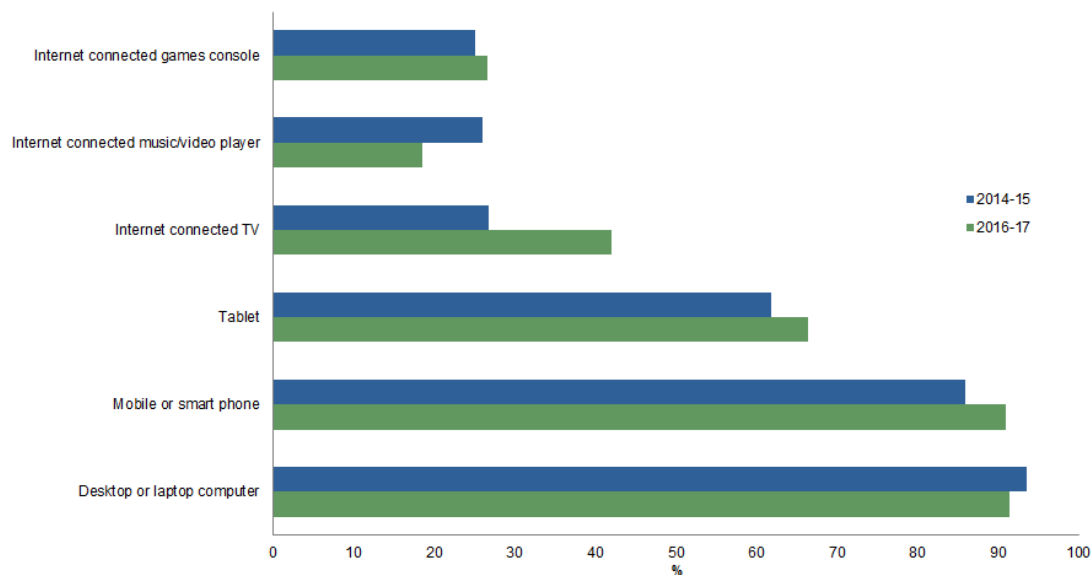


Figure 2.6 Proportion of connected households by device used to access the internet; 2014-15 & 2016-17, Australia (ABS, 2018)

While some of the mobile devices focused on in this study, show a small ownership decline (for example, laptops), this has been offset by higher levels of ownership of other mobile devices, notably smartphones and tablets. The information in the data represented corresponds well with the global data presented previously, although the access to the internet appears to be similarly accessed via mobile phones and laptop/desktop computers in the Australian data. In both sets of data, there is no distinction made between laptops and desktop computers which would have been desirable for identifying mobility of access on devices other than mobile or smart phones and tablets.

Additional studies done in Australia over recent years demonstrate relatively similar data. A study completed in 2017, by the Royal Children's Hospital in Melbourne (see Figure 2.7), shows that in the age groups similar to those explored in this study, that ownership of devices grows with age and that for children 6-13 years, 67 percent own at least one mobile device (Rhodes, 2017).

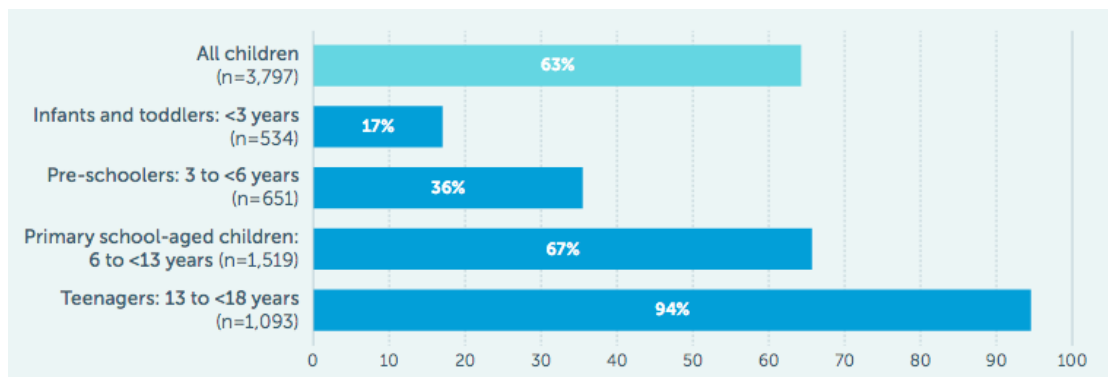


Figure 2.7 Data from Royal Children's Hospital Melbourne showing smartphone and/or tablet ownership across age groups (Rhodes, 2017)

Studies in the last decade have comparably identified global differences in access to mobile technologies, opportunities for engagement and development of literacies and skills (Livingstone et al., 2017). Children's digital opportunities internationally, including the connections with learning enhancement, challenges from the vast range of socio-economic pressures and affordances, and connectivity across different geographical contexts have been explored. Inconsistencies in the provision of internet connections, pedagogical practices and reconsideration of curriculum, marginalized groups of children and cultural perspectives on the use of technologies were all seen as contributing to the diversity of experiences by children when accessing or using mobile technologies. The findings from these investigations recommended that continued research is required to explore what children are actually doing with digital media and "how...these media engagements at school, home or in the community, interact with their cognitive, social and emotional development" (Livingstone et al., 2017 p. 140).

2.4. Children's Experiences With Mobile Technologies

Studies from a range of countries have been explored, focusing on identifying children's access, ownership and use of media and technology, and on the experiences by these children when using mobile technologies. Many of the studies identified, focused primarily on categorising 'children' as either part of a broad or collective age group (Cabello-Hutt et al., 2018; Coyne et al., 2017; Kumpulainen & Sefton-Green, 2020; Sefton-Green & Erstad, 2017) or on more specific age groups such as young children, 0-8 years (Aliagas et al., 2017; Erstad et al., 2020; Grimley, 2012; Marsh et al., 2020;

Neumann, 2016; Nikken & Haan, 2015; Zaman et al., 2016), while others have explored teenagers and their use of mobile technologies (de la Fuente Prieto et al., 2019; Kucirkova et al., 2018; Vanden Abeele & De Cock, 2013).

Schelicher (2019) argues that researchers need to focus on listening to young people about their experiences with mobile technologies and to engage with deeper empirical research focusing on the impact of screentime, digital media and use of technology. Others have identified the need to specifically research pre-adolescent or tweens' experiences with mobile technologies as a separate group (Chou & Chiu, 2020; Kane & Morrongiello, 2019; Rideout & Robb, 2019, 2020). This gap has been explored to some degree by these studies, with recommendations from other researchers for further exploration of the range of pre-adolescent mobile technology use both inside and outside of the home, and the impact on social connections and learning contexts (Kane & Morrongiello, 2019; Livingston et al., 2020; Sefton-Green & Erstad, 2017).

Young children (0-8 years of age) and their use of technology have been extensively investigated over the past decade exploring the direct impact of emerging mobile technologies on the child and family, presenting the notion that “new media technologies are fundamentally transforming how parents and children live, work, play and communicate” (Nikken and Haan, 2015, para. 1). Other technology related concepts have also been explored and presented such as the potentially “transformative power of technologies” (Kucirkova et al., 2018, p. 1) and the increasing impact on social interactions and behaviours in young children (Aliagas et al., 2017; Grimley, 2012; Nikken & Haan, 2015). The impact of the everyday mobile technology experiences of children, at home and at school including the development of multiliteracies (Erstad et al., 2020; Falloon, 2016, 2018; Kucirkova & Potter, 2020; Kumpulainen & Sefton-Green, 2020; McDougall & Potter, 2019; McLean & Rowsell, 2020) and the “digital whereabouts” (Nikken & Haan 2015, para. 4) of children have also been explored over the past decade.

The increasing diversity of digital devices and the range of “interactive, immediate, social, and ubiquitous characteristics” (Zaman et al., 2016, p. 2) of mobile technology has an impact on childhood experiences and family dynamics. Young children's relationships with touch screen tablets and emergent technology literacy on children as young as two years of age has been the focus of studies in recent years considering the impact of increasing home access to, and use of, mobile interactive touch screen devices for young children and the possible impact on a range of behaviours and learning attributes

(Neumann, 2016). It has been noted that young children quickly learn how to use the mobile devices and high levels of interest and engagement in the technology, showing a natural connection and affinity for all things digital (Livingston et al., 2020, p. 79). Previous studies have also revealed that children's capacity to manage or operate mobile devices do not always equal their emotional or cognitive capabilities (Nikken & Haan, 2015). Considerable disparity has been observed in how children are using devices, including the different experiences that may occur between home and school, including parental mediation and the need for children to "develop responsible autonomy and self-control" (Aliangas et al., 2017, p. 3). Interpretations of children's interactions with mobile devices and the apparent impact has been presented in various studies, along with parents' approaches, controls and concerns about their child's use of technology. Ownership and access in the home, the challenges of digital technology use and gender influences affecting parent perspectives or concerns have been addressed in previous studies (Dehue et al., 2008), particularly after the arrival of the iPad and other tablet devices (Hiniker et al., 2016) focusing on "the nature of engagement with a specific device" (Kucirkova et al., 2017, p. 548). These studies have not, however, specifically addressed the issues from the perspective of the children within their experiences of these technologies.

2.4.1. Mediation & Management

Mediation and management of mobile technologies may also be impacted by the technology capabilities and confidence of the significant adults in children's lives, such as parents, older siblings and teachers. When there are older children in the home, providing prior experience in negotiating technology mediation or monitoring, this appears to be an advantage to parents in promoting ongoing collaborative management (Aliangas et al., 2017). Zaman et al. (2016) explored strategies used for a range of mediation and parent controls focusing on access to information, including the use of filters or screen controls. These filters and add-on strategies were reported as more likely used by those parents who were not computer literate or who had a negative attitude towards technology access, with positive or more confident parents more likely to opt for a "co-use mediation style" (p. 4) with the parent and child discussing appropriate use together or as "buddy practices" (p. 14) such as high family involvement, and unintentional mediation such as the impact of older siblings' social media use.

The development of digital capability, understanding and literacies in both parents and children is seen to be best achieved through the process of co-involvement approaches to the mediation of screentime and use, developing appropriate autonomy in children and parental trust (Zamer et al., 2016). The findings from their study reconsidered the view of mediation as “distant mediation” (p. 15), presenting the mobile device as a potential distractor and behaviour management tool at times. The unavoidability of the presence of digital media and devices in the lives of children has also been explored, with parents indicating their need to stay in touch with the changing technology landscape, acknowledging potential benefits and concerns with how to manage technology appropriately.

Other types of mediation and management by parents include a restrictive approach based on parents providing screen time and media use for children when their behaviour is deemed appropriate and restrictions for ‘poor ’or inappropriate behaviour (Coyne et al., 2017). It has been suggested that other approaches to parental management of mobile devices include *active mediation* where parents discuss the impact and effect of inappropriate viewing and media access, and *co-viewing* where the parents and children “use or consume media” in common – with or without discussing the appropriateness of the content (p. 3).

The agency of the child when using mobile devices has been explored in a number of studies, with attention being given to variances of agency and autonomy permitted, focusing mainly on the variables of age, personal behaviours and/or the temperament of either the child or the parent (Kucirkova, 2018). Additional influencing factors such as experience and confidence of the parent, accumulated trust from previously appropriate use, older siblings and family social practices also have an impact on how mobile technologies and the development of a child’s agency might be managed within a family (Koutsogiannis and Adampa, 2011; Kucirkova, 2019). (For further information on agency, see section 2.7).

2.4.2. Screen time

There are existing studies that present positive findings regarding the use of digital devices by young children, while on the other side of this debate, significant concerns regarding screen time and the developing child have also been presented (Livingstone et al., 2020; Tripathi & Mishra, 2020). The need for multiple foci associated with research on children’s and teenagers ’use mobile technologies has been proposed as a way of

considering a balanced perspective on risks and opportunities (Cabello-Hutt et al., 2018). Researchers have recognised for some years, the need for a deeper understanding of risks, facilitating factors and benefits that may arise through children's interactions with mobile technologies (Heller, 2018; Helsper et al., 2013; Livingstone & Helsper, 2010).

Parents of younger children (0-2) are often worried about ensuring a "balance of digital and non-digital engagements" (Kucirkova et al., 2017, p. 555), while parents of all age ranges express apprehension about healthy development and the impact of screen exposure, sleep and wellbeing (Foley & Weiraub, 2017; Hale & Guan, 2015; Reid Chassiakos et al., 2016). A recent study conducted in Australia examining the access and use of mobile devices in pre-school children reported that "the average number of hours...varied from 14 hours per week for infants and toddlers to 26 hours per week for two to five-year-olds" (Zabatiero et al., 2018, p. 15). The researchers claimed that this study correlated closely with similar studies done globally, demonstrating high levels of interaction with mobile technology from a very young age.

The importance of providing a balance of access to technologies, age appropriate digital and non-digital media and resources and maintaining a balanced diet of different types of digital media is commonly focused on in studies. How children are using mobile devices, screen time and the impact of media and technology on child development and behaviour has also been raised in a number of studies (Dempsey et al., 2019; Erstad et al., 2020; Gary, 2019; Heller, 2019; Kucirkova et al., 2018; Marsh et al., 2020; Pedersen, 2020; Tang et al., 2018; Zabatiero et al., 2018). In these studies, the degree to which screen time might (or might not) have an impact on children is explored, with a demonstrated need for future, specific research in this area is necessary (Cabello-Hutt et al., 2018; Heller, 2019). It seems that parents are generally aware of the possibilities of 'good and bad use' of technology by children and the potential risks of excessive screen time, but that what they are looking for is a balanced understanding of how digital technologies can impact on their children, cognitively, physically and in relation to their socio-emotional development (Heller, 2018; Kane & Morrongiello, 2019).

Recognition has been given to the impact of mobile technologies in re-shaping much of the way in which young people operate, communicate and socialise (Sefton-Green & Erstad, 2017; Taylor & Stevens, 2018; Weinger, 2017). Acknowledging children's increased access to mobile devices and their reliance on mobile technologies, consideration has also been given to how experiences involving online, and offline connections, risks and social implications overlap and are less obviously defined by

physical location or time (Dempsey et al., 2020; Hale & Guan, 2015; Livingstone, & Bulger, 2014). Livingstone and Bulger, (2014), call for increased cognizance of this intersection, and a broadening of how researchers look at the associated risks and benefits of young children's access to mobile technology. The correlation between broader demographic factors such as socio-economic status, parent awareness, connectivity and digital capability and school attendance are significant factors in how children experience mobile technology and the impact this may have relating to possible risk of harm or benefit (Kane & Morrongiello, 2019; Vanden Abeele & de Cock, 2013).

Livingstone and Bulger (2014) describe the pressure that policy makers, education sectors and other stakeholders are under as a direct result of the speed at which technological change takes place. They claim that "the temptation is to keep updating the broad-brush picture...rather than (or as well as) solving difficult puzzles, building theory, or developing more nuanced analyses appropriate to the specific needs of vulnerable or marginalised groups" (p. 9).

It has been suggested that screen media usage in children including social media connections, mobile game playing, music, reading, and video viewing is primarily reflecting entertainment forms of media "–that is, media not for school or homework" (Laurcella et al., 2016, p. 13). Studies have been previously conducted on the ownership of mobile devices, and the use and attitudes of children and adolescents, including their perspectives on everyday activities (Cabello-Hutt et al., 2018; Reid Chassiakos et al., 2016 Ng, 2015; Nicholas & Ng, 2019), but these studies did not specifically investigate pre-adolescents or tweens as a separate group of children. The perspectives of early adolescents' experiences and attitudes towards smartphones have been investigated (Moreno et al., 2018), with findings that demonstrated the ways in which the tweens use their smartphones (p. 441). Moreno et al. focused primarily on smartphones and not on the broader understanding of mobile technologies, thereby omitting the interactivity of pre-adolescents across the range of devices used for social connectivity and learning possibilities. A more recent study, completed by Donald et al. (2020) examined the impact of internet and screentime in teenagers, but not preteens. This study has explored the debate holistically from the perspective of the tweens, focusing on a person-centred approach, exploring *their* understanding of device access and use, considering all mobile devices accessed throughout the day. Consideration has been given to the debate in question, but the voice of the tween has been added to the discussion, broadening the

perspective and providing an opportunity for the developing child to contribute meaningfully.

2.4.3. Use Of Mobile Technology And Media Access

There are many perspectives and debates focusing on the way in which children of all ages use – and ‘should’ use mobile devices, including the types of apps, screentime and degree of social prominence and connectivity (Carlson et al., 2010; Reid Chassiakos et al., 2016; Foley & Weinraub, 2017).

Children in pre mobile-technology times were regarded by some scholars as passive viewers and consumers of digital input using television as the principal source, with limited ways in which the child could participate actively in the media presented (Collins, 1982; Singer, 1980, as cited in Kirkorian et al., 2008; Strasburger & Donnerstein, 1999). Anderson (1979) further presented the view that these experiences were more of a “sophisticated blend of passive and active cognitive activities” (p. 4), maintaining that although the children appeared to be passive consumers, they are, at the same time, actively and cognitively involved in what they are viewing. Consideration has been given to the notion of “attentional inertia” where passive viewing of television media over time was seen to increase the probability of sustained, deep absorption in the media by the child to the detriment of other social or physical interactions (Anderson et al., 1987; Anderson & Pempek, 2005; Richards & Anderson, 2004). Buckingham (1993) presented an alternative notion that children were not passively viewing but rather they were making “complex judgements” (p. 143) as they were watching media. Additional studies have also explored the impact of the content being viewed on the educational and social development of children (Bickham et al., 2003; Christakis et al., 2004; Huston et al., 1999; Kirkorian et al., 2008). This study has further explored the notion of passive viewing or consuming media, investigating *what* the tweens are watching – and *why*, identifying purpose from the perspective of the participants rather than observer conclusions.

More contemporary studies show that the style of media children are viewing is changing, with the source shifting from stationary televisions to mobile devices to streaming or social media sites (Dinleyici et al., 2016; Grimley, 2012; Robb & Rideout, 2020). With greater access to personalised mobile devices that came with the emergence of the iPad in 2010 (Melhuish & Falloon, 2010), myriad opportunities presented for more varied and active participation. Since then, children have been able to increasingly take ownership of

their technology-mediated activities, initiating interactions, collaborating through games and social media, inquiring, discussing, arguing, playing, shopping, critiquing, investigating, responding, fanaticising, seeking information, developing social connections and being informed about a range of concepts (Brailovskaia & Bierhoff, 2020; Boorman, 2019; Danovitch, 2019). Tweens (and other children) are demonstrating changes in the way they locate, transfer and use information. Previous generations are seen to have looked *at* information, whereas now, children have the opportunity to interact with and look *for* information (Boorman, 2019; Given et al., 2016; Graham & Dutton, 2019).

Self-reported data logs from a study of students aged 14-15 in Singapore (Weninger, 2017) identified the degree to which various media and apps were used across the day. The data considered frequency of use, total time spent, consumption activities, social interactions and sharing, creation, and whether the activities were solitary or connected. The teenagers studied by Weinger (2017) reported a range of activity and engagement, from high uses of social media (96% of individuals studied) to around 70% of users interacting with music, online videos and games each day. These statistics are corroborated in similar studies where key findings suggesting that children are accessing apps, media and social connections in ever increasing proportions, with technologies becoming “embedded, embodied and everyday” (Hine, 2005 as cited in Livingstone et al., 2020, p. 87).

In a recent study conducted in the US (Rideout & Robb, 2020), the preferred ways in which children choose to use mobile devices and screentime allocation changes as they transition from pre-adolescence (tweens) to adolescence (teens) (see Table 1). The data represents the activities as reported by children in both age groups, reflecting the different choices and time allocations as a proportion of daily usage (Rideout & Robb, 2020).

Table 1

Favourite Media Activities, 8-18 Year Olds, 2019 (Adapted From Rideout & Robb, 2020)

Media activity	Tweens	Teens
Television/videos	53%	39%
Gaming	31%	22%
Browsing websites	5%	8%

Social media	4%	16%
Content creation	2%	2%
Video chatting	2%	4%
eReading	2%	2%
Other (email, shopping etc)	2%	6%

2.4.4. Mobile Experiences And Education

In the first decade of the 21st century, studies were already presenting the notion that access to mobile technologies could change the nature of an individual's experiences in accessing information and learning (Melhulish & Falloon, 2010). The affordances of mobile devices, in what could now be considered to be relatively primitive forms, indicated the potential for portability, ubiquitous access, the ability to access information as needed, situated learning, social interaction and connections, and the prospect of personalisation of experiences for the individual user (Johnson, Levine, Smith & Stone, 2007, Sharples, 2007 and van't Hooft, 2008 as cited in Melhulish & Falloon, 2010). Sharples (2007) suggested that the affordances of mobile technologies would not be realised until they were "used by real people in real settings" (p. 20). Sharples et al. (2009) also called for the need to evaluate how individuals interact with one another and socially through their engagement with emerging mobile technologies.

Radensky et al. (2015), presented the argument that research on the *use of mobile devices* by young children for learning, was lagging behind the rates of adoption and use of interactive screen media and devices. Weninger (2017) also argues that there may be a disconnect and contradiction between the espoused ideals of education, promoting innovation and digital literacies compared to the opportunities for mobile technology-enhanced learning in schools. Other studies have focused on aspects such as mobile intensive pedagogies contributing to the quality of teaching and learning with mobile devices (Schuck, 2015; Swallow, 2015) whilst studies such as that undertaken by Looi and Wong (2014) have sought to implement mobile learning curricula in schools. Different foci have been explored, considering the affordances of one-to-one technologies in the classroom (Varier et al., 2017), integrating mobile learning in the classroom

(Christensen & Knesek, 2017), intentional mobile pedagogy (Dennen & Hao, 2014) and the use of educational technology in primary classrooms (Domingo & Gargante, 2016).

Kucirkova et al. (2018), examined the transformative influence of digital technologies on learning, in addition to the concerns raised through addictive behaviours associated with excessive use of these technologies. Their study focused on children in the United Kingdom (UK) from 0-8 years of age, the demographic just “under” the tween age group. The beliefs of parents were explored over time, with consideration given to concerns about the impact of different technologies on the child’s development, and the increasing availability of a range of technologies for young children (Plowman et al., 2008, as cited in Kucirkova et al., 2017, p. 538). Studies have shown that mobile technologies have the potential to encourage children to become engaged in activities that promote learning and provide the availability of alternative means of expressing themselves through a range of assistive resources (Zamer, et al, 2016).

Toh et al. (2017) delved more deeply into the affordances of mobile devices such as smartphones to “traverse different learning contexts” (p. 305), with a specific focus on science learning and engagement. Their study considered the broader learning ecology of the child and the way in which they connect with the mobile device in their life in and outside of school. Using several case studies, the researchers investigated the potential impact of the smartphone as a learning connection, making “explicit attempts to forge connections between informal (incidental, life-experience based) and formal (structured, delivered by teachers and/or facilitators) learning, mediated by the use of mobile technologies” (p. 306). Traxler (2010) presented the notion that the emergence of mobile technologies would present opportunities beyond the fixed experiences afforded by desktop computers, noting that “interaction with mobile technologies is woven into all times and places of students’ lives” (Traxler, 2010, as cited in Melhulish & Falloon, 2010, p. 3). It has been suggested that teenagers are also immersed in the “constant production and distribution of mashups and memes” (Weninger, 2017, p. 510) through various social media sites, yet this is not reflected in an actualisation of digital literacies due to an apparent reluctance for teachers utilise the creative possibilities of the technologies available.

In 2017, scholars at Swinburne University of Technology, in Melbourne, Australia, undertook an intensive research and evaluation of screen time and digital literacy for the Australian Government Department of Education and Training (Kaufman et al., 2017). The focus of this study was to identify screen time impact on children’s and teenagers’

health and physical outcomes, effective use of digital technologies for improving learning outcomes, the alignment of guidelines for screen time and technology use to current research, and an investigation of a “model of “best practice” in the use of digital technologies in preschool, primary school and high school regarding which risks of using digital technologies can be ameliorated and positive outcomes maximized” (Kaufman et al., 2017, p. 2). The study focused on age related groupings of children aligned to Australian school contexts, approximately less than and up to 5 years of age (preschool), 5-12 years of age (primary school) and 13-18 years of age (high school). Key explorations were concentrated on physical and other health related factors as a consequence of digital device usage, involving “exergames” (active games) and screen time across the range of game consoles, touchscreen (tablets and/or phones), computers, virtual or augmented reality and television/video (p. 13). Of relevance for this study are the recommendations by Kaufman et al., suggesting that rather than a strict prescription of time limitations on the use of screen time in educational settings, guidelines should focus more on “effective use of technologies” (p.42). This is particularly significant in light of the recent responses by various education department sectors in Australia and overseas, where decisions have been made to ban the use of mobile phones in classrooms and schools (Busch & Watson, 2019; Lepkowska, 2019).

2.5. Digital Literacies

Digital literacy and digital culture are significant challenges and requirements in formal education today (Penalva & Zuazua, 2017). Children (and adults) are using mobile technologies regularly to access and manage information, consuming, creating and recreating, communicating and expressing themselves in ways previously unimagined. Pangrazio (2014) suggested the need for a reconsideration of our understanding for a “critical digital literacy” reflecting the complexity of contemporal digital contexts (pp. 163-164). Mobile networks have created the infrastructure to a new digital narrative, shaping and developing a changed paradigm of social practices that impact on the literacies of the user (Lazo et al., 2016).

Digital literacy is the compelling skill for children to maintain the dialogue and connections they require to function in this new paradigm of mobile networks. These literacies are considered to be essential for young people to participate effectively in the emerging knowledge economy and global information society (Ehret & Hollet, 2014;

Noh, 2017). The concept of digital literacy has been interpreted by individuals through the way in which they perceive and experience technologies, thereby presenting a multiplicity of definitions varying across different stakeholder perspectives (Boechler et al., 2014). Zurkowski (1974) referred to the need for an understanding of ‘information literacy’, connecting the value of information to the users’ needs (Zurkowski, 2014 as cited in Reedy, 2018, p. 8).

With the advent of increasing digitisation of information, the term digital literacy has become somewhat interlinked with information literacy (Reedy, 2018), while other definitions have included “computer literacy, ICT literacy, e-literacy, network literacy and media literacy” (Bawden, 2008, p. 17). Glister (1997) is reputed to have been one of the first to use the term digital literacy, referring not to lists of skills required, but rather to how an individual can understand and use information from a variety of digital sources (Glister, 1997, as cited in Bawden, 2008, p. 18). Warschauer (1999) used the term electronic literacy, referring to the way in which our understanding of literacy was adapting to include greater levels of screen information. Potter (1998) further explored the way in which media impacts on our understanding of information, presenting the notion that “the tools are our skills, the raw material is information from the media and from the real world” (Potter, 1998, as cited in Oyanagi, 2002, p. 1101). Jacobson and Mackey, (2013), refer to the term ‘metaliteracy’ as a way of addressing the changing nature information literacy, reflecting “how learners communicate, create and distribute information (p. 84).

The term digital literacy was largely influenced by the International Information Communication Technologies (ICT) Literacy Panel in 2002 (Oyanagi, 2002). Attention was given to the essential idea that “digital” literacy was much more than mastery of technical and operational skills and included “regular” literacy and numeracy, critical thinking and problem solving skills as being essential. At that time, Princeton (2002) presented the concept that “ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society” (p. 2).

Since 2002, with exponential development and changes in available technologies, the fundamental definition of digital literacies has developed incrementally to encompass the impact of mobile technologies not previously available. Beetham and Sharpe’s ‘pyramid model’ of digital literacy developed in 2010, was scaffolded on the premise that the acquisition of digital literacies is progressive, dependent on context, individual

capabilities and how individuals respond to the development of new understandings and skills (Bennett, 2014). The model represents the way in which students might draw on proficiencies when immersed in technology experiences, identifying digital literacies as “social practices and not just skills” (p. 2). Beetham and Sharpe’s model considered how experiences, access and attitude affected practices, motivation and use of technologies. Wie et al. (2010) further developed the pyramid model to represent greater detail and connections between digital access and capability and how this could impact digital outcomes. The redesigned model explored how skills, practices and attributes are affected by access, experiences and the development of positive attitudes, through exposure to the use of technologies in learning (Wie et al., 2010) and that digital literacies develop through these experiences.

2.5.1.Expanding The Definition Of Digital Literacies

By 2013, the definition of digital literacy had been expanded to encompass the use of technologies and emerging mobile technologies to contribute to effective participation in school, home and the community or workplace (Fraillon et al., 2013, p.18). Benfield and Pavlakou (2013), working on an InStePP project (Oxford Brookes University, 2012) explored the concept of students being key change agents for the development of the concept of digital literacies. The study noted that when institutional practices aligned with the exploration and development of authentic technology focused activities by students that the impact was significant in the adoption of digital teaching and learning practices (Sharpe & Benfield, 2014)

In 2014 the description of digital literacy was further refined through research completed by JISC in the UK (formerly the Joint Information Systems Committee UK). JISC is a not for profit organisation (UK) who provide independent research focusing on the development and use of new technologies. The JISC study associated the development of digital behaviours, practices and identities as being essential, and that these will change over time as a result of context and access to new and diverse technologies. Key digital literacies may differ from early childhood, through kindergarten to year 12, then higher education settings and professional contexts.

Deeper understandings of digital literacy have evolved over time, with the focus including knowing and understanding, accessing, evaluating, managing producing and exchanging information, whilst also knowing how to share and use this information safely, ethically and legally (Ainley et al., 2016; Chetty et al., 2018; Neumann et al.,

2017; Pangrazio, 2014). The notion of digital literacy is linked to the continuum of information access, creation and sharing, impacted by the range of skills, competencies, social and productive efficiencies and purposes relating to the context of the individual (Alexander et al., 2016).

The concept of digital literacy has been further explored through a global digital impact study completed by the New Media Consortium (Alexander et al., 2016), which presented three overarching models, reflecting the need for continued skill development and associated experiences for learning. Factors in the education environment and the workplace have been explored, investigating how these places are impacted upon by rapid technology changes. These literacies are categorised into three ‘macroliteracies’ – universal, creative and multi-disciplinary (pp. 5-6). Macroliteracies are overarching literacies, under which a number of microliteracies might sit and draws on the user’s “*linguistic, multimedia, spatial, kinesthetic and other skills.*” (Dudeney et al., 2014, p. 6). Canelli et al. (2008) defined digital literacy as a complex incorporation of “cognitive processes and dimensions as well as methodological and ethical awareness” (Calvani et al., 2008 as cited in Nascimbeni, 2018, p.2). In addition to identifiable digital literacies and capabilities, a range of ‘new’ literacies overlap, connect to and/or are impacted by emerging digital technologies. The concept of new literacies is developed on the supposition that primarily their “inscriptions are rendered by means of a digital code...rather than material means” (Knobel & Kalman, 2016, p. 5). New literacies (Gee, 2013) appear to be concentrated on behaviours that are more participatory, and less “author centric” than traditional literacies (Gee, 2013 as cited in Knobel & Lankshear 2014, p. 98).

Dudeney, et al. (2014) developed a framework of digital literacies with a focus on language, information, connections and re-designing literacies and the increasing complexity that changes in technologies bring. Their study also focused on personal literacies, network literacies (p. 226), multi-media and print literacies (pp. 233, 238), and a range of multi-cultural and participatory literacies (pp. 265, 291). Digital literacies are characterised as linking to both internal and external imperatives, determining value through the digital practices of the individual for learning and social participation (Noh, 2017; Pangrazio, 2019; Pangrazio & Selwyn, 2018; Pegrum, 2019; Selwyn, 2011). The value achieved is related to both contributions and the contributors, as the development of new ideas cultivates community and new social construct (Haythornwaite, 2014).

The study of digital literacies has embraced social, critical multi-modal, spatial and sensory mechanisms. Mills (2015) explored the notion of discourses raised by Gee (2012) as socially accepted patterns of behaviour, interactions and associated meanings aligned to particular ‘languages’ of the activity or social location, thereby, aligning to critical, literacies. These literacies are impacted by the socio-material connections where the digital practices of individuals are shaped by the resources and tools available, and reflect the beliefs, behaviours and opinions of the user (Early & Kendrick, 2017; Kim, 2016; Mills, 2015; Pangrazio, 2019) and subsequently, the structure of “texts, language and literacy” (Mills, 2015, p. 73). Chaka (2019) suggests that new literacies are often more “collaborative, more participatory and more distributed (p. 57). Pegrum (2019) suggests that digital literacies influence and are influenced by sociopolitical changes (p. 7791) reflecting “diversity, unpredictability and change” (Hauck & Kurek, as cited in Pegrum, 2019, p. 7791).

Intercultural literacies define the possibilities for students as they connect, share and sometimes be confronted by different belief systems, languages and political principles of others. The interpretation of information from cultural connections, the ability to communicate effectively and interact with constrictive outcomes underpin the development of intercultural and transcultural literacies (Kim, 2016; Early & Kendrick, 2017).

The concept of remixing content and media as a contemporary digital literacy focuses on the redesign and rehashing of curated objects and ideas - sometimes referred to as a “mash-up” (Dudeney et al., 2014, p. 307). This notion of digital literacy refers to the ability of the user to reconceptualise and re-work existing materials, producing something new from the pre-existing objects (Lund et al., 2019). Remixing or mashing is seen as the higher end of digital literacies in that students are immersed in macroliteracies that present opportunities to curate, critique and create at the same time in order to produce something new that is relevant to either the user or an intended social audience (Dudeney et al., 2014; Pegrum, 2017; 2019; Smith et al., 2018). Remixing can also be seen as a component of multi-modality, where the user takes different media elements to re-create something new (Boechler et al., 2014; Eckert, 2008; Pangrazio, 2019).

Pegrum et al. (2018) revised their proposed framework of digital literacies as a response to the impact of emerging and developing digital technologies, “such as the continued rise of mobile technologies, augmented reality and virtual reality interfaces, coding and robotics, big data and learning analytics” (p. 4). The notion of an adjusted understanding

of digital literacies presented continues to be aligned to the social and cultural environment of the user, focusing on overarching macroliteracies and integrated subliteracies previously presented. The notion of plural digital literacies is presented by Heitin (2016), aligning the definition to the ways in which users can integrate multiple tools and resources to curate and recreate in a multiplicity of modal representations. Continual revision and adaptation of this framework reflects vicissitudes enabled by mobile enhanced communication, collaboration, and curating, assembling and re-mixing information and media (Pegrum, 2019).

The term dynamic literacies has more recently been used to describe the fluidity of digital literacies, encompassing the changes in meaning making occurring as users' behaviours and interactions with mobile (and other) technologies evolves over time and experiences (Canon et al., 2018; Chaka, 2019; Potter & McDougall, 2017). Potter and McDougall (2017) argue that the concept of dynamic literacies is significant as it raises the idea of the interplay between literacies of meaning making and understanding with the sociocultural experiences of the individual. The suggestion of a "dynamic ideological model of literacy" (Canon et al, 2018, p. 194) implies a fluid state of capability, one that is increasingly critical as children and adolescents navigate the interconnected experiences of the ever-changing digital environment (Turner et al., 2017).

The literature examined, points to the complexity of digital literacies is associated with a range of capabilities and ability to navigate new literacies that involve the use of technologies within the social and learning spaces (Reedy & Parker, 2018). These literacies are influenced by the technologies available and the ability of the social group to utilise the affordances of those technologies. The socio-cultural literacies and practices of any group in contemporary settings are also impacted by the presence of three-dimensional worlds, mobile communications and communities of connection. The notion that as mobile technologies continue to evolve, the concept of digital literacy should be transformative is powerful, invoking a sense of agency and in making the technologies work for the user (Lund et al., 2019). It would seem reasonable, then, to consider that digital literacies encompass a wide range of macro, micro and transdisciplinary literacies, empowering the user (of technology) to acquire dynamic competencies and enabling functional use of technologies for learning and professional gain (Senkbeil & Hime, 2017; Canon et al, 2017; Pegrum et al., 2018; Pottter & McDougall, 2017). Digital literacies can be viewed as a spectrum of literacies acquired dependent on exposure and

practice, rather than a specific continuum – a scattered range of aptitudes and behaviours rather than a progression of linear skills (Chaka, 2019).

2.5.2.Digital Literacy And Tweens

The legitimacy of an existing well-developed digital literacy in tweens, teenagers and young adults has been questioned by Metz (2017). The main focus of the Metz study was to explore how groups of children can “use” mobile technologies to access, retrieve and repurpose information, and yet do not appear to have developed core literacy skills that enable them to be discerning about the information they receive and use, and that they are unable to determine fact from fiction. The concepts of “fake news”, bias and trusted websites were tested with 8,000 students. The outcome was interesting and “troubling” as across a range of experiences, 80% of respondents were unable to determine fact from fiction (p. 6).

Additional research has tested the efficacy of targeted training programs for pre-adolescent children – tweens – to develop greater digital literacy including a deeper awareness of possible and probable vulnerabilities when using technologies, including privacy issues and social behaviours (Fernández-Montalvo et al., 2017). Their study proved successful in developing stronger, embedded digital literacies that would be useful in reducing risks in participating children in this age group. The Fernández et al. study also suggested that the development of these broad digital literacies is not, currently embedded into the school curriculum (p. 14).

Brown (2017) promoted the notion that there cannot be one single overarching framework describing digital literacy and that we have a need to reimagine what these literacies might be. Brown also notes the need for the development of digital literacies aligned to critical mindsets, digital agency and active participation. These concepts of digital literacies present a broad lens that recognises the interplay of agile, digital literacies incorporated within the lived environment of the individual. The emphasis for this study focuses on these literacies embedded within and encompassing the tweens’ emerging digital ecology (Charteris & Smardon, 2017).

2.6. Digital ecology

The literature explored has demonstrated that ‘today ’children and adolescents spend a considerable amount of time in their day interacting with mobile devices. The emergence and increased use of mobile technologies has provided opportunities to explore how

adolescents are responding to the associated changes in their environment (Geid, 2012; Chaka, 2019; Potter & McDougall, 2017). The changing environment has been a focus of a number of other studies, with substantial debate about children and adolescents' social connectivity, online safety, mental health, development and the emergence of a possible digital divide between parents and children (Geid, 2012; George & Odgers, 2015; Williams & Merten, 2011).

The online, everyday environment of children and adolescents can be seen as a "bridge between different parts of [their] lives" (Hallberg, 2014, p. 2), with children of all ages experiencing an overlapping of their digital and non-digital worlds (Helsper, 2017; Raptis et al., 2014). The notion of a "digital ecology" (Livingston et al., 2017 p. 10) describes an environment where mobile devices and other technologies are inextricably entwined into the lives of young people. The evolution of the notion of the digital ecology has focused on identifying connections between the user and technologies, describing concepts such as the personal ecology (Jung, 2008) the information ecology (Nardi & O Day, 1999) and the artefact ecology (Vyas & Dix, 2007). Others have described the emergent digital ecology as ambient where interactivity and interrelatedness support meaningful activities (Goumopoulos & Kameas, 2009) and as ubiquitous (Resmini & Resati, 2009). Forlizzi (2007) had also associated the digital ecology with the growing social use of digital products or artefacts to create meaningful interactions (Forlizzi, 2007, as cited in Raptis et al., 2014 p. 3).

The concept of a digital ecology, first suggested as a "techno sub system" (Jones, 2010) was expanded from an earlier model of ecology, referring to the interplay of the various elements of a child in their broader, lived environment (Bronfenbrenner 1979, as cited in Hallberg, 2014, p. 4). These elements include personal development, social relations and structures, communication, formal and informal learning experiences and are presented as 'nested' ecologies of interaction within micro, meso, macro and exo aspects of the tween experience across time.

The nested arrangement of Bronfenbrenner's ecologies has been presented by other researchers as more appropriately conceptualised as a networked model to represent the interrelatedness of the individuals' lived ecology (Ettekal & Mahoney, 2017; Neal & Neal). The ecology represents the construct of the person, their context, processes and time, networked and interwoven with cognitive, emotional and physical engagements that occur through the social interactions of the individual, reflecting changes over time (Bronfenbrenner 1986, as cited in Neal & Neal 2013; Etteka & Mahoney, 2017; Neal &

Neal, 2013; Plowman 2015; Raptis et al, 2014). The digital ecology encompasses a range of poly-synchronous personal, social and learning activities and opportunities, considered as subsets of the individual's broader personal ecology (Charteris & Smardon, 2017; Raptis et al, 2014).

Supporting the need for further investigation of the digital and lived ecology of the individual, Livingston et al. (2017) stated that previous studies considered interrelationships between children, technology use, demographic and social factors but that the outcome of using technologies has been left largely unexamined. They identified the need for research investigating children's personal engagement, social practices and the datafication of children's lives through technologies. This study is investigating the broader age range of pre-adolescent children from 9-13 across all aspects of their everyday lives, whereas Toh et al. (2017) investigated the transformation of participation and learning seeking to "understand how young children [aged 9-10] use mobile technology...to traverse different learning contexts and harness a constellation of resources to make sense of their (science) learning in daily lives" (para. 1). Nevertheless, some of the methods and findings provided a useful foundation for data gathering methods and situating this study, using a sociocultural lens and concentrating on the broad digital ecology of the tween including the "personal, interpersonal and cultural-institutional forces on both formal and informal learning spaces" (Toh et al., 2017, par 2).

2.7. Tween Agency

Agency is seen as integral to the interactions of the individual, "situated in context and contingent on sociocultural interactivities and dynamics" (Stetsenko, 2019, p. 1). The notion of agency incorporates the "capacity of people to act upon, influence, and transform their activities and circumstances" (Kumpulainen et al., 2018, p 29). The concept of relative or relational agency expands this understanding, focusing on the capacity of an individual to relate to others, negotiate, construct and restructure relationships, acting with purposefulness in response to others and the environment (Choi, 2018; Edwards, 2011).

Immersion in the digital ecology may be contributing towards a shift in agency for children, particularly concerning relational and ecological agency. As the children transition into adolescence, the shape of their digital and non-digital ecologies changes, expanding beyond the immediate family, impacted increasingly by external influences,

affecting the way in which the individual develops their 'voice' and identity (Helsper, 2017). Ecological agency (Preistly et al., 2017) can be interpreted as "something that occurs over time and is about relations between actors and the environments in and through which they act" (as cited in Charteris & Smardon, 2017, p. 58). When children are interacting with their peers through social media and other digital communications, changes in the child's capacity and rationale for making decisions impacts on the development of relational agency (Charteris & Smardon, 2017).

There is an interplay between the child's development of agency and the construction and co-construction of meaning through processes, dynamic interactions and participation in social activities at home and at school (Damsa et al., 2019; Sirkko et al., 2019). Agency is further discussed by Rainio and Hilppö (2017) as a complex concept of an "individual's understanding of themselves as agentive" (p. 79) reflecting the quality of engagement for the individual as they respond the range of situations and contexts of their daily lives (Biesta & Tedda, 2007).

In this study, considerable focus has critically examined the way in which tweens use technologies, exploring their interactions and experiences across the range of activities in any given day. The changing nature of ecological, social and relational agency, and the notion of the individual's digital ecology interstitially embedded within all facets of their lived ecology have been central to this research study undertaken.

From 9-13 years of age, the developing tween has been recognised to be developing greater focus on the need for personal agency, transitioning away from childhood games and activities to demonstrating a more sophisticated authority on technology, media, trends, brands, apps and social interactions (Danovitch, 2019). Tapscott (2009) suggests that in the 21st century, tweens are authorities on the digital revolution and that they will, through their altered behaviours and interactions ultimately impact on education, business, government and other aspects of life, with children in this age group developing greater agency through their use of mobile technologies.

The concept of being "wired up" has been used by Zarra (2017, p. 81) to describe the young person of today, acknowledging their ever-present connection to technology and input from mobile devices. Potter (2017) refers to the "social media/data-harvesting platform entering the complex system of the classroom" (p. 387), posing the question that focuses on what we understand by what it means to be digitally and media literate. Potter also refers to the impact of the changing nature of our consumption of aspects of the digital environment, exploring the how this has changed our daily interactions and

experiences. Potter suggests that in alignment with research done by Selwyn (2012), there is a need in research to explore what is visible and then re-problematise what is uncovered (Potter, 2017, p. 388). Selwyn (2012) considers that education researchers need to constantly ask “what is new here” (p. 215) and to ensure they investigate the “state of the actual” (Selwyn, 2012, p. 216; Olofsson et al., 2018). This research study has focused on what is new for tweens through the ways in which they use mobile technologies, the impact this has on their agency and how the digital ecology in which they live, can be considered the tween’s *state of the actual*.

2.8. Spaces and places

Previous studies have examined the pre-digital use of time, spaces and places where boundaries were delineated primarily by adults, with the transitioning tween having elements of negotiation within these boundaries (Thomas & O’Kane, 2000). This study has considered changes to these boundaries enabled by the use of mobile devices by children in and across all aspects of their everyday lives, including traditional and new learning spaces. The associated blurring of binaries of physical and virtual spaces, places and synchronicity have also been investigated. This study has further identified and explored dynamic digital literacies, investigating how these can be understood and applied to formal and informal learning experiences (Potter & McDougall, 2017). Significantly to this study is the concept of spaces and places – how and where mobile technologies are used across the day, considering the mediation of learning and socio-cultural interactions of the user. The learning ecology is seen as a network of participation and activities as children interact across different learning spaces, including formal and informal learning opportunities (Erstad & Silseth, 2019; Snaddon et al., 2019; Toh et al., 2013).

The notion of a ‘third space’ where communication and interactions are made possible through the affordances and fluidity of mobile technologies has been explored, considering the presence of ‘in-between’ spaces unconfined by physical location and time (Kearney et al., 2010; Kelly, 2019; Potter & McDougall, 2017; Schuck et al., 2017; Williams, 2014). The concept of the third space proposes that individuals draw on multiple resources to make sense of interactions and connections within the broad scope of experiences, with consideration given to social dimensions and relationships as well as the physicality of the space (Bhabha, 1994, Soja, 1996, Kearney et al, 2010).

Oldenburg (1991), describes the third space as being an informal construct, separate from the two usual social environments of home and the workplace/school (Oldenburg, 1991 as cited in Wilhelm, 2010, section 3; Wright, 2012). Babha (1994) described the third space as a metaphor for the space or place in which cultures meet, engenders new possibilities and is “interruptive, interrogative and enunciative” (Babha, 1994 as cited in Meredith, 1998, p. 3). Moje et al. (2004) further presented the concept of the third space as an undetermined location where home and school knowledge crosses over. Within this space, individuals are able to interact, learn or teach in a ubiquitous manner, transitioning from physical to virtual spaces as required and desired (Kelly, 2019; Potter & McDougall, 2017; Schuck et al., 2017; Williams, 2014).

Expanding the concept of the third space is the notion of polycontextual learning presented by Gutiérrez et al. (1999), wherein the ubiquitous hybridity of the learning space is shaped by the diversity of the individuals interacting in that space.

Polycontextual refers to the concept of being in more than one place at the same time (Elstad, 2016; Gutiérrez et al, 1999) where individuals can be seen to be occupying the same physical space while simultaneously interacting within other, different virtual spaces. Individuals can also be seen as present in a physical space and/or simultaneously in another space, observed as having divided or conflicting attention, not seemingly involved in any specific space, but rather slipping from one to another without any obvious sense of engagement (Arnesen et al., 2016).

Aligned to the view of polycontextual learning is the notion of transitional learning, where student engagement is seen to occur inside and outside of the classroom, before, during and after classes, between the offline and the online – the spaces in between (Herz, 2005; Bradbeer, 2016). These in-between spaces further connect to the concept of the third space, with a framework presented by Gutierrez (2005), that ‘rejects traditional theories of home and school discontinuities (p. 7). The affordances of mobile technologies enable the potential for the learner to connect through a range of physical and virtual networks in any space or time (Traxler, 2009 as cited in Schuck & Maher, 2018, p. 473).

The idea of the third space can be viewed as transformative in its potential for an expanded paradigm of connecting, interacting and learning (Gutierrez, 2008). Within these experiences, there are opportunities for the learner to find a “portal” (Land et al., 2014) through which they may develop a new perspective or understanding of previously challenging concepts, enabling “new and previously inaccessible ways of thinking and

practicing” (p. 200). The juxtaposition of different digital and associated literacies intersect with one another and provide a foundation of interpretations and skills that can be applied in new contexts, ‘thereby opening up paths to third spaces ’(Klatzin, 2012, p. 15). The view of a third space that is between spaces can also be associated with intertextual connections between digital literacies that develop an individual’s understanding and constructs from one activity to another, through progressive and interwoven concepts and subject matter.

The concept of “third culture kids” is raised by Kocheva & Guzikova, (2017) using the term in this instance to relate to children who are a new generation of learners, transitioning from one learning culture to another through their immersion in digitally enhanced mobile places of interaction. Previous studies have noted that the digitisation of everyday lives has changed the experiences of childhood significantly (Poyntz & Hoechsmann, 2011; Sefton-Green, 2006) and that there may be a detachment from some of their other more traditional cultural influences. The influences from which children form their social connections, identities and literacies are affected by the multifaceted, digitised, mobile culture in which they are immersed (Hannaford, 2016). Children of the second decade of the 21st century have been described as polycultural individuals, where the impact of all experiences influences behaviours, actions and interactions, resulting in a “more generic intercultural competence, indicating a high level of individual acculturation and expansion of communicative horizons” (Kocheva & Guzikova, 2017, p. 707).

The third space is not specifically defined or contained as an exact entity, but rather exists for the individual through their current experiences, co-existing in and across the narratives within a range of converging physical and virtual spaces (Kozleski, 2011; Potter & McDougall, 2017). Through this lens, the concept of unintentional or incidental learning might also be observed and investigated. Unintentional or incidental learning occurs when an individual is involved in learning or other activities, including a range of explicit or implicit processes that might also be connected to intentional learning experiences (Schmidt & De Houwer, 2012; Reider, 2003). Sharples and Spikol (2017) explore the seamlessness of learning that is interwoven into physical and non-physical spaces through the use of mobile technologies and Wong (2016) presents the notion that the learner should be presented opportunities that include contextual and cross-contextual possibilities. It would seem plausible that the possibilities for unintentional or incidental learning, might occur when a person is involved in activities using mobile technologies.

UNESCO (2005; 2019) refers to this as informal learning, with an emphasis on the learning being “unorganized, unstructured and unintentional” (p.4). The concept of unintentional learning might also be referred to as accidental, indirect, additional or unplanned learning, occurring when an individual is involved in *any* activity, and that learning is possible through a range of interactions, with or without intended learning outcomes. This study has included an exploration of children’s informal or unintentional learning practices as they collaborate and interact across and within a range of mobile, social and liminal landscapes (Hattingh, 2017; Luckin, 2018; Masanet et al., 2019; Trinder, 2017).

Schuck et al. (2017) explored the situatedness and social interactivities of learning, defining third spaces the hybrid construct of space that is enabled when the margins of face-to-face and virtual, synchronous and asynchronous experiences interweave and are no longer clearly delineated. This notion was developed further by Schuck and Maher (2018) describing the third space as encompassing “formal and informal places and times as well as the overlaps, conduits and bridges between those times and places” (p. 2).

Building on existing research, this study focuses on using conceptual paradigms such as the third space framework (Schuck et al, 2017) and the Mobile Pedagogical Framework (Kearney et al., 2012), to further explore children’s learning in the spaces beyond traditionally recognised learning settings. Mobile technologies in action have been investigated, exploring how they are experienced by tweens, in and out of formal learning places, aimed at supporting teachers with a deeper understanding of the iniquitous potential of the learning ecosystem when using these technologies (Kelly, 2019).

Consideration in this study has been given to furthering an understanding of the third space, considering how within transitional and polycontextural spaces and experiences, children draw on resources from home, school and external repositories, connecting new literacies, social-cultural behaviours, skill acquisition and multimodal applications to the school learning environment (Kupiainen, 2013; Schuck et al., 2017). Children experience social connections that are not limited by binaries such as time or physicality but where both worlds are “real at the same time (Kosari & Amoori, 2018, p. 181). Sociometeriality, the interplay between the material and sociocultural interactions of the child that reflects the “inseparability of the technical and social” (Orlikowski & Scott, 2008, p.433) is conceivably integral to the construct of the third space they experience (Potter & McDougall, 2017).

2.9. Literature review summary

The literature presented demonstrates that there has been significant previous research into the technology children have access to and how they are connected digitally for a large proportion of their day. Research also indicates a blurring of boundaries from physical and digitally accessible virtual spaces for living and learning – part of the third space metaphor (Potter & McDougall, 2017; Schuck et al., 2017). The notion of digital ecologies and agency has been explored with consideration given to how the increase in mobile connection has altered the environment in which the pre-adolescent child lives. Previous studies have focused on the impact of technologies on the child – and education – negatively and positively, considering the implications for children, teachers and the education community. With the current generation growing up in a world of increased ubiquitous connectivity enabled by mobile devices (Bartholomew et al., 2017), research into what is happening when children use mobile technologies would seem invaluable (Potter & McDougall, 2017) and this is one premise of this study.

It could be asserted from the literature explored, that the notion of digital literacy presents an overarching or umbrella term (Boechler et al., 2014), a macroliteracy, that broadly encompasses a range of microliteracies associated with the use of technologies, drawing on a collection of personal literacies that are either required for or acquired through, technology-based interactions (Pegrum, 2017; Pegrum et al., 2018). Of significance to the research undertaken in this study, learning can be supported through real world digital interactions (Dudeney et al., 2014). Multiliteracies and transliteracies encompass the ever-changing literacies that are connected to reading, writing, manipulating, curating and interacting with and through a range of platforms, tools and media (Eckert, 2008; Pegrum, 2019; Smith et al., 2018; Thomas et al., 2007) and incorporate the range of interconnections of technological, social and cultural modalities, behaviours and practices associated with new media interactions (Chaka, 2017; Pegrum, 2017; 2019; Potter & McDougall, 2017).

Bartholomew et al. (2017) considered the relationship of middle school students' access to mobile devices and self-directed learning and the relationship to student achievement in open-ended problems (p. 3) and another study by Areepattamannil and Khine (2017) considered how early adolescents used technologies for social communication. The researchers explored the roles of technology (primarily computers and the internet) related behaviours and motivational characteristics. Of significance, were the findings

that early adolescents indicated that when afforded the use of technologies at school for learning, there was an increase in their use of technology for social communication and that this frequency of use in and out of school, might contribute to the development of skills, attitudes and motivation.

Of interest to this research are the findings that “early adolescents who reported using computer-based, work-oriented software applications more frequently outside of school tended to use ICT for social communication significantly more frequently than did their counterparts who reported using computer-based, work-oriented software applications less frequently outside of school” (Areepattamannil & Khine, 2017, p. 270). Christoph et al. (2015) found that the individual adolescent’s perceived efficacy in the use of technology linked to a consequential expansion in the social use of technology and an associated expansion in the individual’s confidence and capabilities.

The findings by Christoph et al. (2015) reaffirmed and supported those from an earlier study by Ilomäki and Rantanen, (2007) where adolescents were demonstrated the development of higher levels of technology skills, competency and knowledge as a direct result of frequency of use. The study completed by Areepattamannil and Khine (2017), was also consistent with previous studies by Livingstone and Helsper (2017) and Scherer et al. (2017) where findings indicated that the early adolescent’s efficacy in using technologies impacted upon, and was influenced by, the frequency of use, attitudes towards technology, exposure towards using technology for learning and social or recreational purposes, in addition to their general interest and enjoyment in using technologies.

This study considers the layers of behaviours, capabilities and interactions that lie beneath the findings from many previous studies. The research focuses on the gap in the existing research that aligns with the perspectives raised by Reid Chassiakos et al. (2016) to investigate *what’s happening* when tweens are involved in mobile technology use across all aspects of their everyday lives. This study seeks to explore and understand the development and presence of dynamic, transitional digital literacies (McDougall & Potter, 2017; Sefton-Green & Erstad, 2017), as tweens experience and interact with mobile devices. Consideration has also been given to the impact of unintended learning experiences and the Discussion chapter explores the potential influence this understanding will have on quality teaching and learning.

This research project aims to build upon the findings from the aforementioned studies and to investigate the previously unconsidered impact of digital connectivity, communication

and interaction on the development of proficiencies and behaviours of the pre-adolescent child user, the tween, specifically exploring the experiences and outcomes of these experiences when tweens are using mobile devices. Potter (2017) espouses that we need to find new ways of understanding the digital culture in which we are immersed, and asks how we can, as researchers respond to the changing paradigms of the digital ecology. This research study responds to that question, critically engaging with young people to better understand their use of mobile technologies and how this impacts on and influences their experiences.

Critical to this study's investigation of the world of the tween and how they experience mobile technologies, has been the consideration of implementing new and alternative methods for approaching contemporary research in this field (see also 3.5.1). The need for new methods as used in this study has been recognised in other studies in recent years, notably Wingvist and Ericsson (2011), Prieto (2013), Toninelli and de Pedraza (2015), Potter (2017), Toh et al. (2017), Falloon (2018), Gower and Marenco (2018) and Tie et al. (2019). The studies examined suggest the need for changing methods of data collection to reflect and align with the speed of development in available and emerging technologies. The pace of technology development means that "a generation of mobile devices is short lived" (Wingvist & Ericsson, p. 10) resulting in research being quickly outdated. Responding to the rapid changes described, alternative approaches for gathering data have been utilised in this study to find ways to gather data that authentically represents the experiences of tweens as they interact with technologies in their everyday lives.

3. Methodology

3.1. Introduction

Chapter 3 presents the methodologies and methods that were implemented to address the overarching question that underpins this research study:

1. How are tweens experiencing and constructing meaning as they interact with mobile technologies in their everyday lives?

The literature review in Chapter 2, focused on analysing the existing research and assembled from data in previous studies of children and technology. The studies indicated that children and teenagers today have unprecedented access to mobile devices and that this has implications social behaviours, individually and in various learning environments (see section 2.3). The concept of the wired child has been explored through the literature review chapter, focusing on changing access to mobile technologies and the emergence of a digital ecology (see sections 2.4, 2.5 & 2.6). The literature review has also examined the concepts of multidimensional, transdisciplinary and dynamic literacies (see section 2.5) that have evolved with the development of mobile technologies, considering the impact that these have on individuals and in education.

The literature in chapter 2 has provided significant background information and aligned with the need to conceptualise and understand shifting learning spaces (Erstad & Silseth, 2019; McDougall & Potter, 2019; Sefton-Green & Livingstone, 2019) has meaningfully shaped the direction and design of the research undertaken in this study. This chapter (3) describes the perspectives and theoretical underpinning that informed the study design, data collection and processes implemented, issues that were encountered and ethical considerations. The chapter also includes participant selection, methodological approaches, innovative methods used to generate data, instrumentation processes, technologies available and data analysis techniques utilised. The chapter concludes with a discussion on ethics and consent considerations, methodological issues and limitations associated with this study.

3.2. Research Paradigm

This study has focused on exploring the gap in the existing research, investigating what is happening when tweens are using mobile technologies, examining the layers that sit beneath the actions of use, probing for a deeper understanding of the skills, literacies and capabilities that are developed along the way, through these interactions.

The research undertaken was from a qualitative, interpretive perspective, empirical in nature, exploring the evidence of experiences through a range of data generating approaches, including inquiry, reflection and participant narrative (Charmaz, 2020; Vidich & Lyman, 1998; Walther et al., 2017). A qualitative research paradigm was selected for this study, as the aim was to establish an in-depth understanding of elements of human behaviour and experiences, and the influences that govern or impact these behaviours and experiences. The research study was situated within a grounded theory framework, providing the guiding principles for investigating the experiences of tweens, exploring their interactions and use of mobile devices directly through their recollections and reflections.

The purpose of this study was to clarify and understand tweens' interactions with technologies and their construction of meaning through engaging in the digital world around them – through their own reflections of experiences and behaviours when using mobile devices (Motherway, 2019). This investigation has included 'what's happening' in the full range of everyday experiences of the tween, including in school and out of school experiences, across weekdays, weekends and holiday times, investigating practices and interactions holistically. The tween's understanding of what they are doing, their use of time and space have also been explored, considering the between these constructs as they navigate their mobile digital lives.

3.3. Philosophical Perspective

To provide exactitude and credibility in the findings, and to authentically interpret the reflections of the tweens' contributions in this study, it was also essential to establish the philosophical perspective underpinning the research (Charmaz, 2004, 2020). Grounded theory is seen as enabling the researcher to think outside the paradigm, challenging existing orthodoxies therefore suited to innovative studies that endeavour to explain observed phenomena (Bryant & Dey, 2007). According to Charmaz (2005) the constructivist grounded theorist is aware of the existing interpretive frames of reference,

the research context and how conceptual understandings are constructed “through interpretations *of* data rather than emanating *from* them” (p. 509). The focus in research is best done through co-constructing experiences and meanings with the participants in a research study rather than about them (Charmaz, 2020; Tie et al, 2019).

To carry out research within this paradigm provides opportunities to examine and comprehend the experiences *of* the target study – *with* and *from* the target study. This first-person approach is one that enables the data to be truly reflective of the participant’s contributions – changing the nature of researcher observation and interpretation (Roth, 2012), in turn addressing the key aspect of the research question, ‘what’s happening ’ when tweens are using mobile technologies. Roth (2012) describes the first person in research as being an in the moment perspective of the experience, tying in with the methods used for data collection, focusing on capturing data on the go and think aloud processes (see sections 3.8.2 & 3.8.6).

3.4. Key objectives

This study has focused on the regular daily experiences of the tween with an emphasis on how this particular group of children uses mobile technologies to interact within their world at all times of their day and when transitioning between physical, virtual and reconstructed hybrid concepts of places and spaces (see section 2.8). Consideration has been given to the impact of the tween’s existing and constructed (or reconstructed) social context - and the resources available for generating these experiences. The direction of this study was embedded within an investigatory approach, reflecting the narratives of the tweens involved, intent on “what they care about, [valuing] the continued explorations by the students of themselves, and the world around them” (Wells, 2019, p. 7).

The investigations were not limited to how tweens used mobile devices specifically for learning, or at school, but rather how they use them in all aspects of their daily experiences, exploring the skills and literacies developed as they incidentally, and/or purposefully seek information, generate ideas, communicate, collaborate and socialise. The notions of informal and formal learning were not separated, but rather seen as being integral to the overall experience/s of the tween, exploring the mobility of socialisation and changing nature of learning as pre-adolescents “participate in an emerging terrain of digital literacies that are mobile, embodied, geospatial and participatory” (Taylor, 2017, as cited in Toh et al. 2017, p. 306). Exploring changing concepts of information literacy,

media literacy and digital literacy were integral to the investigations in this study, with an emphasis on the development of dynamic literacies as described by Potter and McDougall (2017), considered through a sociocultural and experiential lens (see section 2.5 for more information on digital literacies).

3.5. The study

3.5.1. *Participants*

Aligned to the various phases in the research study were the groups of participants within the target population of tweens who became involved in different aspects of the research process. The target population is defined as the “collection of individuals of primary research interest” (Drotar & Reikart, 2000, p. 78). The target population for this research project is the tween, or pre-adolescent - children in the age demographic from 9 -13. The groups and individuals participating in the various phases and areas of study are derived from this target population and are referred to as the study population.

The participants in this study were drawn from children primarily residing in New South Wales (NSW), in Australia. Participants came from a range of different education sectors, private, independent, Department of Education, home schooling and School of the Air.

The aim was to not distinguish between the different school sectors for recruiting participants or for analysis, but rather, to potentially draw from as wide a representation as possible from the sectors to enable maximum variation of participant demographics and experiences (Byrne, 2001). Additionally, there was no emphasis made to determine an equal number of boys and girls in this investigation, with few aspects of the analysis focusing on gender-based responses other than interest as specific themes emerged. Table 2 provides an outline of the broad age demographic and aspects of involvement in the participants for this study. Further details about participants can be reviewed in section 3.14 and 3.15

Table 2*General Participant Information - Mobile & Wired Study*

Age demographic	Survey	Interview	Focus group
9-10	√		
11-12	√	√	√
12-13	√	√	√

3.5.2. Phases of the study

This study was developed around four key stages. The first two phases of data generation iteratively moved from a general study, to a more specific focused examination of the behaviours and interactions of tweens with mobile technologies (Chun Tie et al., 2019). Phase one of this investigation was a comprehensive, interpretivist exploration, using survey to provide a broad view of how tweens interact with and use mobile devices in general. The survey provided opportunities for the participants to contribute open-ended responses in addition to answers to more specific, guided questions. Survey questions were based around key questions were designed to ascertain broad usage patterns, with open-ended sections providing opportunities for the participants to further explain, or to add information they felt was open ended questions relevant (Lloyd & Devine, 2015). For more information about phase one, the survey, see section 3.14.

Phase two (see section 3.15) embodied a multiple-case study approach, with the investigation focused more specifically on a number of individual cases (14) within the specified age demographic of tweens (9-13 years). There were two key sections to this phase of this study – the online interviews and focus groups. In the online interview component, participants took part in several conversational meetings using a webinar format, with the structure of the session informally organised to enable the direction of the discussion to expand and unfold as the conversation and data sharing took place (Doria et al., 2018).

The interviews were intended for the participant to share their data and mobile technology experiences on a 1:1 basis, with the interviewer probing gently as, if and when required, using the participant's data as a guide (Bryman, 2008; Cohen et al., 2011; Opie, 2006).

The second part of phase two incorporated the facilitation of collaborative discussions or unstructured focus study groups of tweens, that provided the opportunity for deeper, sustained, collaborative conversations amongst a group of children familiar with one another (Bryman, 2008; Hughes & DuMont, 2002; Mishra, 2016). Focus groups have been promoted as a means for providing opportunities for greater understanding of the personal essence and experiences of a group (Hughes & DuMont, 1993). Doria et al. (2018) present the notion that the focus group is a means of cultivating the experiences of a group of individuals where the conversation around the group's understanding is a collaborative exercise that contributes substantially to address the researcher's questions. For further discussion about the interviews and focus groups, see section 3.15. Phases 1 and 2 of this study, (see Figure 3.1), embraced flexibility to enable the emergence of themes and categories, responding to data analysis and guiding further data generation in each phase, true to the parameters of grounded theory (Charmaz, 2005; 2006; 2014; Corbin & Strauss, 2008).

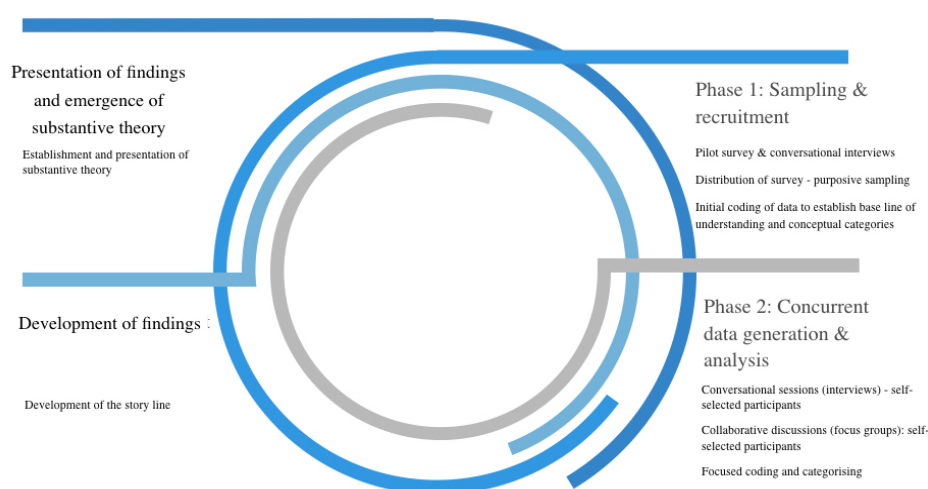


Figure 3.1 Integrated stages of this Mobile & Wired research study

The final two stages of this study focused on analysis of emergent themes, categories and ideas, constructing the story line (Scott & Howell, 2008) that would lead to the generation and establishment of the substantive grounded theory (Charmaz, 2005; 2006; 2014; Cohen et al., 2011).

The methodology selected for a research study is defined by the key focus of this study and the research questions (Sikes, 2005; Opie & Brown, 2019). Qualitative research methods have been applied in this study, to interpret, translate and make meaningful

sense of the personal reflections and observations of the tweens, through which they have communicated their stories (Corbin & Strauss, 2008). The key objective was to explore and develop an understanding of the everyday experiences of tweens with mobile devices, learning through their recollections and reflections from an authentic perspective, without judgment of values or actions. The format of this exploration required careful design so that the methodology and processes undertaken would promote an appropriate investigation of the questions and target subjects (tweens) in order to “produce credible findings, conclusions and claims” (Opie, 2004, p. 17). Establishment of the philosophical position and fundamental assumptions driving the investigation of the interrelationships of experience and multiple perspectives in the pursuit of explaining phenomena has been key to the ongoing direction and shape of the study (Corbin & Strauss, 2008). The position from which the study has been directed was primarily an interpretivist, qualitative approach, consistent with the researcher’s desire to “seek experiences, understandings and perceptions of individuals” (Thanh & Thanh, 2015, p 24). Qualitative studies are generally used when investigating the social world, with the “researcher-as-interpretive-bricoleur” (Denzin & Lincoln, 2005, p. 375). In seeking this outcome, the researcher is required to make choices about how they will design the study and the strategies that will be employed to gather and analyse data. In this study, a qualitative approach enabled the investigation of the “interactions and communication in children’s everyday experiences in the family and at school, on the street, among peers, and at play” (Alanen & Mayall, 2001; Breidenstein & Kelle, 1996; Corsaro, 1992 as cited in Krieken & Bühler-Niederberger, 2009, p. 190). The research design, therefore, has integrated appropriate and suitable methodological approaches and procedures for addressing the questions for which answers are sought, the specific group being investigated and the context of the study subject, in this case, the pre-adolescent tween (Opie, 2004; Opie & Brown, 2019).

3.5.3. Defining The Research Paradigm

The boundaries of grounded theory were considered the most appropriate methodology, as the overarching goal was an exploration of experiences rather than a targeted investigation of one idea, and grounded theory promotes this style of investigation (Charmaz, 2020; Tie et al., 2019). When using grounded theory, as and when new information and ideas emerge, and experiences worthy of further examination are identified, the researcher is able to follow these ideas through (Strauss & Corbin, 1990),

with data generated at each stage informing and shaping subsequent phases (Charmaz, 2000).

Glaser (1996) suggests that grounded theory is the “systematic generation of theory from data” (Glaser, 1996, as cited in Cohen, 2011, p. 598). Therefore, key to the implementation of grounded theory is the view that the data generated and collected does not have to fit with a specific theory, but rather that the theory is generated through the inductive processes of analysis (Cohen et al. 2011).

Grounded theory as the central methodology was decided as appropriate for this study as the investigations primarily sought to understand the ways in which the participants (twens) inhabit their world. This concept is described by Glaser and Strauss (1967) as “multivalent, multivariate and connected” (Glaser and Strauss, 1967, as cited in Cohen, 2011, p. 598), with the researcher expected to consider all aspects of daily life, encompassing the naturalistic connections and interactions being made by the individuals. Glaser further comments that the “world doesn’t occur in a vacuum” (Glaser, 1996, as cited in Cohen, 2011, p. 598), suggesting the importance of the researcher exploring beyond the singular focus of the study, realizing that all things that happen are connected to other aspects of everyday living. This understanding fits well with the purpose of this study, in that all interactions and connections being experienced by the twens are deemed to be relevant to the data being collected. Flick (1998) also advocates that the complexity of the experiences being investigated is made relevant by being grounded in context, and that this is what provides the researcher with greater levels of authenticity in their inquiries (Flick, 1998, as cited in Cohen, 2011). In this study, being mindful of these considerations, emphasis was placed on designing methods of data collection where the participants were situated in the most authentic and natural environment as possible, with limited impact from the searcher (for more information on the natural environment of the participant, see section 3.6.6).

The design of the study undertaken is made up of a flexible number of components (see figure 3.2) with each section contributing to and informed by the other sections - reflective of the quantity of repetitions of data gathering and analysis, bounded by data saturation (Cohen et al, 2011).

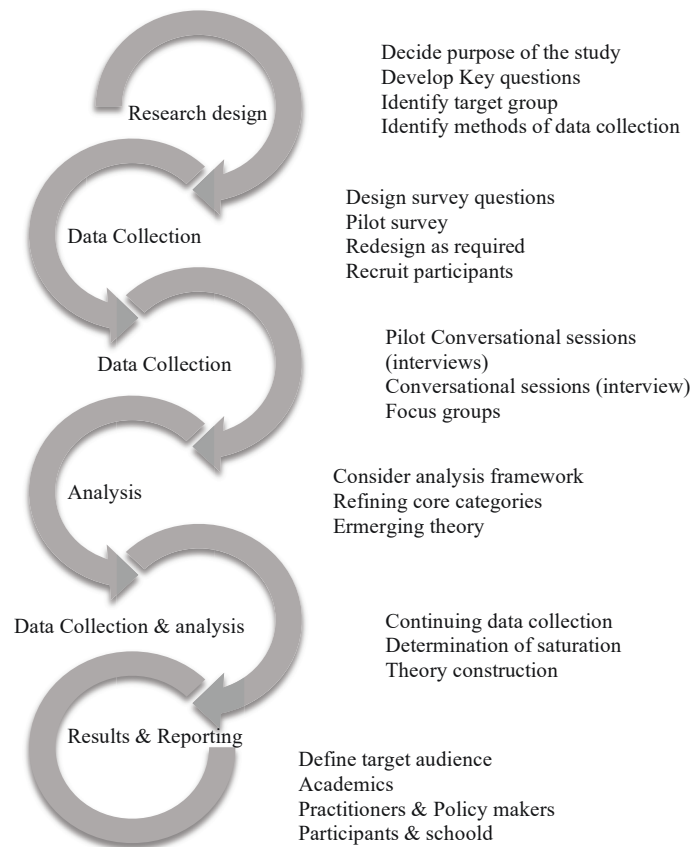


Figure 3.2 Flow chart showing steps for research design and implementation

The researcher is able to ascertain saturation when the data no longer reveals new insights, explanations or discoveries, consistent with grounded theory processes (Gasson & Waters, 2013; Strauss & Corbin, 1990). Iterative data generation and analysis continuously cycling throughout the period of the investigations being undertaken, underpinned how the various phases of the research were shaped and implemented. Using this approach, the researcher is able to make sense of the data, analysing the transcripts from interviews, observations and notes from the interviews, and reviewing the data generated from survey responses to continue to inform the approaches required for further data generation (Burnard et al., 2008).

3.5.4. Grounded Theory Methodology

Grounded theory provided a scaffold for the identification and development of questions in this study, with the approaches used for generating data and the analysis of the data collected supported the criteria required (Fernandez, 2004). Each discussion or response

from the tweens in all sections of the study identified factors that were of interest and worthy of further scrutiny (Strauss & Corbin, 1990). True to the grounded nature of this methodology, no attempt was made to pre-define the nature of tween mobile technology usage or the literacies that might exist, but rather the focus was on developing an understanding directly from the reflections of the tweens involved (Charmaz, 2005, 2020). Data generated at each point of the study was used to develop and direct the focus for the next area of investigation. Denzin and Lincoln (2005) describe the qualitative researcher as a *bricoleur* who can deploy whatever strategies and methods are available to best examine the questions being investigated. This description is applied across traditional and non-traditional methods of research and refers to ‘the combination of multiple methodological practices, and empirical materials, perspectives, and observers in a single study is best understood, as a strategy that adds rigor, breadth, complexity, richness and depth to any inquiry’ (Denzin & Lincoln, 2000, as cited in McFeeney & Faust, 2019, p. 343). This enables the researcher to be comfortable when observing and collecting different perspectives and multiple understandings, opening the possibility to give greater agency and voice for the study participant. O’Regan (2015) depicts the bricoleur researcher as being able to see things differently, making sense from “observed and encountered practices and performances to make a solution to a puzzle” (p. 461).

3.5.5. Grounded Theory Framework

Using grounded theory as a framework the researcher is able to work within these bricoleur parameters to search for and examine areas of interest as they emerge, with an increasingly narrow lens, focusing on the discovery of the theory that is implicit in the data being generated (Kolb, 2012). The methodology also provides for the examination of socially situated behaviours and the development of learning (whatever form this might take; informal and/or formal) through the systematic analysis of empirical data leading to the theorisation of “what is happening in that situation” (Gasson & Waters, 2013, p. 97). Grounded theory is suited to research projects such as this study, wherein the key investigations focus on a range of socially assembled activities and interactions, “constructing theory through the interpretive analysis of multiple perspectives to reflect a social reality” (Charmaz, 2000 as cited in Gasson & Waters, 2013, p. 98), with the emphasis being more focused on the subject of the study rather than the methods employed (Denzin & Lincoln, 2005).

In the grounded theory methodology, specific methods and processes are applied (Tie et al., 2019), including the implementation of a range of sampling techniques, data generation, continuous coding, comparative analysis, theoretical sampling and memoing. Figure 3.3 demonstrates the stages, interplay and movement between the various methods and processes that underpin the use of grounded theory in a research study. The significance of this framework is that the processes are not seen as linear, but rather as iterative and recursive, with a cyclical process continuing until the researcher can no longer find new data.

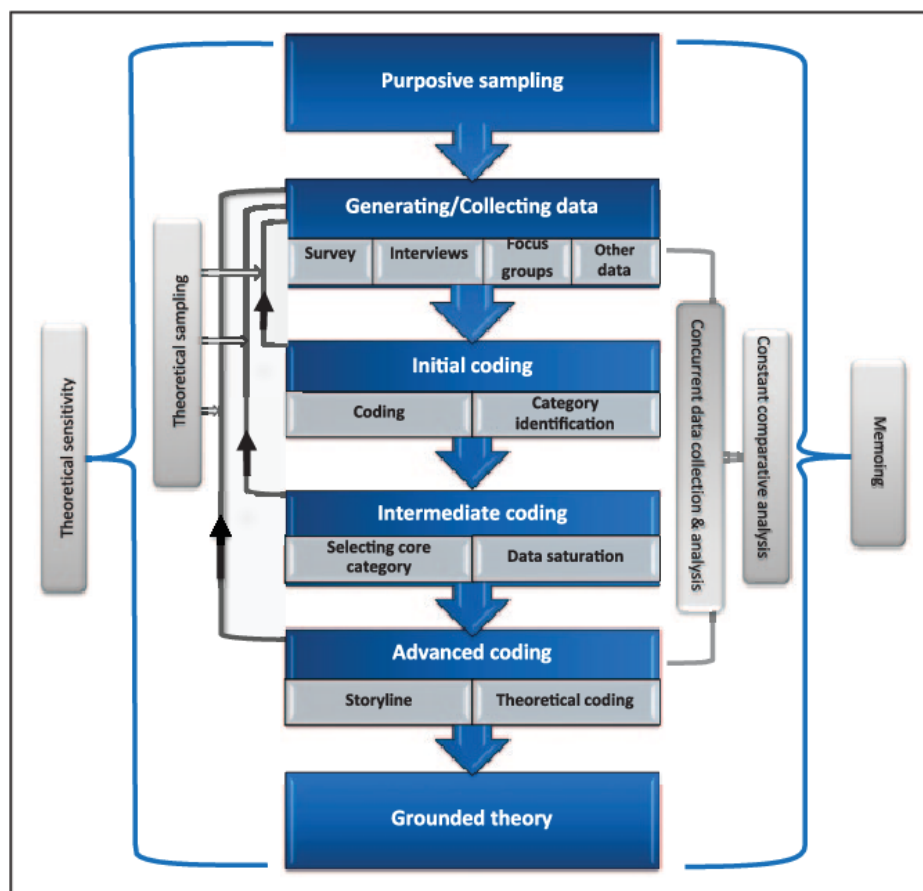


Figure 3.3 Research design Framework - interplay between essential grounded theory methods and processes (Tie et al., 2019, p. 3)

Through the addition of a reflexive approach embedded within the grounded theory process, the data generated is continuously reflected upon, with consideration of existing assumptions, situational dynamics and the examination of preconceptions interwoven within the method (Gasson, 2004). The reflexive expands the grounded theory

framework, demonstrating the elements of interpretation and theoretical development integral to this methodology (see Figure 3.4).

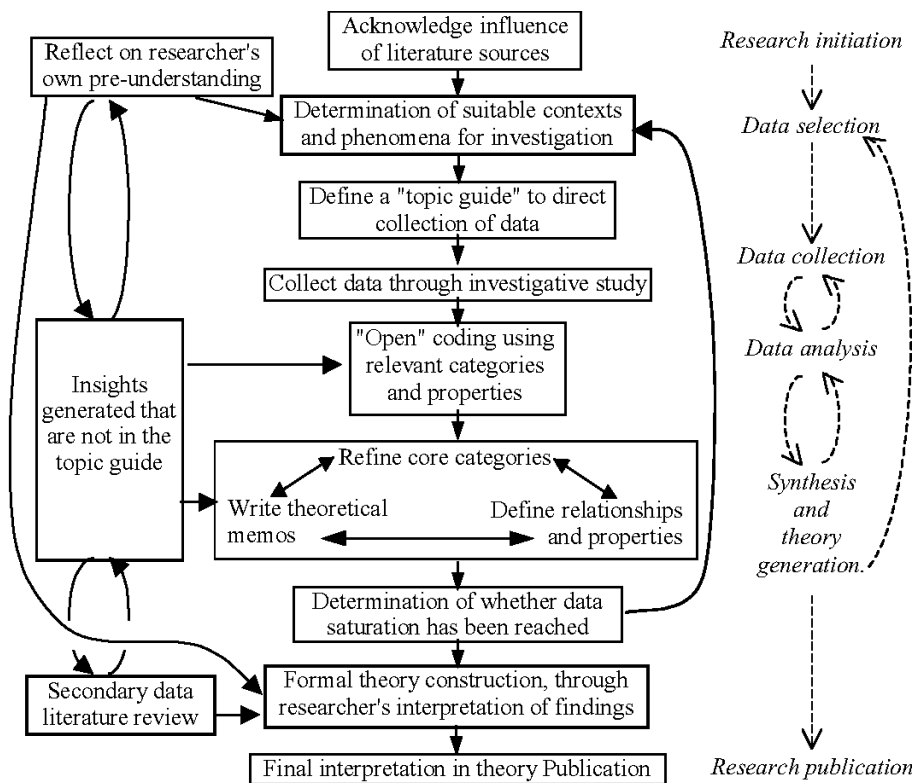


Figure 3.4 Reflexive grounded theory approach (Gasson, 2004, p. 81)

The patterns identified during analysis, coding and memoing come directly from the data – not from “inferences, prejudices or the association of ideas” (Gasson, 2004, p. 80), with the emerging theoretical constructs being developed from the “constant comparisons between the emergent theory and new data” (p. 80). The identification of substantive information, together with the consideration of experiences and associated implications is integral to data sorting and analysis, enabling the researcher to work towards an explanation of the questions being investigated (Glaser & Holton, 2004). Through constant comparison and analysis, inconsistencies and differences can also be identified, enabling the refinement of concepts, categories, ideas and patterns (Tie et al., 2019).

3.5.6. Data Collection And Coding Processes

Data collection is the significant contribution to the success of grounded theory research, with a range of different approaches and sources suitable for this methodology. There is prescribed process of generating inductive, raw data that can represent the range of questions or phenomena being investigated (Charmaz, 2006). The collection of data is controlled by the emerging theory and is decided by the continuous analysis of existing data that suggests or determines the direction for future data collection (Glaser & Strauss, 1967, as cited in Cohen et al., 2011, p. 116). The instruments used for data collection are an essential consideration of the overall study, impacting on research design and determined by the time frame for the study, costs involved and sampling methods implemented. Thoughts also need to be given to whether or not the same data collection methods will be used for the range of potential participants and if changes are required, how these will impact on the data collected. Amongst the instruments available for qualitative data collection are those that were integrated into this study – survey, case study in the form of 1:1 interviews and focus group discussions (see sections 3.14 and 3.15).

3.5.7. Case Study

The parameters of case study are a commonly utilised approach in qualitative research (Starman, 2013; Yazan, 2015) and were deemed suitable to use in this study, with a reflexive grounded theory methodology underpinning the approaches taken. This methodology has, as its core purpose, the notion of building theoretical constructs through a qualitative analysis of the data generated in a research process (Corbin & Strauss, 2008). In this context, an exploratory case approach focused on the investigation of a particular group or “case” in order to address the questions raised, identifying emerging concepts as data was collected and analysed. Stake (as cited in Denzin & Lincoln, 2005) argues that the case study as such, is “not so much a methodological choice, but a choice of what [or who] is to be studied” (p. 443) with Yin (2003) highlighting the significance of case study as an approach that enables interrogation of relationships and social interactions.

Stake also presents the view that case study is a “bounded system” (p. 444) and that essentially, this enables the researcher to focus on better understanding the systems or individuals within the boundaries of the case. The main purpose of case study is not

theory building, but rather providing the opportunity to better understand the “stories of those living the case” (p.445). When using traditional approaches for case study, data is generated through “direct observation of the events being studied and interviews of the persons involved in the events” (Yin, 2009, p. 11). The case study paradigm enables the focus for the investigation to explore the *how* and *why* questions when trying to understand the reasons behind particular behaviours and the impact of specific experiences of the individual (Myers, 2009).

3.5.8. Field Research

With a deliberate focus on authenticity for the participant and data generation, the perspective of case study for this research can be further defined as field researched case study, where the research takes place in the user’s natural context, rather than in an artificial environment (Gentles et al., 2014). This approach enhances the opportunity for authentic interactions and behaviours, as the participants are involved in their normal routines and activities rather than completing tasks at a specific time and designed for the purpose of the study. The notion of observing the user in their natural environment investigating how they are behaving in that environment is not new, however, this study, has, with the integration of technology enhanced data collection, taken the approach of a *naturalistic* field researched case study, enabling the participant to be unencumbered by observation or recording, providing an environment in which they could operate unrestricted by outside influence ie., their natural lived environment.

The field research approach implies that the research itself relied on the existing user’s social structure and environment (Salkind, 2010), with the aspect reflecting the fact that the researcher did not have to personally observe the participants in the field, but rather relied on inbuilt recordings of field related activities and then the stimulated recall discussion in the interview with the participant (see 3.8). Using the affordances of technologies currently available, data collection could be done by the participant, but without substantial effort or interruption to their daily activities. Using this naturalistic field case study approach ensured that all aspects of the study were seen to relate with and connect to one another, wherein the observable actions and concepts can be interrelated with other actions and concepts...[because] as is seen through the lens of grounded theory, “nothing happens in a vacuum” (Fernandez, 2004 p. 43).

Research Methods

3.5.9. Sampling

In qualitative research, a range of different methods for sampling can be applied throughout the study (Denzin & Lincoln, 2005; Opie, 2006). The sampling methods and size of the sample in qualitative studies, particularly when using grounded theory should remain flexible (Glaser, 1978, as cited in Robinson, 2014). As constant data collection and analysis run parallel when using grounded theory, additional data samples may be required at any stage (Strauss & Corbin, 1998, as cited in Robinson, 2014). Data collection in the study was aimed at providing a rich overview of the experiences of target group, tweens, as they used mobile devices under regular everyday interactions (Bryman, 2008; Cohen et al., 2011; Naderifar et al., 2017). With this goal in mind, a non-probability approach was implemented with the understanding that the study would therefore represent the desired broad range of tweens' experiences, but not be representative of the total experiences of all tweens (Cohen et al., 2011; Opie, 2006). Table 3 provides an outline of the key sampling methods embedded in the study, and the phases where each approach was used.

Table 3

Methods Of Sampling Used In The Study

Sampling	Description	Study phase/s
Purposive	Subjects are selected on the basis of estimated typicality of the target group to enable the research questions to be addressed	1 2
Snowball	Using social networks to pass on information about the study – recruitment by referral	1 2
Self selection or volunteer	Participants make a decision to join the research study through their own interest	2 3

3.5.10. Purposive Sampling

The primary sampling method for attracting participants to this study involved purposive sampling as this aligned to the direction of the study, where the experiences and opinions of the specific group (tweens) were being sought (Mesa et al., 2016). Purposive sampling is a non-probability approach to research used widely in qualitative studies, where the study participants are sought as samples of the population of interest in the investigation (Cohen et al., 2011; Stake, 2005; Opie, 2006).

The approach focused specifically on the target group for the study, that is, children aged 9-13 in grades 4-8. As the study was attempting to develop a broad understanding of tweens as a specific demographic, the aim was to obtain responses from as many young people in this demographic as possible – illustrative of the larger group, but not necessarily representative of the entire group. The goal was to represent individuals from within this target group, “in the full knowledge that [the participant group] does not represent the wider population: it simply represents itself” (Cohen et al., 2011, p. 155). Non-probability, purposive sampling was chosen to work towards this objective, as within parameters of the approach, the researcher has capacity to make judgments about selecting information rich subjects who are potentially capable of “yielding insights and in-depth understanding” (Patton, 2015 as cited in Gentles et al., 2015, p. 1778). This approach supported the process that involved invitations being sent to a range of schools and education sectors, enabling diversity, but not targeting specific equality in demographic representation, enabling the researcher to reach a greater number of potential participants. In doing so, a broad representation of tween participants was hoped for, with the end result fully relying on those who responded to the study.

3.5.11. Snowball Sampling

In addition to purposive sampling, opportunities were provided to include respondents for the study who were reached through snowball sampling, where a parent might have shown interest in the research to their tween child, having seen an article or “advertisement” on social media. Snowball sampling is often used to reach “hard to find” groups of participants, such as the homeless, people using illegal resources or substances for example, as they may not wish to be identified (Cohen et al., 2011). However, snowball sampling can also be applied as in this study, to reach out to potential participants who may not be in the clusters approached through the purposive sampling

group. This approach relies heavily on relationships, contacts and social knowledge (Noy, 2008, as cited in Cohen, 2011, p. 159).

Access to social media and social networks enables the connections to a range of contacts and the greater social network, providing time effective opportunities for global distribution of information about a particular research study (Chan, 2015; Stern et al., 2017). Until the advent of social media on a broad scale, snowball sampling relied on the networks between specific groups or individuals with the “six-degree separation theory” (Milgram, 1967, as cited in Chan, 2015, p. 2) with the associated possibility of bias via linking factors between connected individuals. With the emergence of social media sites such as Facebook, Twitter, LinkedIn and Instagram, the average connected distance between individuals has decreased (Naderifar et al., 2017) and the distribution factor has increased (Grové, 2019).

Access to social media is an increasingly significant source of networking, communication and information sharing for a wide range of the population and is therefore potentially a useful method of disseminating information about a particular study in the hope of recruiting participants (Grové, 2019; Stern et al., 2017). Using social media, the distribution of information about this study was posted on a range of social media sites, through personal postings, group discussions or using specific hash-tags to gain attention of users, for example, #mobile, #technology, #tweens, #pre-adolescent #digital literacy. Whilst the information was not targeted specifically at Australian sites, as the research was indicated as being done in Australia in the key information, aside from several international inquiries, the majority of responses were from Australian sources. The overseas sources were contacted, but not invited to take part in this particular study. The reasons were due to time zone differences (for interviews and focus groups) and the cycle of the school year in the northern hemisphere coinciding with the long summer school break, a decision was made to maintain a focus in Australia. This could be viewed as a limitation for the study, but rather is viewed as being a potential future study that could be undertaken at a later date using the processes and methodologies embedded in this study.

The use of social media is considered an effective method of recruitment in research (Gové, 2019; Stern et al., 2017), as was demonstrated in this study, with at least one third of participants becoming aware of the study through parents or teachers, as a response to reviewing social media postings. Participants were not recruited directly through social media as the majority of tweens are under the age restrictions that are upheld through

various data protection laws in Europe and the United States that govern age related protection, that is, under 13 years of age. The Children's Online Privacy Protection Act (COPPA) was passed in the United States (US) in 1998 and amended in 2013, setting the age limit to 13 for social media accounts (Federal Trade Commission, 2019). COPPA designates that personal information from children under 13 cannot be collected, disclosed or used without parental consent (p. 2).

In Australia, there is no specific act or law prohibiting children under 13 from having a social media account (Australian Institute of Family Studies), but the guidance from the eSafety Commissioner (Australia) is that as the social media sites are governed under US law, then the determinations under COPPA should apply to Australian users of these sites (eSafety Commissioner, 2019). The National Framework for Protecting Australia's Children 2009-2020 (Australian Government, Department of Social Services, 2019) also endorses this recommendation. These policies and recommendations will be explored further in Chapter 4.

Exploiting networking and general distribution factors enabled by social media, the viewing and sharing statistics for the postings was significant, with over 100 views in the space of five days on LinkedIn (see Figure 3.5). Redistribution from one social media site to another is evidenced through the 10 LinkedIn>Facebook 'finds' indicated.





 53 views from people at University of Technology Sydney	 51 have the job title School Teacher	 57 views from Sydney, Australia	 Your article was found through LinkedIn.com
Buzzy Games - Create to Play 1 Yarra Valley Grammar 1 Siemens 1 Bond University 1 NSW Department of Education 1 Tresillian Family Care Centres 1 The University of Hull 1	Corporate Trainer 2 University Professor 2 Government Policy Specialist 1 Health Specialist 1 Operations Specialist 1 Executive Director 1 Salesperson 1 Laboratory Technician 1	Melbourne, Australia 1 Albury, Australia 1 Halifax, Canada Area 1 Queensland, Australia 1 Lincoln, United Kingdom 1	Facebook 10

Figure 3.5 Views and reactions for LinkedIn invitation to participate in Mobile & Wired study 2019

Furthermore, when key social media networkers ‘reacted’ to the information about the research study on LinkedIn, their social reach and subsequent redistribution of the study information was significant (see Figure 3.6). More information about distribution of study information and participant recruitment can be reviewed in section 3.7.

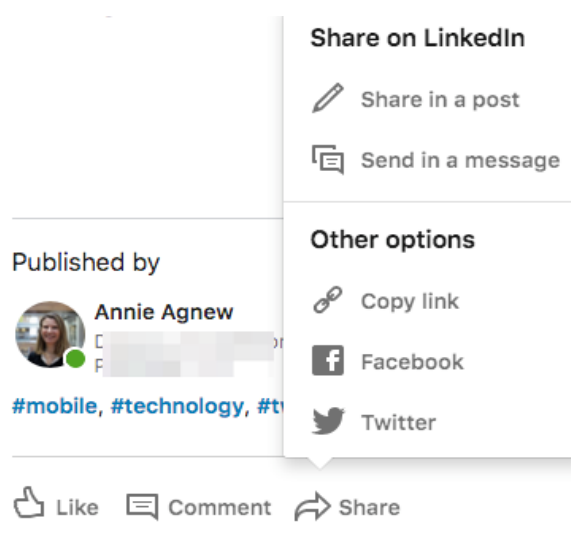


Figure 3.6 Social networking connections and redistribution factors for research study using LinkedIn

The information shown in Figures 3.5 and 3.6 demonstrates the modifications in snowball sampling made possible through the ubiquitous and asynchronous communications available through social media in current times. The social media sites are accessible to individuals at all times of the day and night, their networks and the networks of each individual in those networks, enabling rapid re-distribution to occur in a short period of time (Villi, 2019). The examples shown demonstrate the distribution from one social media site only as a representation of the multiple layers of networking possible using this approach. For the study undertaken, additional social networks such as FaceBook and Twitter were also used for circulation (see Appendix A for examples of social media distribution).

3.5.12. Self Selection Sampling

The third method implemented for sampling in both phases of the study was self-selection. Self-selection was the only recruitment method used for both sections of phase two - the 1:1 interviews and focus groups. This approach was considered significant to the integrity of this phase of the study, ensuring that tweens who participated were not invited by the researcher, but that they expressed interest in volunteering through their own volition (Cohen et al., 2011). This is particularly important when working with younger participants as adult specific requests or invitations for participation can be viewed as a directive by minors rather than an open call for involvement (Spriggs & Gillam, 2019).

Initially, self-selection was not going to be included as a recruitment process for sampling due to the structure of the survey and requirement for consent. However, with restructuring of the survey made possible by the affordances of functions available in survey instruments, self-selection became the preferred approach (see section 3.14). Integral to the objectives of self-selection and authenticity in the study, the method for contributor involvement in phase two was based on a participatory input, encouraging active involvement by each individual, with the research focused on being “*with* them [tweens], not *on* them” (Wilkinson & Wilkinson, 2018, p. 16). This was significant as the perspectives of each young person in the study population was essential to the investigation, with their personal construction of the knowledge being produced through dynamic reflections a major component of the emergence of the theories being sought (Drotar & Riekert, 2000). The study focused on ensuring that the research respected and

included the participant viewpoint, incorporating a person centred or person first approach to all instruments employed (Bergman, 2001; Spriggs & Gillam, 2017).

3.5.13. Integrating Sampling Approaches

In Figure 3.7 the diagram demonstrates the different approaches used to recruit participants for the study. Each method was contributory to the overall success of recruiting a diverse range of participants, which enhanced the authenticity of the data generated and enabled analysis of a broad range of tween experiences.

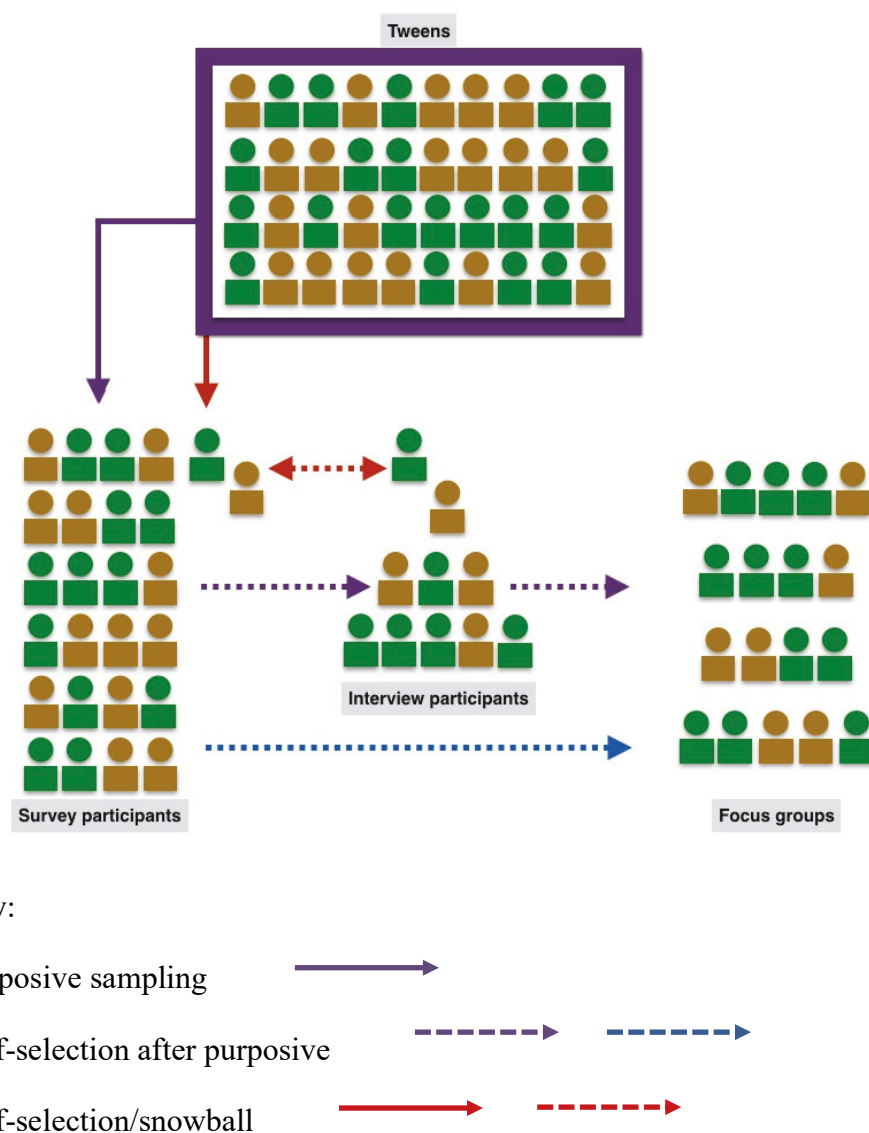


Figure 3.7 Visual representation of the sampling process in the Mobile & Wired research study – diagrams is representational only and does not reflect exact numbers of participants.

The symbols in the top section of the diagram illustrate the target population of tweens – the numbers are representational only and are not considered an accurate depiction of a total tween population nationally or globally. The colours used in the symbols are a visual illustration of the diversity of gender and school sectors, with neither colour specifically linked to gender, social or cultural identification or education sector. From the overall group of tweens, the majority of participants for the survey were recruited through purposive sampling, (purple arrow – see key for Figure 3.7). A few tweens, however, did self-select for this part of the study as a result of snowball sampling (red arrow). Some of this self-selected sub-group, indicated an interest in the interview phase in the first instance, but were provided access to the survey should they also wish to complete that part of the study as well.

Those participants who elected to do the survey first indicated in later discourse, that they had a better understanding of the overall aim of the study and therefore were more effectively prepared for further participation (see Chapter 4). Twelve children who either self-selected after completing the survey (purple dotted arrow), or directly from the snowball sampling approach (red dotted arrow) took part in the 1:1 online interviews. Several of the children in this group (interviews) also elected to take part in the focus groups (purple dotted arrow), although it should be noted that not all the interviewees elected to contribute to focus group discussions. The majority who didn't volunteer for the focus group sessions were individuals who had self-selected and had not come from a school-based sampling group. A final sub-group of children did not elect to take part in the interviews, post survey, but did volunteer to contribute to the focus groups (blue dotted arrow). The individual phases of the study are explored further in section 3.8 and the findings from the various sampling approaches implemented are discussed in Chapter 5.

3.5.14. Research Instruments

In qualitative research, the methods for data collection include in-depth interviews, observations and focus groups, with each method generating different material contributing to the development of responses to the questions being investigated (Bryman, 2008; Cohen et al., 2011; Corbin & Strauss, 2008). The strategies and processes are also guided by the methodology that has been chosen, in this case, grounded theory. In order to achieve suitable data collection and analysis, this study was divided into two main phases - phase 1- the survey, and phase 2 - interviews and focus groups. For this

study, whilst the methods utilised were frequently used in qualitative research, some of the more specific approaches taken have been innovative and contemporary, employing a range of new and emerging technologies that have improved distribution, participation, contribution and analysis opportunities.

3.6. Investigating The Use of Mobile Technologies

Utilising emerging technologies and new resources for data gathering and interview techniques afforded experimentation of innovative methods in the study, aligning to proposals by Potter (2017) and Falloon (2018) about the growing need to devise contemporary methods for capturing and examining mobile technology user data, and investigating meaning making activities with mobile devices. Previous research, where children's use of "untethered" (mobile) technologies has been investigated, have recognised the difficulties in researching mobile experiences, where children and technologies are no longer fixed, or where the mobility of devices and research participants prevents traditional methods of data collection from being practiced (Falloon, 2016, 2018). Mobile devices, unlike fixed computers, are easily transported from one space to another, with student interaction moving quickly and almost seamlessly across a range of spaces, interweaving traditional and alternative spaces, physical and virtual environments of interaction. Falloon, (2016, 2018) comments on how previously successful ways of generating data when studying children working with fixed recording devices, may not reflect an accurate picture of the child's experiences using mobile technologies in current times.

With fixed technologies, students can be relatively easily videotaped, audio recorded and/or observed, but these methods are not reliable when the child can move with the device across an unbounded range of physical and virtual locations. There is a need for mobile learning researchers to develop *processual methodologies*, recognising that contemporary access to technology is not necessarily bound by time and place as was the case prior to the introduction of mobile technologies (Drotner, 2012). Just as mobile technologies enable new ways of learning, interacting, collaborating and sharing, the methods used to research their use, must evolve accordingly. This is not because digital technologies in and of themselves are the instruments of change, but because they facilitate and demand new and more processual and social modes of interacting with knowledge and methods of learning, often enacted across a range of hybrid online and

offline spaces (Drotner, 2012). Researchers have commented that alternative data gathering methods are required to successfully ‘follow the learner’ (Gije & Erstad as cited in Falloon, 2018, p. 66) and to investigate new, mobile and dynamic practices of the learner, moving beyond the single dimension of user experience (Costa et al., 2019).

3.6.1. Shifting Boundaries

Emerging approaches implemented in contemporary research should consider situated and multidimensional aspects of interaction and how this might change across individuals (Drotner, 2013, as cited in Falloon, 2018, p. 56). The boundaries of user experience have shifted, as the research target has become mobile, no longer fixed in place nor bounded by the devices being used. Stornsiuolo and Hall (2014) argue that the researcher has to reconsider the impact of the flexibility of mobile devices and locational access, with the need to develop a new range of data collection strategies to keep pace with these changes. Vasbo and Gudnundsdottir (2014) also identified the challenges of researching [children] where there is unprecedented movement “within and between learning spaces” (p. 2), with Falloon (2016) proposing that as technologies became more mobile and therefore the interactions of users became less fixed in time and space, traditional data capturing methods are no longer adequate.

Sefton-Green and Erstad (2016) explored the issue for researchers following learners through, around and in, their learning across everyday life (p. 1) and Potter (Selwyn, 2017) in an interview with Melbourne University, proposed the emergence of issues related to the capturing of data when investigating children’s use of mobile technologies. Potter, in this discussion, explored the concept of generating and collecting dynamic literacy data, where the meaning of literacy is not fixed, but rather rising as a response to the situation and interactions of the user as a key focus requirement for contemporary researchers in this field.

3.6.2. Capturing data on the go

Notwithstanding the primary focus of the study being to explore and understand the perspectives and experiences of the tween mobile technology user, consideration has also been given to the significance of the evolution of new, innovative methods of investigating mobile technology use and interactions (Falloon, 2017, 2018). These approaches and strategies have considered the notion of the existence of embedded multidimensional, transdisciplinary, interconnected and/or dynamic literacies (McDougall

& Potter, 2019) that may be synonymous with the use of mobile technologies in young people. The findings from using alternative methods of capturing data will be explored in this chapter, with further discussion focusing on the implications for future studies presented in Chapter 5.

The challenge with recording data focused on mobile device interaction, is enabling authentic use of the technologies by participants and finding a way to capture these behaviours and interactions *as* they are happening, without interfering with the *natural behaviour* of the user. Experimentation in capturing data more fluidly (Falloon, 2013) has previously been tested using video recording done “over the shoulder” (p. 53) and “device embedded recording systems” (Falloon, 2016, p. 55). These approaches, while enabling greater flexibility in movement, still encountered issues of invasiveness, awareness of being recorded and at times artificially constructed responses from the children (p. 55). This is recognised as the “Hawthorne effect” where individuals are thought to potentially modify their behaviours and/or conversations because they are aware they are being observed or recorded (McCambridge et al., 2014), noting that it is possible that traditional methods of data collection “have the potential to shape behavior” (p. 276).

Davidson and Vanderlinde (2014) also raise the issue of the difference between what children report as having done, as opposed to what they might have actually done, impacting not just on validity of the data but also on the authenticity of natural field research. This can make reflective data practices difficult and fraught and alter the findings from the study. Falloon (2018) presents the possibility of the students gathering data and self-reporting as a method of recording mobile interactions across physical and virtual spaces, but notes that in doing so, reliability in capturing the data and recalling events after the fact, may not be accurate. Hektner et al. (2007) explored the notion that when self-reporting, if the participant is no longer within the context of the experience or interest, the recall and validity of responses can be compromised.

The concept of the experience-sampling method (ESM) has been considered for several decades as an approach that could diminish some of these inconsistencies, wherein the data is gathered at the time using electronic or digital means (Csikszentmihalyi & Larson, 1987, as cited in Xie et al., 2019). Studies over this period have utilised a range of data collection and recall ESM approaches where students have, through a variety of means, collected and interpreted their learning experiences, deciding on what to include or exclude from their records, being observed periodically and participating in interviews

(Toh, et al., 2017). While all these methods of data gathering have provided valuable data for investigation and discussion, they rely on factors of observation, dependable record collection and the filing of recorded data for contribution to interviews and analysis. The involvement and expectation of the participant is high, requiring them to be comfortable with being observed, remember to gather the data as and when required, and capture upload and or file specific quantities of recorded information over a period of time. If any one of these steps is not completed adequately, the next part of the study is compromised. Toh et al. (2017) recognise that in their study, the data gathered was restricted to what could be done in the classroom, through observation and ESM, and that self-reported data was not always reliable, nor fully reflective of the participants' full experiences. They reported that at times, they had difficulty getting sufficient data and that the "data was very messy" (p. 197), and that the process of having to collect the data may have resulted in "some degree of fatigue" (p. 197). Moskowitz and Young (2006) and Stone and Hufford (2008) proposed the process of ecological momentary assessment (EMA), where participants are contacted electronically several times a day to report their screentime use, as a method of improving self-reported bias and participatory fatigue frequently experienced using ESM.

3.6.3. Contemporary Resources For Data Gathering

Gower and Moreno (2018) explored the process of using data generation presented to "test the feasibility of a novel methodology to "record and evaluate mobile smartphone screen time and use" (p.1) through the integration of the *battery use screenshot* (BUS) that passively tracks and reports "real time app and smartphone activity (p.2) to collect information for understanding smartphone device use with adolescents. The *battery use* application on the devices provides reliable information, improving data accuracy and reduced the impact on participation in the study. The critical component of the study was the reliability on participants taking the screenshots and uploading them, with a reported uptake of approximately half the target sample being willing to and/or completing this response (Gower & Moreno, 2018, p. 6). The device chosen to upload the data and the age of the operating system on the device also played a significant role in the achievability of the desired response rate. Additional limitations for the study included battery use not being recorded while the device is being charged, thereby perhaps missing some screen time and application interaction, older devices with limited capability and the restriction to using only iOS devices. Nevertheless, the method employed, was

deemed to have still provided some insights into screen time and app usage and was seen to “provide an innovative and complementary approach to understanding smartphone screen use without the need for complex programming or app development” (pp. 6-7). During the same period as Gower and Moreno’s study was undertaken, data gathering methods were being considered for the Mobile & Wired research project. Initially, battery health screenshots had also been considered, with the participants uploading their weekly screenshots into a secure dropbox file. Initially, a method similar to the BUS approach, was thought to be innovative and somewhat ground-breaking, addressing previously described issues of data gathering for mobile devices. With further exploration and a developing understanding of additional inbuilt features on iOS devices, new possibilities of data generation were identified that might further reduce the impact on participants, with the BUS approach no longer the defining process.

Changes made in 2018 to iOS (Apple phones and tablets) devices enabled “on device” screen recording of app interactions and user movement from one activity to another. While this was an improvement on taking screen shots, as the participant could now record screen data, apps and other activities if desired, the method still required the participant to remember to do the screen-recording, have their device set up to enable screen recording (sometimes stopped through parent controls) and then to be able to upload the file as required. The method was trialed in the pilot study, and while dependable and valuable data were generated overall, success remained reliant on the participant’s capacity to complete the process and at times, the results were not as anticipated, still requiring significant input from the participant and interrupting the natural flow of mobile interaction. (See section 3.13 for further details).

3.6.4. New Approaches To Data Gathering

By late 2018, additional changes had come into effect where all data on iOS mobile devices was routinely collected through automated applications on the device (iOS, and through an app add-on (Android devices) if not available in the device set-up (see Appendix B)

The changes in the operating systems and app availability for screentime data collection enabled the participant to use their devices as normal across the week, with no thought having to be given to events, capturing screenshots, recording app use or any other activity that might impact on authentic interaction with the device. Not only did this mitigate the impact of the study on the participant, but it also provided a more natural

environment from which the data was being gathered. Linking back to the model of the naturalistic field case study, the new approach enabled for data generation provided the most genuine field study environment possible. The tween participant was not observed, did not have to be reminded to capture activities or app use, and was not required to make notes or journals of any kind to remind them of their activities as the device was automatically providing the means through which this could be completed. Reflecting back to the implications and concerns raised by Falloon (2018) and Potter (2019) regarding e-research, the changes in the mobile device ecosystem appeared to deliver a potential resolution to the issue of capturing data within mobile experiences of the subjects in the study.

3.6.5. Technology Enhanced Stimulated Recall

Contextual inquiry is an approach frequently used in data gathering (Holtzblatt, 2001) and relies on understanding the participant, how they work, their expectations and responding to the gathered data. Toh et al. (2017) present the concept of “intersections of mobility” (p. 306) and that the mobile devices used by children embody a “wide range of cognitive, social and cultural resources across time and space” (p. 306). Investigating and understanding these intersections and interactions was key to data generation and analysis, focusing on mobile technology mediated procedures, stimulated recall and a contemporary approach to the self-reflective model of “think aloud” for the case study interviews. The think aloud method refers to the participant, reflecting verbally (thinking aloud) as they are immersed in an activity or discussing events using resources to stimulate their recall and to immerse them more holistically back into the experience.

3.6.6. Think Aloud And Stimulated Recall

In this study, an adaptation of the think aloud method was integrated into the ways in which experiences were shared by participants in the online interviews. Think aloud protocols (TAPs) are methods of gathering authentic, in-time data while a participant is engaged in a particular activity (Abdel Latif, 2019). Think aloud was described by Karl Dunker (1945) as a technique for understanding an individual’s approaches to problem solving, and further developed by Newell and Simon (1972) as a method of studying problem-solving strategies (as cited in Littlefair et al., 2014, para. 1). Ericsson and Simon (1993) proposed think aloud as a method suitable for verbal reporting. Güss, (2018) further describes this as requiring the individual to report everything that is going through

their minds when doing a task [while]...not interpreting or analysing their thinking (para. 1). The think aloud method became integrated widely into research studies focusing on human-computer interaction following the ideas about this process that were promoted by Ericsson and Simon (Guan et al., 2006) and is used broadly in broad qualitative research as a technique for encouraging individuals to speak about their experiences as they work, play or are involved in an activity (Young, 2005). Two main types of verbalisation of strategies and processes were described by Ericsson and Simon, “concurrent [and] retrospective...depending on the time interval between performing the cognitive process and verbalizing/recalling it” (Abel Latif, 2019, p. 112). McKeown and Gentilucci, (2007) also describe think aloud as a potentially transactional process, enabling participant and researcher to work together to construct understandings of [a task] as they interact with it (as cited in Sudiati et al., 2018, p. 2). In the think aloud approach, individuals verbalise their thoughts through an otherwise internalized and personal activity experience, thereby mitigating the likelihood of assumptions being made by the researcher about the behaviours and processes being observed (Alshammari et al., 2015).

The classical or concurrent think aloud process, also referred to as CTA, provides the environment for research subjects to verbalise what they are doing when completing a task, with this narrative being recorded for data generation and future analysis (Mercaue, 2017). Reliable recording of think aloud processes needs to be done through the use of audio, video or other digital protocol, minimising inconsistencies (Güss, 2018). think aloud delivers an opportunity for the researcher to gather rich data focusing on participant reasoning as they progress through a task or activity (Fonteyn et al., 1993), whereby the observer is able to *hear* what the participant is thinking, an otherwise inaccessible process (Hawala et al., 2010). Eccles and Aarsal (2017) also present the notion that the think aloud method is applicable across the spectrum of ontological and epistemological perspectives, and that the probability for eliciting authentic reflections of experience is high using this approach. Think aloud practices enable the researcher to capture the immediate thoughts of the research participant *in action*, rather than during reflection or reconstruction of the activity using stimulated recall. When using think aloud as a strategy, the researcher has to provide the right environment where capturing the verbal data is not intrusive and does not lend itself to the possibility of artificially constructed behaviours from the participant – the “Hawthorn Effect” (see 3.5.1.2). This possibility can be mitigated through the immersion of the participant in a task or activity, whereby the main focus is on the

“completion of the task limiting the available cognitive space for the participant to formalise desirable thoughts [over] immediate thought processes” (Young, p. 22). The researcher has to ensure that the activity being undertaken is appropriate, not presenting situations that are too challenging, thereby constraining fluent verbalisation by the participant (Payne, 1994, as cited in Young, 2009, p. 21). Additionally, it is recommended that for effective think aloud verbalisation, the participant should be provided with a short period of training or instruction prior to the task being undertaken so they are able to speak aloud as they are engaged in the activity rather than retrospectively (Abel Latif, 2019). To minimize reactivity and researcher influence, it may also be appropriate for the researcher to watch the participant’s verbalizations via the glass of the door” (p. 115).

Hawala et al. (2010) discuss variations to the think aloud approach described by Ericsson and Simon (1980) wherein the researcher is only permitted to probe the participant slightly when there are sustained periods of silence. The variants include integrating more specific verbal feedback as communication through short questions to encourage further thinking aloud explanations (Boren & Ramey, as cited in Hawali et al., 2010) and coaching, where the researcher asks direct questions of the participant when they are struggling to explain their process, becoming frustrated or confused and pausing for extended periods (pp. 2384-2385). Their study found that higher perceptual accuracy rates overall in task completion and explanation were obtained from participants when the researcher was engaged in some form of verbal coaching or communication during the process. Nevertheless, recognition was also given to the possibility of coach influence in the thinking process, and that researchers should identify specifically the method of think aloud implemented in order to establish how data was elicited. Additionally, Short (2004) suggests that the researcher should consider the characteristics of the participants (p. 37), and that by thinking aloud, participants’ internal processes may “differ from what they would have been if they had not performed the verbalization” (p. 38). The researcher also needs to be cognisant of the possibility of difficulties in verbalisation and cognitive load impact due to the complexity of the task being undertaken, and how this might influence the quality and quantity of participant verbalisations (Littlefair et al., 2014) particularly when young children or the elderly are involved.

Retrospective think aloud (RTA), the alternative think aloud approach to the concurrent method, provides reflective opportunities for the participant to verbalise their thoughts about the processes, problems and solutions encountered regarding the task, immediately

after the completion of the activity (Güss, 2018). This process is also known as *think after* or post task reporting, retrospective protocol or retrospective reporting (Guan et al., 2006). Stimulated recall think aloud in which the retrospection is prompted by visual reminders of the task (p. 1254) has been utilised as an alternative think aloud method whereby the participant is seen to be situated in an environment that mitigates the potential cognitive impact of thinking aloud *as doing*. When utilising Stimulated recall think aloud as a data generation method, the researcher enables the participant to be immersed in the task with less probability of reactivity, thereby facilitating deeper levels of dialogue about the task processes (Alshammari et al., 2015).

Stimulated recall (stimulated recall) assists interview participants to recall or reflect upon their experiences and can be defined as “a family of introspective procedures through which cognitive processes can be investigated by inviting subjects to recall, when prompted by a [visual] sequence, their concurrent thinking during that event” (Lyll, 2003, p. 861). stimulated recall techniques may involve a range of photographs, diagrams, audio or video recordings, where the interviewee reconstructs the event or activity from any previous timeframe using the resources as memory stimuli (Mercau, 2017). When reflecting, interviewees reconstruct their experiences, drawing on significant elements of the memories from the event, illuminating concrete details that underpin the recollections being discussed (Seidman, 2013). Integrated as a component of RTA, stimulated recall is usually presented as a video recording of the task that was undertaken, providing the participant with a visual recall of the event that happened just a short time previously (Abel Latif, 2019).

The time frame between the activity and think aloud recall is important, as an extended interval may degrade the accuracy of recollections of processes undertaken, affected by the working memory capacity of the participant (Ji & Rau, 2018). As the interval increases between the task or activity and the stimulated recall think aloud opportunity, studies have shown that their memory of reasons for actions and behaviours may diminish, resulting in a greater likelihood of generalization and rationalization (Willis & McDonald, 2016).

The advent of new technologies and has delivered opportunities for think aloud and stimulated recall to be enhanced, adapted and contemporised. Ji and Rau (2018) implemented an adapted method of think aloud protocols, implementing an interactive think aloud (ITA) process, where the “utterances” or responses made during the thinking aloud process are collected and analysed using voice intelligent agents (VIAs). The VIA

responds to the user, mitigating the interference potential from disturbance of cognitive processes through prompting, invalid data or incorrect interpretation by the subject (p. 375). VIAs are widely used across a range of social media and other interfaces, providing familiar interactions through voice and emoticons for the user (Ji & Laue, 2018) enabling an alternative, technology enhanced protocol for the implementation of think aloud in qualitative research.

Other technology enhancements to the think aloud process include eye tracking (Salmerón et al., 2017; Cho et al., 2019) and the use of social robots (Ramachandran et al., 2018). In the social robot variation, a range of software components such as voice activity monitoring and behaviour planners are integrated into the robot, in addition to adaptive leveling of question difficulty to enhance the participant's think aloud responses (p. 61). Eye tracking has been used with retrospective think aloud processes (RTA) to evaluate the degree to which participants scanned text or images during the think aloud process, comparing responses with scan data (Salmerdo et al., 2017; Cho et al., 2019). In this study study, emerging technologies have afforded the availability of screen time data on mobile devices, visual history on other mobile devices such as laptops, together with the ability to screen-share between interviewee and interviewer using webinar resources such as zoom (www.zoom.com), has further enabled modification and variation development in think aloud protocols. In this study, a conventional think aloud approach was fused with Rthink aloud and stimulated recall processes, enabled through online discussion, with the integration of organically shared images, scaffolded through unstructured interview techniques for conversation, questions or prompts. At different times in the online interview, the tween interviewee reconstructed their experiences verbally as they reviewed screen-time data records, apps or other device related constructs, sharing this dialog in real time. At other times, the participant demonstrated how they completed an activity on their device, thinking aloud as they progressed. In most instances, they did not require prompting and were not instructed to speak aloud, but rather just to show the researcher how they used an app or created something using a resource on their device. Therefore, it could be concluded that the procedure for generating individuals' data in this study has presented an innovative adaptation of TA, potentially defined as technology enabled self-directed think aloud (TESTA). This development and concept are discussed further in 3.5.2.2 and chapters 4 and 5.

3.6.7. Mobile Enabled Self-Directed Think Aloud (MESTA)

When implementing traditional think aloud protocols, the normal process involves the participant being assigned a particular task to undertake and training or practice sessions for familiarisation of the think aloud procedures required. In this way, this study varied significantly from the traditional techniques for think aloud, whilst maintaining the essential functions of think aloud enabling the process to evolve organically as the online interviews took place. The affordances of real time sharing through zoom, enabled the tweens to go beyond recall or reconstruction of events, and connect directly to an app or resource, demonstrating in a natural setting and in real time, how they used the application. These features supported the development of innovative dynamic thinking aloud experiences within the discussion – taking the approach beyond conversational and stimulated recollection of the experience, to full immersion in the activity. As the tween was not sitting in a room with the researcher, but rather in a familiar environment (usually at home), they quickly became unaware of the researcher, absorbed in the activity being demonstrated, allowing for unaffected recording of the think aloud process (see chapters 4 and 5). The process described demonstrates a novel application and adaptation of the think aloud process – using visual imagery and construction of the event in real time but maintaining the environment of authenticity enhanced by a lack of interference from the researcher's presence.

Adapting strategies from a more traditional think aloud approach, where the participant is asked to complete a specific task whilst thinking aloud about their problem solving and processes, in this study, the tweens were self-directed, choosing the applications, resources or activities they wanted to share. Participants were able to recall the apps or resources they had used from the visual data records on their device, from apps available on the device main screens or by going to the resource through an internet browser as required in response to their own interest in sharing (see figure 3.8)

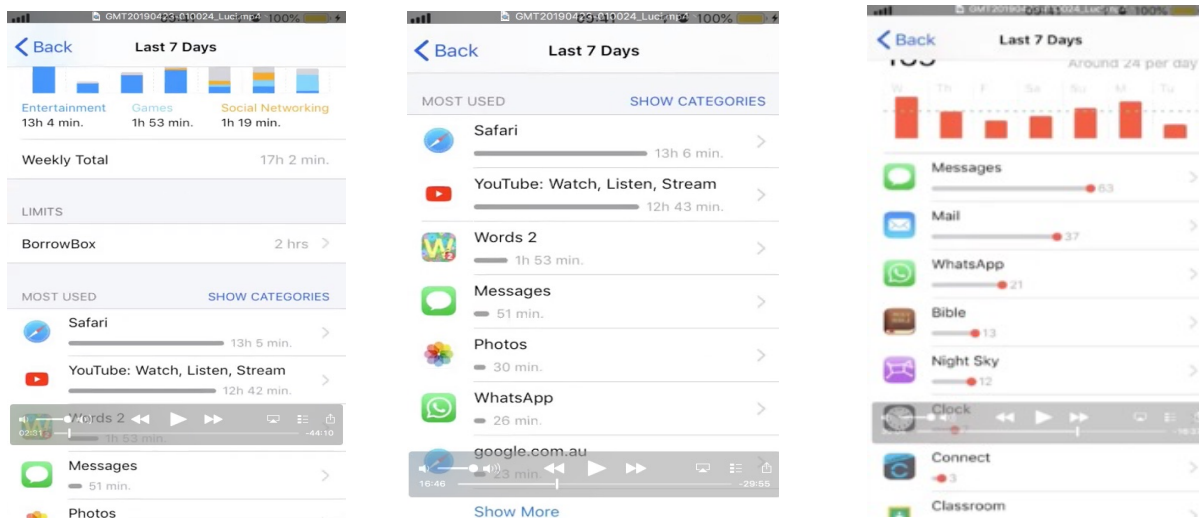


Figure 3.8 Examples of screen time data shared by tweens for online conversational interview think aloud process

The tweens in this study, continued using the live screen data during the webinar session by opening various applications, demonstrating how they experience and interact with the app, fully immersed in the process as they constructed a new event (see figure 3.9)

Detailed findings and further discussion about the screen sharing of data can be found in chapters 4 and 5.

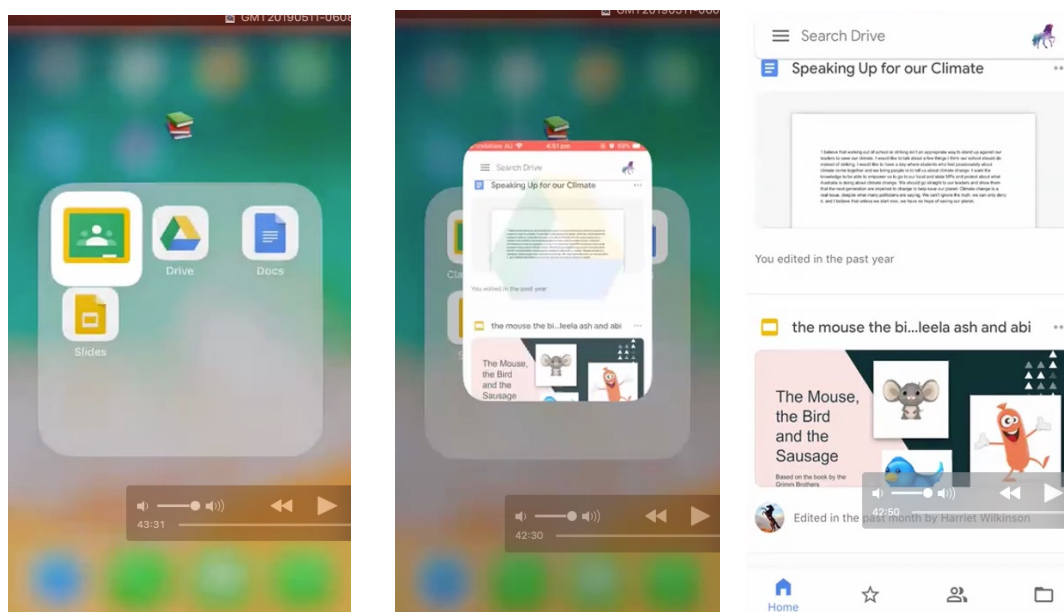


Figure 3.9 Example of tween sharing how they use an app using shared screen during online conversational interview

The method used in this study has merged traditional approaches of think aloud and stimulated recall in an innovative manner, enabling the participant and researcher previously inaccessible methods of connecting and sharing during the research process as a result of emergent technologies. Throughout this study, responding to emerging strategies for conversational online interviews, think aloud and stimulated recall, promoted continued development of this method for data generation, adapting traditional approaches to reflect and respond to available technologies. Through adaptive application in this study, this approach can be explained as ‘mobile enabled self-directed think aloud ’(MESTA), wherein the functionality of the available technology has *enabled* a self-directed, personalised process of thinking aloud while generating and gathering data for research during the action of activity – providing further development of appropriate methods of and for authentically capturing data from in time mobile experiences (ITME).

3.7. Student Agency

Integral to the methodological practices utilised in this study, is the agency of the tween participant. Agency can be described as the personalisation of experiences and control over how an individual does something, particularly with regards to interactions and decisions about time, space and places (Kearney et al., 2019). Iversen et al. (2017) refer to the agency of the child in participatory practices as “the role of the protagonist” (para. 3) or leading character in the study. They present the notion that the child is capable of playing a key role in contributing reflective insights and perspectives, particularly when considering engagement or design of practices involving technologies. Providing opportunities for stakeholders to be involved in the research or design process is considered of value, in that it facilitates connection and purpose through linking epistemological perspectives and beliefs, acknowledging the importance of experiences of the participant (Galletta & Torre, 2019).

For children, in particular, working with adults can be impacted by perceived positions of power (adult to child), where decisions are made primarily by the adults and students are largely consumers. Landsdowne, Jimerson & Sharoosi (2014) state that “young people should be able to articulate their views on issues that matter to them and their views should be given weight according to their age and maturity” (as cited in Halliday et al., 2019, p. 176). In establishing practices where the participant is afforded the opportunity for agency, opportunities arise that encourage a sense of being heard and collective

efficacy (p. 177), contributing overall to the young participant relating to the research being undertaken.

Participatory research should reflect an understanding that the participant, in this study, the tween, be afforded the opportunity to engage on a personal level in the research as “active, informed and informing agents” (Groundwater-Smith et al., 2014, p. 8). This study, therefore, considered a sociocultural perspective, reflecting personal views of social participation and relationships, taking into account the significance (if any) of the environmental factors and directions of the individual in the interviews and data discussions. The unique perspectives of each individual were valued as significant contributions to the emergence of key understandings, with consideration given to each tween’s personal interpretations, reflections and behaviours, with further provision given to the inclusion of influence by peers, family and other factors in both the immediate and wider environment in which the students interacted throughout the day.

It was essential that this study did not demonstrate a biased or partisan perspective (Opie, 2006) and that the findings revealed participants’ perceptions, not those of teachers, parents or the researcher. Reflective practices enable participants to reflect on and report their experiences and may in some studies take the shape of journals (visual and/or digital) or focused discussions with individuals and if appropriate, amongst participants (virtual). Significantly, reflective practices must be demonstrated by the researcher, ensuring “interpretation of interpretation” (Alvesson & Sköldbberg, 2000, p. 5).

Qualitative research is a means for the researcher to access the thoughts and experiences of participants (Austin & Sutton, 2015), with reflective practices used to understand and interpret responses submitted.

In the phase two section of this study, individual students self-selected to participate more specifically in the focused case study, which involved online interviews, where each tween reflected on their week’s technology use using technology stimulated recall from the data automatically gathered by their mobile device activity. The same process was used in the collective discussions in focus groups, where participants were encouraged to bring their mobile devices to access the collected data during the session. The overall design of participation in this study was focused on researching *with* the participants, exploring their reflection of everyday use of mobile devices. The use of participatory methods when researching the behaviours of children is recognised for establishing an environment in which the child feels safe to speak openly, and where the researcher is able to capture the authentic voice of the participant (Horgan, 2016).

It is considered essential that in social research, the viewpoint of the participant is key to the investigation (Cohen et al., 2011). Therefore, as a component of participatory research, this study has integrated the concept of the participant as a co-researcher, providing opportunities for the tweens to have a say in how some of the research was undertaken (Goodyear-Smith et al., 2015). During the process of data gathering, particularly with the pilot group of tweens, there were a number of times when the participants provided feedback or suggestions that impacted on the evolving shape of the research. This approach is particularly beneficial when working with vulnerable groups such as children, where different levels of consultation and discourse enable the participant to have a voice as a valued contributor to the research in which they are participating. Forbes (2019) states that involving children in research in this way provides the opportunity for “positioning young people’s voices as a valued form of knowledge” (p. 19).

3.7.1. Agency & Self-Selection

The process of self-selection or non-probability sampling enables the individuals to take part in the research of their own accord. This method of recruitment is used across a wide range of research designs and methods and relies on the individual finding a personal connection and interest in this study. At the same time, there needs to be an awareness of the possibility of selection bias, in that those who indicate an interest in participation, might not, in essence be truly representative of the group as a whole, but rather representative of a more motivated and interested sub-group (Khazaal et al., 2014). This was seen as a potential limitation in this study, particularly in the process of recruitment for 1:1 interviews and the focus group discussions. Nevertheless, the process of self-selection was still considered to be the most appropriate method of recruitment for the interviews and focus groups as it was essential to this study to have students willing to participate, volunteer to maximize authenticity of the voice of the tweens contributing. JotForm is an online, mobile friendly survey tool that enables the collection of data across all platforms (windows, iOS etc) and has features that enable greater flexibility for the researcher and contributor. One of these features is the inclusion of an e-signature field and an auto-generated unique identification code (ID code) for each participant (see Appendix D). These features meant that the invitation to participate in Phase 2 of this study (interviews and focus group discussions) was able to be added at the end of the survey, posted in a range of social media sites such as LinkedIn, Twitter and FaceBook

and included in school newsletters, emails and other forms of communication as required. If a child in the tween age demographic or a parent saw the invitation and was interested, they could scan the QR code provided or click through the link to review the information about phase 2. This link also provided the consent form for the child and parent to review, sign and submit.

This process of self-selection anticipated that the tween who volunteered, did so, because they felt they had something to contribute and do so of their own volition (Sharma, 2017). Khazaal et al. (2014) note that non-probability sampling through self-selection via social and other online networks is a worthwhile recruitment alternative to purposive sampling, offering a high level of active participation in the data collection. Enabling self-selection has a different outcome to when individuals participate in different aspects of a research study because they are selected by the researcher or another person, particularly one of authority, perceived or real (Thomas & O’Kane, 2000). When children are given the opportunity to make the decision about participation in research and become the voice of the investigation rather than the object of study, this enables agency, insight and personal contribution to the process (Grover, 2004).

3.8. Spaces & Places

This study was not delimited by time, place or space, investigating the use of mobile devices and technologies used across the entire range of tweens’ experiences. There was no fixed descriptor of when or how the devices were to be used, and participants were encouraged to reflect on all experiences, whether in the car, bus, classroom, bedroom, across virtual spaces, considering synchronous and/or asynchronous interactions. The tweens were not expected to articulate these times and spaces in any particular fashion, but rather to explore their own narrative of the previous week, using the screen time data, apps recorded and device history information as a stimulus for the conversation. The spaces that the tweens operated in were not specifically recorded but identified during the reflection discussions. Whilst not specifically a research method, the consideration of spaces was an important factor in this study, as the data generated, reflected on and analysed was closely connected to the spaces being used at the time. The digital ecosystem in which the various physical and virtual spaces fuses through the interchange between social and technical architecture, enabling flexibility, context and personalisation for the user (Gazula, 2015).

The concepts of the “third space” and multidimensionality are explored in this study, considering the role of transitional spaces vis-à-vis how, where and when young people might use mobile technology (see Chapter 2.4). Further to the literature review discussions on third space, McDougall and Potter (2019) raise the possibility that the understanding of third space has potentially been misplaced and that we need to consider more deeply the notion of how spaces are “socially produced and as such always fluid and hybrid” (p. 4). They also discuss the probability of exploring the ways in which children “improvise with the stuff they have to do, overlaying it with other things for example, or finding new pathways through it or ways of being together” (p. 4). The concept of malleability of spaces and the importance of questioning the boundaries (or not) of third spaces, wherein the significance is more on the “exchange of cultural capital between social actors” (p. 5) is of greater focus, rather than defining or containing the space by its definition. Schuck et al (2017) and Kupianien (2013) have also raised the importance of exploring the notion of third space, promoting that consideration be given to how children draw on a range of resources, exploring the interplay of developing literacies, social-cultural behaviours and the likelihood of multidimensionality in mobile technology driven exchanges.

3.9. Timeline – The Research Process

The research study undertaken, commenced with an initial pilot study with a small group (4) of tweens aged 10-13. The purpose of the pilot study was to examine the proposed data collection instruments and primarily to gather feedback on the appropriateness of the questions in the survey as a starting point for this study (see section 3.8). The pilot study was originally aimed to take only a few weeks between distribution, analysis and pilot participant feedback. However, the availability of automated data generation on the mobile devices being investigated was updated during the pilot phase, with the time period extended by several weeks, during which additional testing of the new features took place.

The initial period for this study was, therefore, spread over 8 weeks with extensive examination of the updated features recently added to smartphone and tablet devices. included screentime data records, data capturing and sharing possibilities and new methods of participant data sharing being trialed. Whilst this period of additional testing appeared to potentially slow down the research study, ultimately, the new data gathering

and sharing possibilities provided greater opportunities for implementing authentic methods of capturing the data from participants (see section 4.2).

3.10. Data Analysis

When using grounded theory, there are a number of different techniques available for analysis, with coding being the primary approach implemented for sorting information and the development of a hierarchy of significance from the data. Coding is seen as the pivotal link between the collection of data and the development of a substantive storyline and theory that provides an explanation of the data (Glasson, 2004). The methodological approach of grounded theory fosters a paradigm wherein the researcher avoids looking for something *specific*, that is, this study not attempting to *prove* that tweens develop specific literacies and capabilities as they interact with mobile technologies, but rather, investigating what was happening as a consequence of these interactions, and *are they* developing new literacies and capabilities. The focus of this study concurs with the view that when using grounded theory, data should be collected through an inductive process ensuring that, as much as is possible, only the voice of the participant is heard (Glaser, 1998). This study was exploratory, investigating the *micro* and *macro* behaviours and patterns of interaction, collaboration and use of mobile technologies, aiming to understand more about the participant - the tween – as they use mobile technologies across a range of activities.

In keeping with the methodological approach of grounded theory, all data has been considered, generating a theoretical framework that has been built on the key ideas and themes that have emerged along the way. Triangulation is used in qualitative research to view the generated data across a range of perspectives in order to provide credibility to the findings (Bryman, 2008). Richardson and St Pierre (2005) take this notion further and refer to the “crystallization of data” where they suggest that data be considered from multidimensional angles rather than the more traditional triangulation perspectives (p. 963). The term crystallization is later used by Merriam and Tisdell (2016) as a metaphor for describing the many facets of data as being like real crystals that show a range of colour and patterns, “prisms that reflect externalities and refract within themselves” (p. 246). The concept they present is that data is many faceted should be looked at, analysed and considered from a number of dimensions, many of which only emerge as the data is examined through a different lens or in a new light. Glaser (2002) states that the

identification of “emergent patterns across time, place and people” (p. 23) is a significant element in the process of grounded theory development. In this study, therefore, the data is being constantly compared and analysed, with the different instruments of data generation contributing to the emergent theory, each new finding creating it’s a new pattern or building on an existing theory or idea.

The focus for data analysis is on maintaining a depth of rigour and robustness, accomplished by many steps in the research and analysis process, finding patterns that are “woven together by the constant comparison process, which is designed to generate concepts from all data” (p. 23). The emergent theory takes shape during the study, with the interchange between data and analysis directing and redirecting the lens of investigation as the patterns of theory develop. As these patterns or concepts appear, it is essential to check and re-check the incoming and existing data, where the final shape of the pattern is revealed when data sampling becomes saturated (Burden & Root, 2007).

3.10.1. Coding

Open coding or Initial coding (Tie, et al., 2019), is the first “layer” of analysis and provides the researcher with opportunities to identify and develop major categories or themes that become apparent. During this phase of the data analysis, Glaser (1978) determined three questions to scaffold the higher level or overarching categories:

- What is the data a study of?
- What does the category for this incident indicate?
- What is actually happening in the data?

(Glaser, 1978, p. 57)

In the initial stages of coding, the researcher inductively generates as many codes as can be recognised, linking patterns in the data through a process of review, looking for connecting ideas, “social and psychological processes and actions” (Tie et al., 2019, p. 5).

It is recommended that constant comparison (Glaser & Strauss, 1967) is utilised to determine the support of the data for emerging categories, with analysis of the data identifying similarities and differences through comparison, resolving “data overwhelm” (Glaser, 2003, p. 24) thereby minimising the possibility of redundancy in the data.

Reflexivity, theoretical sensitivity and circular testing of codes, concepts and categories safeguards reliability and rigour in data analysis, with the process of theory building at the centre of the process.

3.10.2. Memoing

During the open coding process, memoing is also undertaken. This consists of the researcher writing notes as they review the data and develop categories, recording insights and thoughts that align to conceptual ideas. Memos are “theoretical notes about the data and the conceptual connections between categories” (Glaser & Holton, 2004, par. 61). This aspect of the grounded theory methodology is considered essential in the process of generating theory, identifying ideas that “reveal and relate...drawing and filling out analytical properties of the descriptive data” (par. 63). Evans (2015) describes the value of memoing as ensuring that the observations made by the researcher during analysis and coding are not forgotten as time goes on. The memoing process is also considered useful for capturing the notes that are significant in contributing to the emergence of overarching ideas and theory (Elliot, 2004). In grounded theory, the researcher’s perspective is also considered as representational of another view in the study, contributing to the development of theory, and is therefore supported and validated by the memoing process (Charmaz, 2006).

3.10.3. Axial Or Fixed Coding

Axial or focused coding is embedded in the analysis process to align and inter-connect the identified categories. During this phase, the researcher remains deeply connected to the data, whilst still probing to ascertain “what is really going on” (Glaser, BG as cited in Tie et al., 2019, p. 6). At this stage, the data are pieced together in a process that Strauss (1987) describes as the construction of a “dense texture of relationships around the axis of a category “(p. 64). The researcher, throughout the process of data collection, coding and analysis becomes an integral part of the study, embedded in a dialectical relationship with participants, taking a reflexive position, considering how and why meanings are constructed (Charmaz, 2006, as cited in Hallberg, 2009).

3.10.4. Inductive Reflexivity

The inductive approach for data generation and analysis, requires repeated scrutinising of the data, analysing and reanalysing in order to identify, maintain, justify and promote the emergence of theory. Whilst the primary focus in inductive, the method can also be considered somewhat deductive in the ideas and emerging statements or themes are interpretive, assembled by the analyst from the data during analysis (Corbin & Strauss,

2008). The researcher may use a combination of both processes to cycle from observations to developing theories, repeating to further observations and more defined theories throughout the stages of analysis. Qualitative considerations contribute rigour to the study through the integration of questions, thought and the subsequent emergence of inquiry (Shermann & Webb, 2001). Utilising the framework presented in the model in Figure 3.7.4, developed by Gasson (2004), the preferred approach is to implement a *reflexive approach* throughout the analysis, continuously reflecting on the data collected, and examining existing assumptions, situational dynamics and preconceptions. The framework promotes the revisiting of ideas and the establishment of overarching categories and relationships, ensuring that the process of interpretation and theoretical development remains true to the grounded theory methodology underpinning the study. Reflexivity is considered valuable as it increases transparency and trustworthiness of the research report (Gentles et al., 2014).

3.10.5. Saturation Of Data

In grounded theory, data is collected continuously until saturation, with analysis being carried out simultaneously, contributing to the development of theory as the study progresses. Saturation of data is considered when new ideas, themes or information are no longer observed during data collection and analysis (Corbin & Strauss, 2008). Data saturation or satisfaction is an indication that there is no requirement to gather further data in order to support the emerging theory that has developed and is the point wherein the same codes and categories are appearing, but no new codes materialise (Urquhart, 2013). In grounded theory the process of data saturation may be referred to as theoretical saturation, where the notion of saturation relates more directly to the theory that emerges, whereas inductive thematic saturation refers more specifically to the codes and themes that have become apparent (Saunders, et al., 2018). Memoing is an essential aspect of data analysis in grounded theory, aiding the establishment of saturation through the notes and connections being made across data and within coding and observations (Corbin & Strauss, 2008). Saturation becomes a significant step in the process of theoretical sampling in grounded theory as the key focus of this methodology is to discover the theory that emerges from the data collected, exploring “relevant concepts and their properties and dimensions” (p. 147).

3.11. Pilot And Pre-Test

Initially, a pilot survey was undertaken to ascertain the flow and general suitability of the questions developed (see section 3.7). Several iterations of the pilot survey were undertaken before the questions delivered a range of responses that would provide adequate data outcomes for this study. The five tweens involved in the pilot study were instrumental not only in providing feedback from answering the questions but were also given the opportunity to contribute to the development of the questions in the revised versions of the questionnaire and other elements of this study such as the inclusion of focus group discussions. The contribution of the tweens was considered a significant aspect of the overall construct of this study, in keeping with the concept of authentic person-first or person-centred participatory research (Dewar et al., 2016), where the tweens not only contributed to the data gathered, but also to the direction and shape of data generation. A blended approach to the development of the survey instrument was employed to meet the tweens “where they are” (Vander Ark, 2018) recognising the value in engaging the participant demographic in a study that was to focus on them.

Of significance, was the development of the survey to provide easily qualifiable responses to questions about access to mobile technologies and general use, with provision for longer personalised responses for those who wished to contribute further. The pilot group of tweens also discussed the concepts of parent controls and the issue of school use or control of technologies. As a result, questions focusing on these issues were included in the final iteration of the survey distributed for this study. Additionally, the pilot survey undertaking identified issues such as the initially required “nickname” for contributors (see 3.8.1), with conversations exploring alternative approaches for the final draft.

Additionally, the second phase of this study was co-designed by the pilot group of tweens, who made considerable contributions to the development of ideas for how the interviews and focus group discussions might take place. Through the feedback given by the pilot group, the shape of the online interviews and the proposal for bigger, discussion groups became key methods for data generation that would prove invaluable. This contribution by the pilot group was, in itself, worthwhile data for this study, demonstrating the capabilities and literacies of these young people, as they were able to present ideas for data gathering in ways that had not been previously considered.

3.12. Phase 1 - Survey

Phase one, the survey, was to establish the framework of general understanding of how tweens use and perceive different aspects of mobile technology use. The survey was implemented in several stages, including the pilot implementation, with analysis and feedback informing the redesign of the overall objectives and questions. As Oppenheim (1992) remarks, “everything about the questionnaire should be piloted; nothing should be excluded, not even the type face or the quality of the paper” (as cited in Cohen, 2011 p 341). Post pilot completion (see 3.6.2), a newly designed survey was constructed with a combination of closed and open-ended questions, enabling data to be generated that could be conveniently transferred into graphical representation as well as providing the participant the opportunity to contribute additional comments in each question.

The survey focused on both the general and specific use of mobile technologies, the range of mobile technologies available, preferred and owned, social interactions and other aspects of tween use of mobile devices. Participating tweens (see 3.7.2) were asked questions about how they use mobile devices in their day, regardless of location, reflecting on a non-specific range of activities and other interactions such as music, playing games, reading or watching videos. The tweens involved also had the opportunity to answer several open-ended questions in the survey generating data about mobile device use that might not have been considered by the researcher. This maintained the focus of a grounded theory approach to the discovery new data rather than attempting to prove or disprove particular ideas. The data from this phase of the study was considered alongside existing global and national data regarding the use of mobile devices by tweens (may also be referred to in other studies as pre-adolescents), examining any correlation between the data generated and findings (See chapter 4).

3.12.1. Phase One - Survey interest and approaches from schools

The actual implementation of the survey took several different forms. In some schools, the students in the age group of the tween demographic completed the survey during class time. This did require commitment and time allocation from the school and was the approach used by approximately 50 percent of schools who agreed participate in this phase of the study. Other schools made the decision to have the students complete the survey during class time or homeroom/mentoring sessions. The impact of the different approaches for survey completion is discussed further in section 4.2.

Many schools did not reply to the request emailed directly to the principal inviting them to take part in the survey. Of interest, were a few schools that replied, but elected not to have the students do the survey, nor take any part in this study. The two schools that gave a reason stated quite clearly that they did not wish to contribute as they did not allow any devices at the school... *Unfortunately, we cannot be part of your survey. We actually ban mobile devices and phones at school...*(personal communication, August 21, 2019). Further clarification was sent to the school, explaining that the mobile devices in this study, included laptops and smart watches and that the research was exploring how the students used all mobile devices and technologies across all aspects of their lives, including outside the school, but the response was, again, negative.

3.12.2. Phase One - Survey Participants

The survey was devised to generate a broad understanding of how and when tweens use mobile technologies, the key things they do with these resources and their general perspective on use of the devices. As the primary aim of this phase of this study was to explore the general patterns and behaviours of tweens using mobile devices, recruiting participants from the widest range of young people in this demographic was useful, promoting a range of perspectives in the data collected. The range of schools initially invited to participate in phase one (survey), extended across the independent, Catholic and Department of Education sectors in Australia, further extending to include school of the air and home schooled children during the data collection phases. By the time the collection of survey data was concluded, the participants represented a cross section of socio-economic demographics and locations. In all, 1378 tweens completed the survey, with approximately 30% males, and slightly fewer than 70% females. A small percentage of respondents elected to choose other or prefer not to say when selecting gender. The majority of respondents were in grades 7 and 8, correlating to response ages of 11-13 years (see section 4.2 for more details on participation data).

In the survey, there was no specific attempt made to ensure gender or school sector balance, although as previously noted, there was a focus aimed at achieving such a range. The potential for sample bias was considered when sending invitations to schools during the survey period, however, in order to achieve a range of responses, intentional selection was employed as an additional means for recruiting responses. This decision was reflection to analysis of initial responses regarding willingness to participate in the survey, that had all come from private, single sex, girls schools. In order to establish a

broader viewpoint, a deliberate focus was made to invite schools that represented the wider community education sector. Due to responses – or non-responses - from schools, and greater interest from some sectors, particularly the independent schools, the sector balance was not achieved as planned.

The anticipated age distribution of respondents was realised, with participants spread across all age brackets in the tween demographic, increasing in size towards the top end of the age range. This was a desired outcome as the thought was that the children who were closer to the age where they were transitioning into teenage years would be experiencing different levels of educational, personal and social interactions with the mobile devices than those just entering the demographic. This aligns with the literature previously explored (see section 1.1) where children are recognised as transitioning between being children and adolescents in the age range of 9-13 (Guthrie, 2005; Tomari, 2008).

Initially, invitations to contribute to the survey were intended to be sent to principals in schools that were within the geographical range of metropolitan Sydney and close regional areas, as in the early stage of this study (before the pilot study analysis), it was considered that recruitment, provision of information and collection of consent forms would necessitate a face-to-face visit from the researcher. This process was required for ethics approval initially, as the survey was to be used to not only gather data about how tweens used mobile technologies, but also to identify potential participants for phase two, the case study and focus groups.

In the original study design the students would, with their parents, generate a nickname to be used in the survey, ensure de-identification in the data for the responses. This nickname was to be correspondingly added to a spreadsheet with the tween's name or school identification number. The school and/or the researcher would maintain the spreadsheet solely for the purpose of contacting potential phase two participants. The intention was, after analysing the survey data, to identify those respondents who appeared to be "high" users of technology, align the nickname with parent contact details, then send an email with an invitation for the child to participate in phase two of this study. The parent and child could then decide whether or not they were willing to participate and accordingly return or not return the consent form for participation in phase 2. All consent forms for the surveys were to be printed and distributed or emailed from the school as a pdf; signed and emailed or physically returned back to the school, where the teacher would collate and give to the researcher as required. All returned forms had to be

manually transcribed to the study spreadsheet along with the chosen nickname for the child.

This procedure was originally devised because conventionally, for children under 18 to participate in a research study that was de-identified rather than anonymous, consent forms were required for participation. As the age range for the children involved in this study are considered minors by the law, (9-13 years of age), ethics approval required consent from both the child contributor and a parent or carer (see section 3.11). For the remainder of this discussion the term “parent” will be used, being seen as synonymous with inclusive discussion about parent/s and/or carer/s.

In Australia, ethics requirements for including minors in a research study, generally require that consent is provided by both at least one parent and the young person who wishes to participate in the study (National Statement of Ethical Conduct in Human Research, 2007, chapter 4.2), unless the study is deemed to come under “standing parent consent” where the impact on the child is minimal and the school is required only to notify the parents that the study is being undertaken at the school (National Statement of Ethical Conduct in Human Research, 2007, chapter 4.2.10). Further discussion about ethics can be found in section 3.16.

As the phase one pilot study progressed, feedback from pilot participants, analysis of the process and new technologies available provided opportunities to alter consent requirements for the real survey. In hindsight, the original process proved to be laborious and would have required significant input from all stakeholders, which is not an ideal position for recruiting participants or requesting assistance from others, such as teachers, in the study process.

Following the pilot feedback, the process for participant recruitment in phase two was re-considered to enable an opportunity for individuals to be directly recruited through self-selection via an integrated QR code in either the survey, on various social media platforms or through the school newsletter (see Appendix D). As a result, the survey was no longer a restricted component for identification of potential phase 2 participants. Consequently, the survey could now be completely anonymous, thereby requiring only parental communication about the study being undertaken and child self-consent. In all school communications, an “opt out” selection was made available to enable parents and tweens to make a non-participatory decision. To further improve anonymity and privacy for all students, no personal data was collected in the survey, including the IP addresses of the devices used for response. This was an important factor in schools participating in

this study, as they could now guarantee to parents the anonymity of the survey, indicating that no question would potentially create stress for their child or fear of retribution from the responses submitted.

Additionally, after one school had completed the survey because of interest from the participants and school community, where there was limited technology for students at the school, the decision was made to either have children in similar schools participate at home independently, or to not contribute to the survey component of this study. The rationale for this was that all data from the survey should be collected digitally in order to facilitate analysis with limited opportunity for data disruption. While data collected on paper can be transferred to the collecting instrument, this was considered fraught and time consuming. For children to complete this study via paper was also considered in conflict with the intent of the study. Nevertheless, the tweens from one such school made invaluable contributions to the second phase of this study as many of these children were high users of mobile devices outside the school environment.

3.12.3. Phase One – Survey Pilot Study

A pilot implementation of the survey was undertaken in order to ascertain efficacy of the survey, appropriateness of questions asked, and reliability of data generated. Initially, the survey was, in addition to gathering broad information about mobile device use by tweens, designed to identify those who would be “ideal” participants for phase two, the individual case studies. The pilot study showed that whilst the selection of the nickname and return of the consent form was not overly difficult, it did require some time for the researcher and/or teacher to collect and collate. Under the original design, the parent and child were required to sign the consent form and select a ‘nick-name’ that the child would use instead of their real name, in order to maintain de-identification for survey purposes. Parent and participant consent were both required as the survey was (at that stage) not anonymous, but rather de-identified, resulting in the understanding that at some point, although limited to the researcher and teacher/principal, there was the possibility of connecting the child’s responses to their identity. In the pilot study, the consent process proved to be laborious and potentially restricting regarding participation as only those children who had completed the consent and returned the form (electronically or paper-based) were able to take part in the survey. Additionally, the process became rather “clunky” and inefficient, with time taken to enter data accurately a consideration. The pilot study also demonstrated that the nickname concept was good in principle but created

issues when the child forgot their chosen name, requiring the teacher to have to find this information before the child could continue the survey.

Consideration was then given to having an online consent procedure with another small pilot undertaken. This process enabled an auto-generated de-identified code to be emailed to the parent immediately after submission of the consent form, using the resource JotForm (www.jotform.com). The child would then use this code (for example, MW105) to ensure that consent had been provided (see Appendix D). Whilst this appeared to make the process easier for all stakeholders, there was still a possibility that a child might not recall their “code”, necessitating teacher intervention. The creation of a spreadsheet with the relevant information was now an easier process, being automatically generated by the online form used for consent. However, this spreadsheet would still have to be sent to the school and class teachers for addressing the issue of forgotten codes.

The survey consent and associated phase two recruitment strategy as originally devised, was potentially a time consuming and cumbersome method, where the researcher and/or teachers obligated to do significant “paper handling”, including distributing and checking consent forms, creating or reviewing spreadsheets and correlating all submitted information. Exploration of online survey collection resources revealed that Jotform (www.jotform.com) provided the breadth of tools necessary to appropriately collect participant consent and data without the ongoing need for paper consent forms. Reducing time and complexity in the process of consent acquisition and supporting ethically appropriate dissemination and retrieval of consent forms, the original paper based, hand-to-hand procedure was consequently considered unnecessary, thereby improving the survey administration for the teachers in particular. The new process enabled parents to access and complete the consent form online, and to receive an automated confirmation of their consent, requiring limited additional involvement of the teachers other than facilitation of the survey in class or the occasional checking for forgotten codes (refer to section 3.9.1 and Appendix D).

During the pilot study, through discussion with the students as some progressed into a pilot of phase two, it became clear that the existing process was not the most appropriate for this study on a larger scale. In the pilot study, several of the participants were identified as being “suited” for phase two, because their responses indicated high use of a broad range of mobile devices. This had been devised as the recruitment conduit for phase two prior to the pilot implementation. However, several of those tweens identified in the survey responses as “high users” and therefore potentially suited for phase two, did

not prove to be suitable participants in the pilot phase two case studies, and did not contribute as anticipated. On the other hand, several tweens who were not originally selected from the pilot survey, indicated their interest in taking part in and proved to be more reliable in providing data and articulating their experiences than some of the participants previously “selected”. The self-selected (pilot) participant group did not all use a wide range of mobile devices, which would have previously discounted them for phase two, but when interviewed for the pilot case study, proved to have significant contributions regarding *how* they used mobile technologies.

As a result of the feedback from the pilot study, the decision was made to change the recruitment process for the phase two case studies to enable self-selection by tweens, regardless of their expertise or the number of mobile devices being used. This change was seen as a major necessary modification of the study design that would provide a greater number of potential participants and less complex processes for the survey. Additionally, the new design reduced potential bias in selecting phase two participants, thereby aligning authentically to a grounded theory approach, wherein the recruitment of participants who have experienced what is being investigated is considered a primary focus (Morse, 2010). Furthermore, the change in design negated the need for full consent in the survey as there was no longer any requirement to hold records (that is, the automated code) that could identify students in any way for participation recruitment.

As a direct consequence of the restructure of the survey participation process, response rates regarding the willingness of schools to take part in this study increased, with positive indicators returned from a larger number of invitations. Previously, the interest in the study from schools invited had been minimal, but after the re-design of the study process, and the ability to have the survey completely anonymous, the feedback from schools was more positive. The new approach also enabled a smoother transition through the NSW Department of Education ethics application – SERAP, and the Catholic Education ethics approval process resulting in the ability to implement this study across a wide range of school sectors.

3.12.4. Final Survey Design And Implementation

The survey questions were initially composed following the first literature review. Examination of previous studies considering children’s use of technologies was undertaken and some ideas for probable questions generated. With many of the existing questionnaires focusing on a larger range of technologies including televisions and game

devices, there seemed to be a gap in the focus intended for this study, which was to explore more deeply how, when where and with whom the tweens were using their mobile devices. There were also previous studies that focused on general attitudes towards technology use for both children and teenagers (see Chapter 2) but limited information focusing specifically on the perspectives of the tween age group.

The continued development of the questions for the pilot and subsequent studies was done in consultation with a small group of pre-testing tweens, in addition to using existing questionnaires as a guide. As the research questions for the study focused on examining how tweens were experiencing their mobile devices, it was considered invaluable to include them in all aspects of this study. This approach aligns to the notion that the person first (or person oriented) perspective is a more appropriate method to use when wanting to explore a phenomenon *about* how a group of participants, considering the study *with and through* the subjects in preference to making inferences *about* them (Bergman, 2001). The essential component of this approach is to ensure the subject (the tween) is the voice of the study, “not the variable” (p. 26).

The questions for the primary sections of the survey focused on three main areas:

1. General information about the participant
2. General information about access to mobile devices; location of use; times of use
3. More specifically asking for comment about mobile device use including screen and device restrictions, parental or school-based input into mobile activity management, perspectives on screen and time controls and apps used most frequently

The next sections of the survey requested (if possible) for the participant to upload a screen shot of the “last 7 days” data automatically collected through the screentime function and a screenshot of the most used apps data for the past 7 days. This section was completed by approximately one third of participants, providing a snapshot of the mobile device being used to complete the survey.

The final section was an invitation for the participant to find out more information regarding contributing to the phase two online interviews, with both a link and QR code providing direct access to the information and consent form. In this way, the tween was able to self-select if interested, with consent being required from both the tween and a parent in the online form (see Appendix C for access to full set of survey questions and Appendix D for self-selection process relating to phase two).

3.13. Phase 2 – case studies

3.13.1. *The Case Study Approach*

The use of qualitative case studies is an established research tool that provides opportunities to explore the structure, behaviours and characteristics of particular situations and phenomena (Yin, 2003). In phase 2, this study explored specific tween participants assembled mobile technology experiences and how they interacted with their digital environment, investigating individual behaviours and patterns of use. The focus was from a sociocultural perspective, concentrating on the environment and circumstances in which each individual operates, and how the behaviours of the individual may be impacted upon by these surroundings (Packer & Goicoechea, 2000). Investigations explored the notion of socially manufactured interactions (Areepattamannil & Khine 2017; Christoph et al., 2017; Livingstone & Helsper 2017) considering the opportunities and possibilities for social connections (Areepattamannil, S., & Khine, p. 263) and personal experiences afforded by the use of mobile technologies (Austin & Sutton, 2015).

Case study can be done through observed data generation or person first experiences where the participant contributes the data from their own perspective. In this investigation, a person first, multiple case study approach was used as the investigation was gathering individual data but also comparing how each individual case is both similar and different to the others, looking for patterns that might suggest new ideas and understanding (Gustafsson, 2017). Multiple case study also enables the researcher to analyse the data collected both “within each situation and across situations” (Yin, 2003 as cited in Gustafsson, 2017, ch 3.1). The evidence generated and analysed from a multiple case study perspective is seen as adding rigour to this approach as the method enables a wider, more thorough investigation of the research questions, thereby enabling a reliable evolution of theory (Yin, 2014).

The case study approach enabled the participant to reflect on their experiences from a person first perspective (Cohen, 2017) with a range of strategies utilised to ensure that the data contributes to the researcher’s discovery and construction of knowledge about the case study context. The researcher, through using this approach is, therefore, able to construct meaning directly from the participants’ experiences, interactions and reflections

(Yazan, 2015). Person first is essential in the research design for this study as the experiences being collected had to come directly *from* the tweens, not as a second-hand recount from parents, teachers or other observers.

The interview component of this study, needed to incorporate a flexible approach that would encourage the participant to be open about how they were experiencing and interacting with the mobile devices that they used, but also to support a conversational approach, facilitating the progress of the interview to find its own route throughout the webinar session. Conversational interviews are informal (Lavrakas, 2008) with no fixed, preset questions, enabling flexibility and adaptability, based on the interactions between the interviewee and the interviewer, providing an environment in which the participant might be talking and behaving in a natural manner.

The self-reported interactions of the interviewees provided the framework for investigating *what* the tweens were doing with different technologies, *how* and *why* they were doing these things ie., their patterns and purpose of use. Viewpoints contributed by participants, reflecting their experiences and interpretations of mobile usage and social interactions was key to this study, incorporating “Rogoff’s (1995, 2003) *transformation of participation* (as cited in Toh et al., 2017, p. 304) to explore the role mobile technologies play in each tween’s everyday experiences.

The goal of phase two of this study was to investigate more deeply the digital literacies used and capabilities developed by tweens as they experience mobile devices and technologies in all aspects of their daily lives, not specifically those who were high users of technologies. Therefore, the interviewees recruited needed to be representative of any part of the tween demographic, not a specific selection of a “type” of tween in the broader group. The approach, as a result, was changed from researcher selection and invitation to contribute (purposive) to a more holistic recruitment approach, where the interviewees self-selected to participate in the interview phase of this study. Self-selection of participants provided a broader scope of perspective, as the key element was that the tween concerned was interested in being part of the study. This resulted in thought-provoking interview responses across a range of devices and levels of use (see section 3.6.10 for further discussion on self-selection).

The conversational interviews were all completed online, using Zoom (www.zoom.us) a web based video conferencing resource. Zoom was chosen as it is cross-platform, meaning that it can be accessed easily across a range of operating systems and devices (Windows, iOS, Mac and Android compliant) and required limited set-up for the user.

The user did not have to create an account nor go through a complex process in order to join the interview. The login details for the meeting were emailed in a message to the parent of the tween, confirming the date, time and meeting link for the session (see Appendix D). Parent email addresses were generated through the online consent form process using Jotform (www.jotform.com) where parents provided this information. No tweens' email addresses or contact details were recorded at any time. Additional resources were created and provided to the parent and participant in order to best enable them to be prepared and take part in the study with limited stress or technical knowledge (See Appendix F).

Access to schools and individual participants was extended geographically with the newly available features on the resource, Jotform, that would enable parents and children to easily sign consent forms online. This feature meant that consent forms no longer had to be distributed, returned (electronically or paper based) and collated by a teacher or the researcher, thereby eliminating a major time factor and inconvenience in survey completion. This enabled the parent to review the information about this study, discuss participation with their child, sign (both parent and child) and submit online with one click and from any device or operating system. After submission of the consent form, an automatic response was emailed to the parent with a unique identifying number (ID) that would be used by the child when participating in the interview to assure that consent had been processed.

Initially, it was anticipated that the students would be recording the screen-time data collected by the operating system on the mobile devices, through still screen-shots or screen recordings and then using screen-shots of the "battery health" on the device to reflect further on apps used during the week. These recordings and screenshots were to be uploaded to a secure folder online and then used during the online interview with the participant reflecting on their captured data. This information was to be used in the same way as visual stimulus, establishing a starting point and reference for the children to consider during the interview. The Interviews in the pilot study were conducted in this manner and live recorded. Face to face interviews were also offered as an option, although no participant decided to take up this option.

Towards the latter part of 2018, an alternative process was discovered that would mitigate the need for the participants to capture and upload any data used during the week.

Changes to the operating system on mobile phones in recent times, provided weekly generation of a screentime report (see Appendix B) that could be then be shared during

the interview session and/or uploaded to a cloud based folder. This feature was automated on some operating systems (iOS) and required an app for others (Android) but became a major change agent in the overall process of the generation of data for this study (refer to section 3.8.2). Screenshot data transformed the overall shape and process of data sharing and online interviews, resulting in higher levels of authentic discussion and a greater juxtaposition with the think aloud approach for explanation and reflection during an activity (refer to section 3.8.6). The strategy provided the opportunity for the participant to conceptualise, contextualise and reflect on their experiences, without the need for the imposition of previous data gathering or uploading files to provide the stimulus for reflections and interviews.

3.13.2. Phase Two – Interview Participants

Participants in phase 2 of this study (interviews and focus groups) were derived from several self-nominated sources, including those who demonstrated an interest through indicating involvement after accessing the information link in the survey and individual tweens who, having heard about this study from a parent, teacher or other source, expressed an eagerness to contribute.

Phase two was designed to be an in-depth multiple case study focusing on learning about the real world mobile technology environments of a group of participants (10 in total) with the tweens reflecting directly about their experiences when using mobile devices, through discussion and sharing of screenshot information in one to one interviews. The sample size of this subset of participants was determined by the availability of recruits, time required for individual interviews over a period of time and saturation of data (Charmaz, 2006). As sample results can be exaggerated or affected by sampling error, an effort was made, after the pilot study, to ensure that the interview contributors authentically represented a random selection from the main study group (Martinez-Mesa et al, 2016). Sample bias can be minimised through “constant comparisons across participant accounts” (Smith & Noble, 2014, p. 100) and triangulation or confirmation of data patterns and findings (Gasson & Waters, 2013). Authentic representation became an important driver for the change in how the case study participants were recruited, as the sample group was desired to be representative of tweens in general, with the research focusing on the development of dynamic digital literacies in any tweens as they interact within their mobile environment.

Reconstruction of the survey following the pilot study enabled respondents to self-select for potential further participation in phase two. At the end of the redesigned survey, the tween was able to read information about phase two, and, if interested explore further through a link in the text or by scanning a QR Code (see Appendix D) As a result, in the final implementation of this study, those tweens who self-selected to pursue participation and complete the consent form with a parent, were more pro-active and willing participants than some of those from the pre-identified group following the pilot study survey.

Initially, the recruitment of participants for the interview phase was designed to be through purposive sampling, based on selection of “high use” individuals, identified through survey responses. In this example, the researcher would identify those students who demonstrated high levels of access to mobile devices, high levels of use and frequency of mobile technologies and be further identified by the teacher as having the capability to be interviewed successfully. Purposive, or non-probability sampling focuses on the researcher having control over the elements selected for identifying or recruiting the most representative sample of participants (Black, 2011). In this study, after consideration and pilot interviews, it became obvious that those tweens who identified from the survey as potential recruits for the interviews were not necessarily confident in their interview responses, willing to participate nor representative of the tween demographic as a whole (see Section 4.2 for more discussion about participants).

The interviewees demonstrated deep understanding of how and why they used particular devices, applications and resources. They were interestingly articulate once they were “settled in” to the interview and provided thorough explanations of the alignment between the data collected on the device, including screentime, most apps used, number of pick-ups and general data reflections across the past week of use. Interview analysis and findings are discussed in-depth in Chapter 5.

3.13.3. Phase Two – Interview Pilot Study

The pilot study participants for the interviews, demonstrated that some who had been identified as being high users of mobile technologies (from the pilot survey) did not prove to be successful interview participants, showing limited interest and/or willingness to contribute to this study. High users of technology had been identified from the survey (pilot) as potential participants for interviews, but not all were able to articulate their technology interactions or wanted to participate once invited. Therefore, it was proposed

that a more effective way to recruit suitable participants was to provide an avenue in the survey where children could indicate their interest in that part of the study – enabling self-selection. Additional information about the study was also advertised on social media, connecting to the broader community of parents and/or educators who themselves might refer the study to potential participating tweens to ascertain interest. This proved to be a good method of generating interest in this study, with more than one third of final participants coming from this source. Several teachers also reviewed the “advertisements” for the study (see Appendix A) and followed up with further requests for information to be sent directly to them for exploring the possibility of school participation in this study. A second pilot was undertaken for the case studies, focused more specifically on the technical processes involved in the online interviews. This required several attempts at working through unforeseen issues regarding access to the webinar resource used - Zoom (2019), and the ability to share screens directly from the device being used for the interview along with other minor problems that emerged during the pilot interview sessions. Throughout this process, the ideas and suggestions of the tweens were explored and embedded where possible. This process supported the approaches for person centred or person-centred research, and included elements of participatory research, where the participant is given agency in contributing to the development of the research design (Gillett-Swan & Sargeant, 2018; Jacobs et al., 2017).

3.13.4. Focus Groups

Focus groups discussions were a developmental component of phase two of this study, identified as being a valuable contribution to the data gathering by the participants in the case study pilot. Focus groups are used in qualitative studies to contribute to data saturation and to build social context through interaction (Onwuegbuzie et al., 2009). Several individuals in the pilot study group, proposed that including a type of focus group discussion would be of value, with the idea that in a group environment, the tweens might discuss aspects of use they might not consider in a 1:1 interview situation, as they would “spin” from one another and build on the conversation as ideas were presented. The hope was the group environment would promote discussion more effectively than a more conventional one to one interview (Onwuegbuzie et al., 2009). Group methodology is frequently used to elicit and provide validity to collective testimonies, “providing a safe space for sharing one’s life experiences” (Denzin & Lincoln, 2005 p. 648). The advantage of the focus group format is that there are opportunities for the participants to develop a

deeper understanding of the issues being discussed, or confidence in what they have to share as the group dynamics build (Nyumba et al., 2017) providing the opportunity for the development of a social construct of meaning (Cohen et al., 2011).

The structure of the focus group enables both the researcher and the participant to explore how reflections of personal actions, behaviours and experiences contribute to the construct of greater meaning across social life practices in a conversational atmosphere. According to Kamberelis and Dimitriadis, “Focus groups have enabled researchers to explore the nature and effects of ongoing social discourse in ways that are not possible through individual interviews or observations” (Denzin & Lincoln, 2005, Chapter 35, p.902).

The focus groups were implemented as part of the research design and facilitated concurrently with the individual case studies. Recruitment for the focus groups was independent from the interviewee recruitment process and facilitated the participation of any tween who volunteered; although an individual tween could nominate for both the interviews and focus groups if desired. For the interviews, recruitment was conducted across a range of avenues; from information provided in the survey, through word of mouth (from interviewees), and interest sought through personal contact, school newsletters or other social media via parents and/or teachers. In keeping with the primary approach for this study, the only limitations that were placed on inclusion in the focus groups were that the participants must be within the age range for the tween demographic and use at least one mobile device. The boundaries endorsed for focus group inclusion are that the group members are able to discuss the particular topic of investigation as this provides an environment where stimulated conversation is more likely to take place (Cohen et al., 2011).

3.13.5. Phase Two (B) – Focus Group Implementation

The number of participants for productive group discussion, proposed by Baumgartner et al. (2002) is around 6-12, although smaller, mini focus groups of 3-4 may be used in order to encourage an even more protected environment where the participant is not overwhelmed by a larger group, or silenced by the stronger contributor (Onwuegbuzie et al., 2009). In this study, the groups were between 3 and 8, with the average around 5. The group of five appeared to be the most successful for collaborative discussion, providing opportunities for each participant to speak, but also enabling the flow of the conversation to run excitedly as the tweens shared their ideas and perspectives.

The makeup of most of the focus groups was, therefore, carefully considered to include tweens who on the whole, relatively familiar with one another, providing optimum conditions for confident conversation and personal interactions. Several schools voluntarily offered to hold focus group discussions with participants recruited through a notice published in the daily school bulletin and tutor groups/home room classes (see Appendix E). Seven school based focus group sessions were held in a face to face environment with students from years/grades 6-8 (in groups of 5-8 participants). In each group, the students were kept in their year group to maintain social comfort. One focus group was held with three members from the NSW School of the Air students joining in online, and a third was held face to face with several students in the homeschool sector who were socially connected through the homeschool experience. The homeschool tweens were invited to participate via a social connection with a group of homeschool families.

As an accepted component of participatory research methods of data collection, focus groups have been actively used in qualitative studies since the 1940s (Nyumba et al., 2017). The inclusion of focus groups may be seen as a synonymous division of interviews, in that they are, in effect, small group interviews, designed to further uncover the perceptions and values held by the core group and individuals. In traditional interview approaches, the difference between the role of the interviewer in the focus group and interview can be marked, as the researcher may take a more integral role directing the questions and controlling the dynamics of the discussion (Nyumba et al., p 21). However, in the approach taken for this study, the both the interviews and focus groups discussions were informal, led primarily by the stimulus provided by participants and the flow of think aloud conversation. The interview approach for this study is discussed in greater detail in section 3.8. In this instance, the interview and focus group discussion align closely, as in both situations, the participants are the driver of the conversation, relying on their own screentime data and other visual stimulus on their mobile devices such as apps to direct the discussion.

3.14. Ethics

This study was conducted ethically and in line with the requirements of the University of Technology Sydney (UTS) Human Research Ethics Committee (HREC) and the University's Ethics Policies and Guidelines The study was approved by HREC – approval

number 2014000359. As this study investigated the interactions and behaviours of minors, ethical considerations were required to protect the rights and safety of all participants (Ary et al., 2018). Where also required, additional ethics approval was sought for students attending schools in the Catholic Education Diocese of Parramatta (CEDP) and the School Policy and Information Management (SERAP) in NSW Department of Education, Government schools. Data was gathered regarding broad geo-location, age, gender, school “type” (Government, independent, Catholic, other), individual ownership and access to mobile technologies and other information regarding mobile technology use, but no personal data was required, therefore the survey was anonymous for all participants.

In the second phase of this study, the group of children who elected to participate in either the online interviews or the focus groups met online with the researcher on several occasions. Therefore, specific ethical requirements had to be met. Potter (2018) draws attention to the concern that has become relevant in recent times, particularly following the Cambridge Analytica issue, relating to the collection of data and datafication, specifically for children. Williamson (2017) also discusses the collection of datasets where parents have little understanding or control over what might become of this information.

The principle of anonymity had to be assured and the participants were afforded confidentiality, ensuring that any potentially identifying information will not be made available to anyone outside the direct research component of the study. In this particular research, due to the innovative methods of gathering data, the likelihood of personalised data being shared was minimised and that aside from the recorded interviews, there would be no method of connecting participants with specific data generated contributed directly from the mobile device being used by the participant, without the need for file uploading or emails.

This position was held because conventionally, for children under 18 to participate in a research study, consent forms were required for participation. Due to the age range of the children being investigated for the study, ethics approval required consent from both the child contributor and a parent as all parts of the study were to be de-identified but not anonymous (Office of the Australian Information Commissioner, 2018).

3.14.1. Permission And Informed Consent

The participants in this study contributed in a wholly voluntary capacity, but because the children are under the legal age of consent, they also required the joint consent of a primary carer. That person, a parent had to agree with the tween child that they were free to participate in any phase of the study, with the guarantee of no element of coercion from any consenting party or stakeholder in the study.

Phase one surveys were distributed to participants using both social networks and direct contact with schools. In some cases, the schools published information about the study in the weekly newsletter, inviting students to discuss with parents and to participate if desired. In that instance, teachers will then implement the surveys and the children will respond anonymously

As the children were between the ages of 9-13, it was also essential that the language of the information regarding the proposed study, and the consent aspect, was written in accessible vocabulary, ensuring that all participants had the probability to understand the nature of the study and the degree to which they will be required to contribute

3.14.2. Consent Requirements

The participants in the study undertaken were in the 9-13 year age group, thereby requiring permission from both the participant and a parent Initially, the process of obtaining consent for participation was cumbersome, required considerable contact with teachers and time taken to make contact with parents for the interviews. All information and consent forms to be printed, taken to the schools involved, distributed collected by the teacher and then returned to the researcher. Distribution to the school would have to be done either in person or via traditional mail. Alternatively, documents could have been emailed as a pdf with the responsibility of the school/participant to print, sign, scan and return; or at best, receive a digital copy, sign using the ink signature feature and return via email. In all instances, significant responsibility was placed on the teacher for distribute, collect, collate and check consent forms requiring the printing and or storage of large quantities of signed consent forms and considerable time cross-checking validity with survey responses.

3.15. Conclusion

This chapter has presented the methods and processes used to implement the study undertaken. The methods employed reflect the guiding principles of a grounded theory qualitative methodology, using triangulated data collection strategies of survey, interview and focus groups. This study has purposefully embraced a person centred approach, focusing on the voice of the tween participant with the intent to investigate the inside and outside of their experiences with mobile technologies. Novel approaches have been used to connect with and collect data from participants, utilising contemporary resources and technologies.

In Chapter 4, the findings from the data collected throughout the study will be presented, establishing the codes and themes from which the discussion in Chapter 5 will develop.

4. Findings

4.1. Introduction

Chapter 4 provides a detailed account of the findings from analysis of the empirical data collected in the different phases of this study. Throughout the project, the phases of study were designed around the survey (phase one) and a series of interviews and focus group sessions (phase 2). Concurrently occurring with phases one and two were ongoing comparative analysis of the data and the development of the storyline resulting from the findings. The final aspect of this study, the dissemination of the emergent substantive theory (Figure 4.1), illustrates the four key elements of the study.

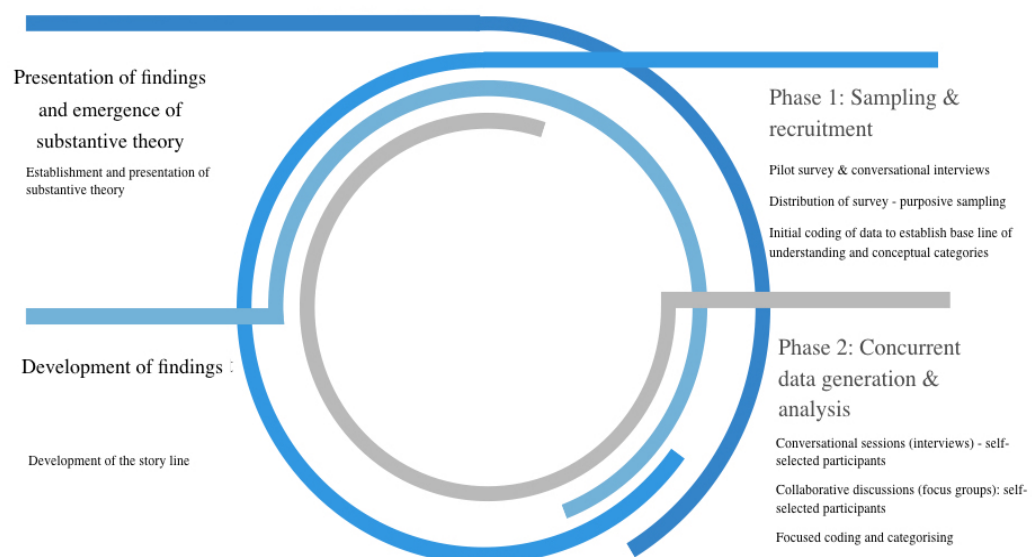


Figure 4.1 Phases of this study

The chapter is organised into three main sections, with the first section discussing the pre-test of study instruments with the second section focusing on background information and demographics of the tweens involved in this study and the findings reflecting their access to and preferences for different mobile technologies.

In the third section, a more comprehensive report of the findings from the surveys, online interviews and outcomes from focus group discussions is presented. This section is organised under thematic headings rather than from the individual sources of data

collection. The findings emerging from the surveys, interviews and focus groups do not sit in isolation from one another but have been used to providing a range of perspectives from the tweens involved, developing the foundation from which the narrative of this study and generation of the emergent substantive theory emerged.

Throughout the process of the research investigation, importance was given to ensuring that the research was undertaken *with* the young people involved, not *on* them (Klerfelt & Haglund, 2014). Importantly, the perceptions of the tweens were openly valued, with contributions made without adult intervention, safeguarding the need for the children to not feel judged or criticised. Charmaz (2000) identifies the significance of the participant in grounded theory research, focusing on the participant as a contributor through their experiences, noting that their voice must be present in the construct of emerging theory (Charmaz, 2000, as cited in Mills et al., 2006). Involving the participant means they are actively situated within the study, engaged in the process of data collection and discussions, presenting ideas for input and not restricted by inflexible parameters. In this study, as the aim was to understand what is happening when tweens are interacting with mobile devices during everyday experiences, it was essential that the shape of this study was guided by the reflections and interests of the participants. In keeping with the grounded theory approach used for this study, that is with no pre-conceived ideas of what these experiences should or might be, the boundaries needed to be capable of flexibility in response to the tweens' contributions, both with data collection and verbal inputs from participating tweens.

The research question used to guide this study was:

How are tweens experiencing and constructing meaning as they interact with mobile technologies in their everyday lives?

Essential to the paradigm of grounded theory used in this study, is that there were no additional sub questions at the outset of the data gathering and investigation of the overarching questions (Allan, 2003). Grounded theory scaffolds research in such a way that the conceptual framework evolves from the data generated rather than framing the research from the beginning of the study (Charmaz, 2006; Sekiwu, 2020). It is endorsed as being a suitable methodology for researching “unchartered waters” (Stern, 1980, p. 20) or for where a fresh approach to investigating an issue or phenomenon is sought. Grounded theory is seen as particularly useful for when there is no specific “descriptive theory” (Crooks, 2001, as cited in Yates & Cahill, 2019, p. 4).

In this chapter, I will demonstrate how the themes that were identified through a sequence of inductive and deductive analysis processes, along with memos and visualisations of evolving concepts, provided an insight into the final categories that emerged from the data. I will determine how the implementation of grounded theory as a methodology provided an insight into how the emerging categories and theories were established. Primary findings of tween ownership and perspectives regarding mobile technologies that emerged initially from the survey responses will be presented and examined in light of the responses from interviews and focus group discussions.

Throughout this study coding and analysis of the data was applied continuously, resulting in emerging themes and sub themes. These themes have been used as headings for presentation of the findings and later, in Chapter 5, as discussion foci. Essential to the principles of the grounded theory process, the extrapolation of thematic elements that addressed the overarching research question transpired during the process of interpretive examination, analysis and theorising of the data (Charmaz, 2006). The approach supports the methodological strategies employed in this study, with a key focus on the processes of data collection alongside the “meso and macro levels of analysis” (Collins, 2004 and Clarke 2003, 2004 as cited in Charmaz, 2006, p. 129).

The main themes emerging from this study were:

- Tween access to and ownership of mobile devices
- The tween digital ecology
- Creating and/or consuming
- Confidence and capabilities
- Time, place and space
- Screentime and device management
- App and device selection
- Social connections
- Learning

Supporting the presentation of findings in this chapter, excerpts from the interviews and the focus groups have been included alongside the data procured in the survey, triangulating the data being collected and presented (see Figure 4.2). The extended

presentation embodies the triangulation of data across time, space and participants in addition to different methods of collection leveraged (interview, survey and focus groups), establishing the themes and patterns that emerged throughout the period of inquiry.

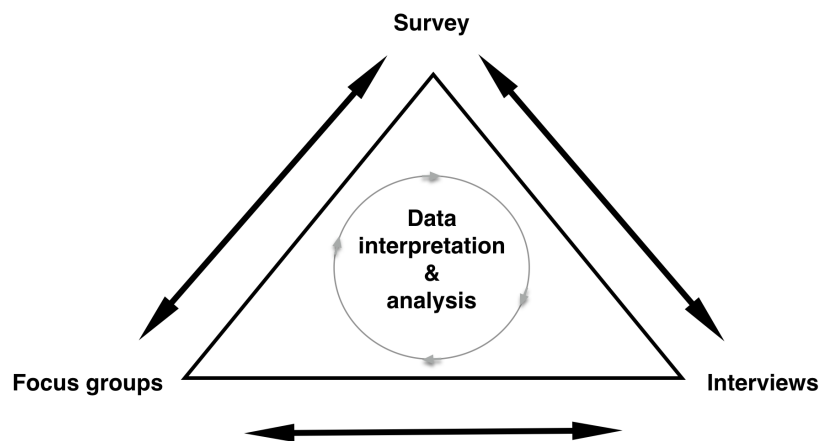


Figure 4.2 Triangulation of data collection from the different study participant groups

A range of perspectives was captured, including dimensions and experiences of tweens from those who contributed to the various aspects of this study. This process was aligned with the methodological approach of grounded theory in that the emergent theory was grounded in the study itself, with the continuous data collection from different groups of tweens enabling iterative analysis throughout the timeline of research. This study explored the concept of ‘what lies beneath’ the more obvious behaviours and actions of pre-adolescent tweens (aged 9-13) as they interact with mobile technologies during everyday activities. Investigations and inquiry focused on the impact of mobile technology connections on the socially constructed world of the tween and the emergence of multi-dimensional, dynamic literacies transpiring within these experiences. The investigations included an examination of the range of mobile technologies and devices accessed and used by tweens, their relationships to and with these technologies, and the influence that interactions and behaviours may have on learning experiences (formal and informal) across time and space.

4.2. Participant Demographics

4.2.1. *The Survey Respondents*

In all, 1,145 Australian tweens contributed to the survey data collected, exploring access, ownership, general experiences, preferences and perspectives relating to the use of mobile devices. It should be noted, however, that as questions were not mandatory, in each set of responses, there was not always a full complement of answers that equaled the number of overall participants. Where specific data have been included, the number of respondents has been indicated in the table or graph label. Where necessary for aligning or comparing replies between questions, response percentages have been used as comparative data in preference to raw data figures.

In the majority of questions, the number of skipped responses was less than 150, with approximately 1000 responses being the average rate of reply per question. Cross-checking individual responses during analysis indicated that in most cases, the same participants omitted the same questions, so the data maintained integrity across the range of answers. Where responses did not correlate with questions being aligned or compared, they were removed from the data sets being investigated.

The completion rate for the survey is shown through statistical analysis to be at 71% (provided by Survey Monkey data analysis). However, this data is extrapolated through the respondent completing (or not completing) the overall survey by submitting the final question and does not necessarily reflect the actual number of specific questions that may have been answered or unanswered/skipped by an individual contributor (see section 3.14 for more information on managing survey data in qualitative studies). In all tables and figures displaying data from the survey, a note confirming the number of contributors has been added to enable the reader to review the findings appropriately.

As discussed previously in section 3.14, non-response in surveys is not something the researcher can control, relying on the participant who has agreed to contribute, to complete the questionnaire. This is particularly an issue when questions are not mandatory (as in this study). It could be assumed that once an individual has agreed to take part in the survey, they would also answer all the questions, but this does not always transpire, thereby creating an unpredictable gap between the overall number of respondents and actual responses (McNabb, 2014). The non-responses were readily

filtered in each question throughout the survey instrument, maintaining overall integrity of the data.

4.2.2. Survey Participant Demographics

The majority of participants in the survey were from mainstream schools (not specialised education focus), including New South Wales (NSW) Department of Education Public Schools, Catholic and Independent schools. A small number of children were from NSW Department of Education School of the Air with another small representation from the homeschool sector (see Table 4).

Table 4:

School Sectors - Survey Responses (N=1145)

School sector	Number of schools
Independent - Girls	3
Independent - Boys	1
Catholic – co-educational	2
Department of Education – co-educational	3
Home school	2

Overall, participation in the survey phase of this study was well supported by tweens across a range of geo-locations, school sectors and gender. Figure 4.3 provides a visual layout of the locations and the geographical spread of respondents from the research survey. As previously noted, not all participants contributed to each question, with the figure using data that reflects those who responded (58 participants skipped this question).



Figure 4.3 Geographic distribution of survey participants (n=1203)

The significance of this data is to demonstrate that the participants represented a broad cross section of both regional and urban locations, with the goal of providing a balanced perspective from the experiences shared. The location of participants was primarily from the state of New South Wales (NSW), and the majority located in the greater Sydney region, a number of tweens from regional areas of NSW and a small number from other states of Australia (see clusters in Figure 4.3). Therefore, it could be determined that a range of perspective was made possible in the responses, through the diversity of the participants. Worth noting, is that in addition to the regionally identified respondents, some of the students who were boarders at independent schools in Sydney may have also entered the school postcode as their address, and not their home address, which, had they done so, would have indicated greater levels of diversity in geo-location as many of these students come from remote, regional areas of the state. Additionally, 181 respondents skipped this question.

Tweens who responded to the surveys were well represented across all school years or grades in the age demographic, with 98% coming from years 5-8 and the remaining 2% of respondents from year 4. The majority of responses were contributed by tweens in years 7 and 8, with this group representing over 60% of the total (see Figure 4.4).

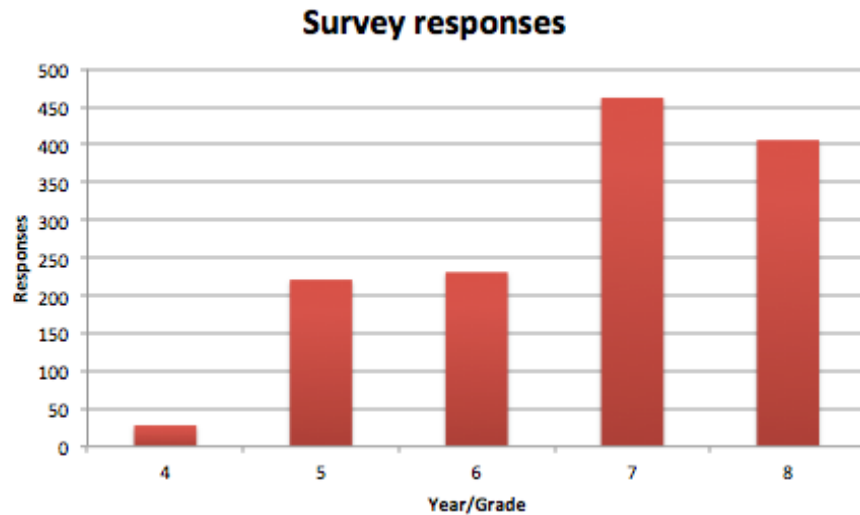


Figure 4.4 Survey responses by grade/year at school (n=1,145)

The age of the respondents is demonstrated in Table 5, with gender for each age group also demonstrated. Respondents who did not reply to both questions were omitted from the table below to maintain consistency with the data. In all, only 34 participants did not answer these questions.

Table 5:

Participant Information - Survey Responses (N=1350)

Age	Boys	Girls	Unspecified gender	Total
9	10	5	2	17
10	13	81	1	95
11	31	208	4	243
12	86	238	9	333
13	174	278	5	457
14	83	117	5	205
Total responses	397	927	26	1350
Skipped				34

The age distribution of the participants was spread across the tween demographic, although figures for tweens in the early age range were significantly lower than the top end of the sector. It should also be noted that 205 of the children who responded to the survey were 14 years of age but were not included in the data analysis for this study as they sit outside the age demographic as specified (9-13 years) and were technically ineligible to participate. These children were permitted to respond to the survey, as they were students in classes (year 8) where the survey was completed during class time. A decision was made to allow the fourteen-year-olds to contribute so as not to feel excluded from the class activity. When the study was completed outside class time, the children not in the eligibility age category were considered less likely to participate as the information clearly indicated the survey was for 9-13 year olds. In anticipation of any child contributing not being in the required age bracket, there was an option to select '14 years of age' in the age-related question, enabling the data from this group of respondents to be filtered accordingly during analysis. The removal of these numbers is reflected in the survey data presented at the beginning of this chapter.

Table 5 also shows that 26 respondents elected to choose either 'other 'or 'prefer not to say 'as a gender response, with 34 skipping the question, thereby not providing data that could be included in this study. Overall, girls subscribed predominantly to the survey, this being a reflection of the demographic of the schools that responded, with contributions from an all girls' school in the final quarter providing a disproportion of gender based responses in the total survey data (see Table 6).

Table 6
Contributions By Gender Showing Greater Number Of Girls Responding To The Survey Than Boys
(N=1145)

Quarter	Boys	Girls	Unspecified
June – August 2019	305	110	14
September – November 2019	1	706	9
Total	306	816	23

The survey did not aim to determine differences between different gender experiences with mobile devices, but rather preferred to consider tweens as a whole group in this

study. Nevertheless, the data reflecting gender proved useful as an element of comparison during analysis when considering responses to the types of activities preferred, time spent on activities and perspectives about parent management of devices, filtering enabled the complete data set to be used to consider tweens as a whole group, with little differences being apparent between gender responses. Consequently, in the findings, little reference has been made to gender as a comparative tool.

4.2.3. Interview Participant Demographics

Table 7 provides an overview of the individual tweens who participated in the 1:1 interviews online. All contributors have been provided a pseudonym to protect anonymity.

Table 7

One To One Interview Participant Information (N=14)

Name/pseudonym	Gender	Age
Cassidy	F	13
Tilda	F	11
Harry	M	10
Jimmy	M	12
Hamish	M	11
Millie	F	11
Harriet	F	12
Alice	F	13
Tessa	F	13
Jennie	F	11
George	M	11
Katie	F	13

Name/pseudonym	Gender	Age
Issy	F	12
Kristina	F	10

As previously noted in Chapter 3 (section 3.15), the interviews were conducted online with tweens who self-selected to take part in this aspect of the study. All participating children required parental and personal consent to participate, with a unique identifying number (ID) ensuring anonymity and privacy in accordance with the ethics approval for this study. Self-selection was considered the most appropriate method of recruitment for the interviews as it provided an opportunity for any tween to contribute, rather than being identified by an adult as appropriate for the study. The decision for self-selection has been previously explored in section 3.7.4.

4.2.4.Focus Group Demographics

The focus group sessions were held at four schools with two additional groups coming from alternative education sectors. Each school sector included a number of focus groups that were generally held at lunchtime or during pastoral care class sessions (11 sessions overall). For those children who participated from alternative education sectors, interviews and focus groups were held during a time of convenience. The focus groups covered a broad representation of school sectors, including NSW Department of Education schools, independent schools, home schooling and NSW School of the Air (see Table 8).

Table 8

Focus Group School Sectors And Numbers Of Sessions Undertaken

School sector	Schools	Focus groups
Independent - Girls	2	5
Independent - Boys	0	0
Catholic – co-educational	0	0

School sector	Schools	Focus groups
Department of Education (DoE) – co-educational	2	4
DoE School of the Air	1	1
Home school	1	1

4.3. The Tween Digital Ecology

The digital ecology of the tween has been introduced in the literature review. A significant factor in this digital ecology is the level of access and ownership of mobile devices afforded to the pre-adolescent child. In the survey, interviews and focus groups, the tweens were asked to identify levels of access and ownership and when, where and how they used the various mobile devices across their normal day, both in school and outside of the school environment. Embedded in all instruments of data generation, were opportunities for the participants to further share their experiences, enabling a deeper appreciation of the shape of this digital ecosystem in which the pre-adolescent tween exists. In the survey, in addition to question response selections, the participants were given open-ended response provisions, where greater discussion space was offered. In the interviews and focus groups, the unstructured nature of these sessions enabled the tween to contribute any details they desired (refer to sections 3.14 and 3.15 for further information about the structure of the survey, interviews and focus groups).

4.3.1. Access And Ownership

Access to and ownership of mobile devices for all survey respondents was quite significant (see Table 9). All data percentages have been rounded to the nearest percentage. The devices listed as “other” were primarily Nintendo, Xbox, Kindle, iPod, FitBit, Alexa, Google Home and PS4 devices.

Table 9*Access And Ownership To Devices By Survey Respondents (N=1,113)*

Device	Access	Ownership	Ownership difference to access
Laptop	96%	89%	7%
Smartphone	97%	88%	9%
Tablet	87%	57%	30%
smartwatch	60%	34%	25%
‘Other’	15%	n/a	n/a

As noted in Table 9, the tweens indicated a high level of access to mobile devices in the home or elsewhere. The exact location of access was not determined in this study.

Following the question about general access, the participants were asked about the devices they personally owned. The responses for the group as a whole indicate that the majority of the participating children own the laptops and smartphones that they have access to, with less than 10 percent of the tweens having to share these devices with other household members. Greater variances are shown regarding tablets and smartwatches, with less overall personal ownership, indicating a higher probability of sharing for these devices.

There appears to be an overall growth of personal ownership of mobile devices as the children transition through the tween years towards adolescence. With increasing age, the tweens appear to be provided greater individual ownership of the devices they use (Table 10).

The type of devices owned by the tweens also shifted from the younger tweens (9-11 years) who predominantly owned tablet devices and smartphones, to the older group (ages 12-13) who were more likely to own a smartphone and laptop (see Table 10).

Table 10

Personal Ownership Of Specific Mobile Devices Per Age Group - Survey Respondents (N = 1012)

Number of respondents	Age	Laptop	Smartphone	Tablet	Smartwatch	Average number of devices per tween
17	9	3	5	12	4	1.4
95	10	56	54	45	26	1.9
243	11	165	146	116	71	2.0
333	12	275	282	182	108	2.5
457	13	392	394	219	125	2.5

The information displayed indicates that ownership of devices increases as children transition from primary school (elementary school) into secondary school (ages 12-13). Note that in Australia, where this study was undertaken, secondary school education begins in year 7, usually when children are around ages 12-13 (Australian Trade & Investment Commission, 2020). In other education sectors globally, this age group corresponds with tweens transitioning into junior high school or in the top end of middle school.

In addition to ownership, the tweens were asked to indicate which of the devices they use most frequently. The graph in Figure 4.5 shows the tweens' first and second choices combined (blue).

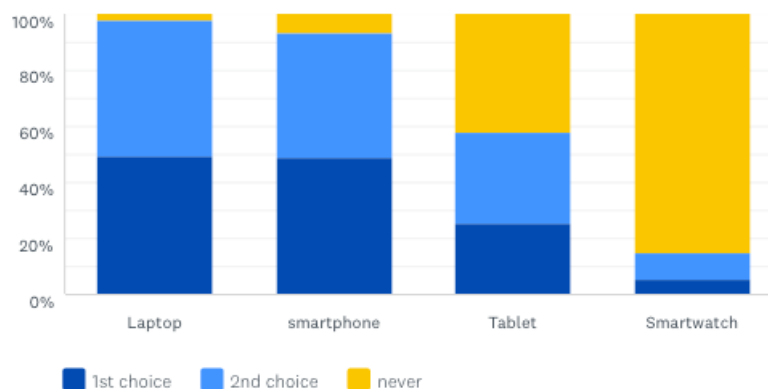


Figure 4.5 Which device do you use most often? (n=1,012)

Participants were asked to select the devices in order of preference to establish “*which device do you use most often*” Table 11 provides a summary of the responses submitted (1,012 responses), with both smartphones and laptops being indicated as the most popular choice of devices, combining selections of first and second preferences. In the process of selecting preferences, participants were given an option to select ‘never use’ if this was applicable to a specific device (see Table 11).

Table 11

Indication Of Devices Never Used By Tweens – Survey Responses (N=1,012)

Device	Percentage – do not use this device	Number of responses – do not ever use this device
Laptop	1.9%	17
Smartphone	6%	56
Tablet	42%	175
Smartwatch	85%	582

First and second choices were combined to indicate overall preferences, ensuring that the different uses of the devices be included in this data. The responses show that laptops and smartphones were reasonably equally selected as both first and second choices, whereas tablets were only selected in either of these categories by approximately 50 respondents. Smartwatches are shown as reflecting very small numbers of being selected as first or second choice devices, but as previously noted, this is possibly, at least in part, a response to the low numbers being owned or accessed by the participants.

The data further demonstrates that only a very small minority of tweens, just under 2% indicated that they do not use a laptop in everyday activities, with a small number (6%) of the tweens not using a smartphone, whereas close to 42% specified they don’t use a tablet and 85% state they do not use a smartwatch.

4.3.2.Laptops, Smartphones And Tablets

The devices presented as the most frequently used by the tweens in the survey - laptops and smartphones was supported by responses in the interviews and focus group

discussions, with a many of the participants sharing that the only devices they used were laptops and smartphones. Some examples of the comments shared include:

"I really only use my laptop and phone...sometimes Ill'play a game on the tablet with my brother, but really I don't use it for most things." (Jimmy)

"Do I use a tablet...no, never. I pretty much just use my laptop for all my schoolwork and for watching stuff and my phone for all the other things I like to do." (Alice)

"I'd never use a tablet...I haven't used one for a couple of years now...they're really just for little kids for playing around." (Jennie)

In the survey, the tweens also submitted responses regarding the number of hours they used various mobile devices the day prior to completing the questionnaire (Table 12).

Table 12

Time Spent "The Day Before" On Each Device (N= 1,005)

Device	0 hours	Up to 1 hour	1-3 hours	More than 3 hours
Laptop	12%	25%	29%	34%
Smartphone	23%	37%	28%	12%
Tablet	80%	12%	5%	3%
Smartwatch	85%	11%	<1%	3.1%

The majority of tweens used a laptop or smartphone, with few children indicating the use of a tablet device for more than one hour. This information reflects the data previously submitted regarding device preferences, with the majority of time spent using laptops, smartphones, tablets and smartwatches correlating well with device of choice selections (see Table 13).

Table 13*Comparison Of Device Choices And Hours Used Per Day (N = 1,005)*

Device	1 st choice of use	Used 1 to 3+ hours per day
Laptop	42%	89%
smartphone	43%	80%
tablet	10%	20%
smartwatch	3%	15.5%

Overall, approximately 50 percent of the tweens indicated that they spent 1-3 hours per day using both a laptop and smartphone. There was no indication of how much of this time was overlapping or separate, as this was not qualified in the questionnaire.

Approximately one third used a laptop for more than 3 hours and 13 percent a smartphone for this same period of time. The precise number of “more than 3 hours” was not recorded in this data, reflecting that there is no way of defining from the data, the actual hours of use more specifically, or knowing just how long these participants were using their devices collectively or individually.

Discussions in interviews and focus groups provided further insight into the amount of time the tweens spend on their devices. Overall, the reflections from the tweens were focused on the difficulty they had in trying to determine exact amounts of time spent using a particular device. The tweens could discuss whether they used a device a lot, if this was more than other devices - or not at all, and what they used the device for, but indicated quite openly they actually had no real idea how long they spent using any of them.

For the tweens who participated in this study, most of their devices appeared to be integrated into the day, with the user reflecting they were not really cognisant of how much time they were using the device for on any specific activity – or across the entire day. The children discussed that when responding to these questions in the survey, many of their responses were guesses; based on how much collective time they thought they might have used a particular device. Later, when using screentime metrics from their phones as visual stimulus, many of the young people were quite surprised at the actual time they used the device. Repeatedly, when considering the data presented, the participants reflected that the time spent was much greater than what they had estimated,

demonstrating their unprompted use of the devices for many activities. For more details about the findings from the examination of screen metrics, see section 4.7.

4.3.3. Device Usage

Of interest, were the reasons given by the participants for how and why they used the laptops and smartphones. Table 14 illustrates the data submitted indicating smartphone, laptop and tablet use the previous day. The tweens were asked to determine if the usage was mostly schoolwork, mostly not schoolwork or a combination of the two. Participants were also able to select if they had not used the mobile devices the day before or if there was another main reason for usage.

Table 14

Survey Responses - Device Use The Day Before (N=1,005)

Mostly used for	Laptop	Smartphone	Tablet
Mostly schoolwork	60.5%	2.1%	1.1%
Mostly NOT schoolwork	5.0%	58.0%	13.7%
A mix of both	24.7%	9.6%	2.3%
Did not use	7.4%	16.4%	76.1%
Other	2.1%	13.62%	5.9%
Total responses	1,188	1,189	1,171

Responses in the survey indicated that the tweens used their laptops primarily for schoolwork, smartphones mostly not for schoolwork and tablets were mostly not used at all in this age group. Few ‘other’ reasons were given for the table or laptop, with the primary explanations suggesting the use of social media, contacting parents, texting friends, music and Netflix – all falling under the ‘not used for school criteria’. In the ‘other’ category for smartphones, the use of social media was highly represented, demonstrating that these young people are already immersed in social media. Later, in discussions with the tweens, indications would be that the majority of these social media interactions are supported by parents, but carefully scaffolded and managed. The use of social media is explored further in section 4.11.2.

It should be noted, however that specific issue of tweens using social media before the age of 13 has not been addressed in this study, as the overarching philosophy of the investigation was to be non-judgmental about specific behaviours and actions. The key focus of this study was to understand ‘what’s happening’ through the experiences of participants when using mobile devices and not focus on the appropriateness of the activity itself.

The use of social media by tweens was explored widely in section 1.4 (Chapter 1), presenting important information about concepts such as the ‘legality’ of use by children under 13. The identified section also discusses the ethical obligations that were required for disclosure of any dangerous or threatening behaviours by participants during this study.

4.3.4.Laptop Use

The following comments are a summary of the contributions from the tweens in the open ended responses for this question Table 15 depicts reasons given for using laptops in the past 24 hours.

Table 15

Reasons For Using Laptop – Survey Responses (N=25)

Reason	Comment
School related	<i>I don't use a tablet, no, I pretty much just use my laptop for schoolwork</i>
	<i>I use my laptop for schoolwork most of the time and don't use my iPad</i>
	<i>Most of my school stuff is on my laptop</i>
	<i>The good thing is, I use my laptop in class, so all my information is there when I want it, no matter where I am</i>
	<i>Most definitely my laptop I use a lot for school purposes</i>
	<i>I use my laptop for school purposes most of the time and don't use my iPad any more</i>
	<i>We use our laptops in class most of the time – we're not allowed to use our phones</i>
	<i>Mostly schoolwork, but I also use my laptop for music practice</i>
	<i>My laptop is mostly just school stuff – homework and work at school</i>

Reason	Comment
Management	<i>If the time is over on my phone, I can use my laptop for looking up more information</i> <i>I use my laptop because personally, I like the way I can control things</i> <i>The laptop has a bigger screen, so I like to use it instead of the mobile phone, it's easier to touch type than on my phone</i>
Social or entertainment	<i>I use my laptop for watching movies</i> <i>YouTube is better on my laptop</i> <i>Laptop is good for games</i>

4.3.5.Smartphone Use

The tweens also shared how they used their smartphones the day prior to answering the survey. Many children (58%) indicated that the majority of their time using these devices was NOT for schoolwork. Their reasons, along with indications of how they did use smartphones are shown in Table 16.

Table 16

Reasons For Using Smartphone - Survey Responses (N=144)

Reason	Comment
School related	<i>It was no for school because we're not allowed to use them [phones] at school</i> <i>I don't use my phone during weekdays</i> <i>I don't do any schoolwork on my phone</i> <i>No schoolwork – just Pinterest</i> <i>Only non-schoolwork</i>
Management/personal	<i>Telling the time</i> <i>I need it for the train timetable</i> <i>Checking the weather</i>
Social	<i>To contact my family and a little bit of YouTube</i> <i>Calling my mum</i> <i>Contacting parents/family members/grandparents</i>

Reason	Comment
Entertainment	<i>Texting</i>
	<i>Instagram</i>
	<i>Messaging friends</i>
	<i>Looking at the time and texting</i>
	<i>Mostly social media</i>
	<i>Games and communication</i>
	<i>Taking photos, social media</i>
	<i>Listening to music</i>
	<i>Playing cards</i>

Reflecting on their use of smartphones, the tweens who were interviewed were equally as open-minded in their responses, providing a range of reasons for how and why they used these devices. Overall, the reasons were varied, however, convenience, personalisation and connectivity were two of the key aspects of smartphone use described most often by the tweens in both 1:1 interviews and focus groups. The following comments (Table 17) summarise the key contributions shared during these sessions:

Table 17

Perspectives For Using Smartphones Shared During Interviews & Focus Groups

Reason	Perspective
Convenience	<i>I like my phone for how easy it is to take – it just fits into your pocket, so it's there all the time if I need it</i>
	<i>I read a lot on my phone, I can read whenever I like because my phone is in my pocket and I can get a new book straight away using the internet</i>
	<i>Your phone is just there in your pocket so you can take photos of information when you need to and you have it for later – it's better than trying to write it down</i>
	<i>A phone will do when a laptop isn't available</i>
	<i>You can quickly check anything you need because it's [the phone] just there</i> <i>I've got my phone – I like to check on the train time</i>

Reason	Perspective
Personal	<p><i>I like how it's just there whenever I need it, I can take a photo, look something up, like a word I don't know or send a message to mum if I'm not sure what she wanted me to do after school</i></p> <p><i>Some days I use my phone more than others – if I'm sad, I'll just watch some memes or YouTube videos to make me laugh</i></p> <p><i>It's great when you're bored, I can just listen to my music or watch YouTube videos</i></p> <p><i>Some days I use my phone more than others – if I'm sad, I'll just watch some memes or YouTube videos to make me laugh</i></p>
Connectivity/social	<p><i>I can play a game with my friends even when they're not around</i></p> <p><i>I'll text my friends while I'm walking home</i></p> <p><i>I like how I can just keep in touch with all my friends, see what they're doing and send them a message whenever I want</i></p>

The tweens reflected on the functions of the phone that enabled them to be in contact with the people they need or choose to do this with, but also to learn in their own way, using apps and other inbuilt features. The perspectives of the tweens regarding their use of smartphones are presented in Table 18.

Table 18

Functions Of The Smartphone Shared By Tweens In Interviews And Focus Groups

Function	Perspective
Convenience	<p><i>I make flashcards for revision – and then you don't have to carry a lot of stuff around</i></p> <p><i>I can work on school documents here even when I don't have my laptop – it's all just there on the app</i></p> <p><i>We get messages through the school app for classroom changes, things we have to remember and other stuff for school</i></p>

Function	Perspective
	<p><i>I don't need any special equipment, it's all just there on my phone</i></p> <p><i>I like the way my phone connects to everything else</i></p> <p><i>There are so many apps, if I don't like one, I can just delete it and look for another that will work better</i></p>
Personal learning	<p><i>I can hear myself saying the words in Japanese and I can check on the app to see if I'm saying it properly</i></p> <p><i>I can use my phone to practise music</i></p> <p><i>It has different ways of teaching you – I can get a different feel from the way the teacher is teaching me</i></p> <p><i>I can record myself playing [instrument] and listen back...it really helps me to improve...I don't need to keep asking for help</i></p>
Entertainment	<p><i>I listen to a lot of music because I can make a playlist and it's just the music I like</i></p> <p><i>I like to just chill out – my phone lets me listen to things I want because I can stream my own music wherever I am</i></p> <p><i>I can save things for later...I don't have to watch them when I have things to do, but I know they'll be available later on when I have time</i></p>

4.3.6. Tablet Use

The majority of tweens had indicated in the survey they did not use tablets. Table 19 demonstrates how the tweens, if they do elect to use a tablet device, choose activities, or why they don't use one if they have indicated that in the survey. While the number of children who did not use a tablet in the preceding 24 hours was high (80%), for those who did, most of the purpose focused not on schoolwork but rather on entertainment, social or personal use.

Table 19*Reasons For Using Tablet Devices - Survey Responses (N=1,003)*

Reason	Comment
School related	<i>Not for schoolwork</i>
Management/personal	<i>Tuning my violin</i>
Social	<i>YouTube</i>
Entertainment	<i>Games and communication</i> <i>Taking photos, social media</i> <i>Listening to music</i> <i>Playing cards</i>
Not used	<i>I can't find my tablet</i> <i>I don't have access to an iPad – we don't have one in our home</i> <i>Don't have one</i> <i>I think they're just for little kids really – I haven't used one since primary school</i>

During the interviews and focus groups, there were opportunities for the children to further explain when and how they might use tablets. The following excerpts are examples of some of the reasons why they might use a tablet device:

"The only time we use the iPad is Sunday nights when we FaceTime our grandparents"
(Harry)

"My younger brother and sister use an iPad, but they pretty much just play games and draw (Alice) and "we use them [iPads] at school because that's what they've given us"
(George).

In one of the focus group sessions, two of the children responded that they used an iPad for drawing, seeing these devices as a resource for a specific activity rather than a multi-purpose device like the smartphone: *"It's a lot easier to do it [draw] because I can actually see what I'm doing, I like looking down to see what I'm drawing. It's easier than*

on my phone because I can see the whole picture” and “I use my iPad a lot most days for drawing things...just sketching mostly” (FG).

4.3.7. Use Of Smartwatches

It is important when considering the data presented that smartwatch figures be considered within current ownership and/or access to these devices, as at the time of this study, tween ownership of smartwatches was relatively low, reflecting general global trends. At the time the research was undertaken, smartwatches had been on the market for a number of years, but the earlier devices had been designed more for adults. Devices being used by children had previously been limited in function and were often more novelty designed or used for parent-child safety connections (Wang, 2014). However, it should also be noted that the market share of smartwatches designed for children and adolescents currently reflects an overall increase (see chapter 2, section 2.3), indicating that the data in this study concerning device choices could plausibly reflect different trends in future research. Ownership of smartwatches amongst study participants was relatively small, representing approximately 33% of all respondents to this question, with further analysis of the data indicating that the percentage of ownership remains quite stable across the age groups (see Table 20).

Table 20

Smartwatch Ownership-Survey Responses (N=998)

Age group	Smartwatch ownership per age group
9 years	23%
10 years	27%
11 years	29%
12 years	32%
13 years	27%

Nevertheless, the discussions that focused on smartwatches, illustrate a new development to the ways in which tweens are using mobile devices. As previously noted, most of the

tweens who owned a smartwatch discussed how they really had little idea how much time they spent using the device during the day.

The tweens suggested that the time was not perceived as being measurable in hours, but more easily by what they used the devices for. The discussions focused primarily on how smartwatches were used primarily as an extension of mobile phones throughout the day, with little conscious recall of the actual amount of time each tween had used the device. The consensus was that they really had no idea how to measure those interactions. A comment shared by Tessa seemed to sum up the feelings of many of the other tweens: “*I actually have no idea...it’s just there, and I just use it whenever.*”

In the survey (open ended questions), interviews and focus groups, the tweens did, however, communicate quite specifically *how* they use their smartwatches, with key uses predominantly focusing on personal management, fitness, and communication, with some tweens exhibiting multiple, integrated uses. From this group of children, they appeared to not use the smartwatch for high levels of communication or social media. These themes have been used to present the key comments submitted by the tweens about their smartwatch interactions (Table 21).

Table 21

Smartwatch Uses Described In Surveys, Interviews And Focus Groups

Purpose	Perspective/explanation
Personal management	<p><i>Check time, stopwatch, timer, set alarms, receive notifications, set reminders</i></p> <p><i>I use it to check the time, see notifications for texts and stopwatch some timing things that I needed to do</i></p> <p><i>I use an alarm, timer and just check what the time is</i></p>
Fitness	<p><i>Count how many steps I do each day</i></p> <p><i>Watched the time, tracked my steps, track my distance on my hike, track my hike time and tracked my burnt calories</i></p> <p><i>Check the time, date and count my steps</i></p>

Purpose	Perspective/explanation
	<i>Check time, Count steps, Track sleep, Check heart rate (no games)</i> <i>Track my fitness and steps etc</i> <i>Count steps, heart rate, stairs, how many Km I walked</i> <i>Listen to music while I run</i>
Communication	<i>Call my mum but mostly my sister uses it because is hers</i> <i>Check if my mum has sent me a message – I can check in class time and not get into trouble for being on my phone</i>
Social	<i>Looking up Wechat (Social Media) and time</i>
Multiple purposes	<i>I just play with the zoom feature, check the time, manage my steps, walk when it tells me to, breathe when the mantra pops up, basically to manage my fitness</i> <i>I text, call, weather, stopwatch, lots of things</i> <i>I use it to tell the time, tell the weather, text and call people</i> <i>Check the time and my heart rate, use the breathing app, look at photos, play games, text and call</i> <i>School and finding out the time and checking the train and listening to music on the train</i> <i>I text, call, weather, stopwatch, lots of things</i> <i>Time, stopwatch, flashlight, alarm, steps</i>

The tweens openly discussed how they like to be able to use their smartwatches as an extension of their phones, using them to quickly check on messages, often to see who has sent the text and its general purpose. They can then decide if the text requires a response or can wait until later. It seemed that for those who use a smartwatch rather than seeing them as a separate device, it's as if they are another component of their smartphone. The key element that came up in interviews and focus groups was the ease of access, as shared

by Hamish: *"You don't even have to go searching for the message, your watch is right there, on your arm"* and from Cassidy: *"I like the way it will buzz on my wrist so I can quickly check who the message is from and then decide if I need to answer it straight away...it's much easier than having to look at my phone"*.

4.3.8. Device Choices

Overall, the tweens indicated fluid choices between the key devices used, with a focus on personal preferences at the time, convenience and operability. Responses and patterns shared by tweens during the interviews and focus groups correlated with the key findings from the survey and offered opportunities for further explanation regarding device selection or choice. During these discussions, the tweens were able to describe reasons why their two primary devices were the laptop and smartphone, with the laptop being seen primarily as their "working" device and the smartphone or tablet (if used) being used largely for entertainment or social interactions. They talked about their choices openly and authentically, with most participants reflecting that they preferred to use their smartphones for social, communication and entertainment purposes, while their laptops were primarily used for schoolwork.

The tweens were quite matter of fact about the reasons they used the devices, with some quite accepting of the status quo for device decisions at school, while others were less tolerant of this, preferring to make their own decisions about the devices they use.

George mentioned: *"the laptop is your main thing, like you don't have to carry books anymore, everything's easier, it's all just there,"* and Tilda commented: *"I like to be able to quickly go to other places to find information and to be able to use it straight away. I usually only use my laptop and I found this year I've used it way more than I did before."* A personal explanation came from Millie, who focused on having to use what is available at school and particular aspects of use that impacted on her device choice: *"I use my laptop at school because that's what we have at school and that's just your device that you use...I don't like writing on the tablet because I don't like tapping on the screen."*

The preference for laptops was sometimes overridden by other factors such as portability and convenience, as Cassidy noted: *"I like to use a laptop for writing and research, but we can't take our own laptops to school and I don't like using the laptops they give to us,*

so I don't use them that much. We're not supposed to use our phones, but I get so annoyed at the laptop that I just take out my phone and use it during class...my teachers know we're doing our work...I'm quite fast at typing, you just get used to it."

These findings reveal the presence of an integrated ecosystem in which the tweens exist, where they are not necessarily consciously aware of the mobile devices they choose, nor the time spent using any of the devices. Nevertheless, when asked specifically to reflect on use of mobile devices, these young people were able to clearly articulate the purpose of the different devices and why they select them for specific activities. These fluid options are made possible by their access to a collection of devices, with personal ownership increasing as the tweens transition into secondary school (in Australia) and adolescence. On average, by the time these children are getting close to teenage years, they have ownership of several devices, which they can personalise and use as they choose across the different activities and requirements of their day.

The tweens acknowledged the devices (mostly laptops) that they use primarily for schoolwork or other more 'serious' activities. George suggested: *"I use my laptop for schoolwork and homework and my phone for all the other stuff because it's just there in my pocket – you don't have to go looking for it,"* and from the focus group: *"On your laptop it's easier to organise things because you don't need to get flicking through pages to look for you know exactly what folder it's in – and you can just do a search."*

While there are some aspects of learning completed on the smaller devices (smartphones and smartwatches), the tweens readily reflect that these devices are more for social activities, communicating, social media or entertainment. They appear to be quite individual in how they use their devices and the choices they make regarding the device (rather than the brand of device), selecting what works for them. In a focus group session, one of the tweens reflected that he preferred using his laptop rather than a smartphone or tablet: *"Well I like to use it on the laptop because I like the controls better... I don't really like mobile devices that much. I just don't like using my fingers to tap on the screen."*

Tablets, on the whole, do not appear to be popular mobile devices for this age group, particularly as they move into the top sector of the age range, with many tweens reflecting that these devices are more for younger children or entertainment. Comments from the survey and discussion groups about how the tweens do – and don't use tablet devices are depicted in Table 22.

Table 22*Tweens' Perspectives On Tablet Device Use*

Focus	Examples
Personal use	<i>I like listening to a book</i>
Entertainment	<i>Most of the time I prefer to watch Netflix or a movie</i> <i>I play games to relax and do things with my friends</i> <i>Mostly I just watch YouTube</i>
Creative	<i>I use it for digital art/drawing – the screen is bigger</i> <i>I can access and use a lot of art apps</i> <i>It's easier for creating games because you can see more on the screen</i> <i>I use the iPad for coding when I don't have my laptop</i>
Learning	<i>I use one for piano scores</i> <i>Internet lessons – I use FaceTime</i> <i>I can set it up for tuning my violin</i>
Not used	<i>I would not use one for schoolwork</i> <i>Did not use a tablet in the past week</i>
Other	<i>I can't find my iPad</i> <i>I don't have access to an iPad</i>

4.4. Tweens' Interactions With Mobile Technology

The tweens in this study shared that they use their devices for a range of varied activities often presenting patterns that from an observer's perspective, might depict them predominately as passive consumers of media rather than active creators. The majority of responses reflected higher levels of tweens involved as consumers of information and

entertainment, with limited time involved in creative interests such as writing stories, creating videos or artistic pursuits (Table 23).

Table 23

Using a mobile device do you ever...survey responses (n=1,008)

Activity	A lot	Sometimes	Never
Search the internet	58%	37%	5%
Watch videos for fun	54 %	40%	6%
Watch people you follow on YouTube	43%	34%	21%
Watch videos about how to build, make or do something you are interested in?	23%	56%	21%
Watch videos about how to do something you need to know for school	13%	72%	15%
Do digital art or graphics	9%	34%	57%
Write stories, articles or blogs for pleasure	7%	31%	62%
Write computer programs (code)	7%	31%	62%
Create video or computer games	6%	18%	76%

The data demonstrates high levels of internet searching with over 90 percent of respondents searching the internet a lot or often. Just slightly less so, but still significant is the time given to watching videos for fun, then watching videos about how to do something. The tweens also spend a significant amount of time watching people they ‘follow ’ on the internet, mostly on YouTube. The data reflects that most tweens who participated in this study are viewing or searching for something on the internet (consuming), with relatively few children demonstrating that they are directly involved in participating in creative activities during the time spent on their mobile devices. The tweens were then provided an opportunity to further break down the activities they engage in when using mobile devices. The tweens were asked to identify the activities done in the previous 24 hours. Their responses are best demonstrated in a graph, showing the range of activities presented (Figure 4.6).

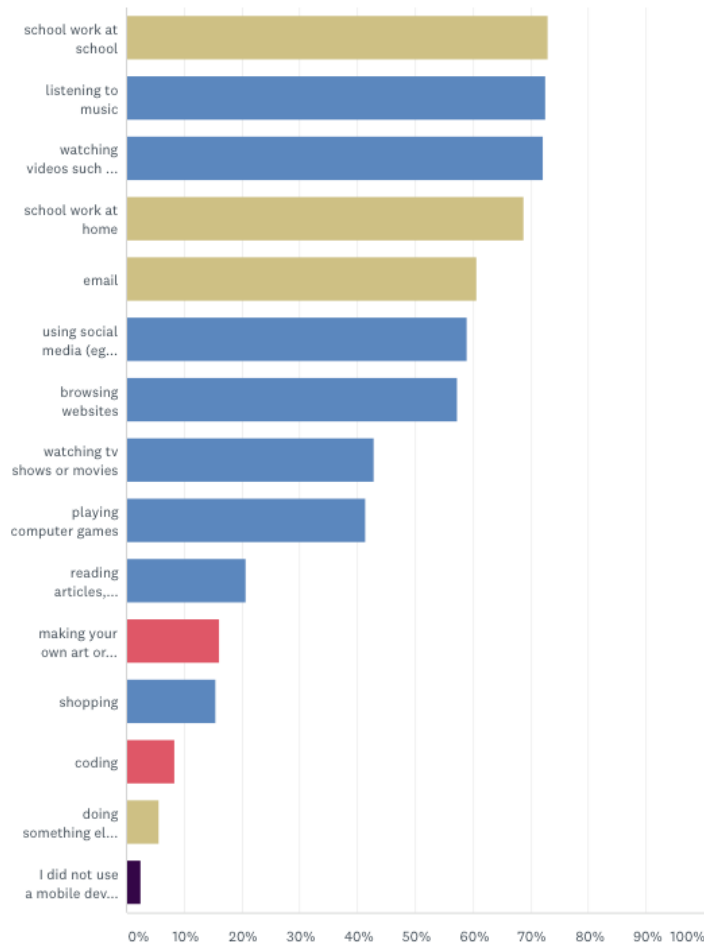


Figure 4.6 activities the previous 24 hours - survey responses (n=1,008)

The graph is collated from highest to lowest activity response, with beige indicating activities that cannot be determined for consuming or creating for example, schoolwork at school or emails; blue coloured graph bars depict consuming activities, red creative and the black bar at the bottom of the graph indicating that only 2% of the participants did not use their devices at all in the previous twenty-four hours.

The explanations shared by the respondents in the about their selection for ‘doing something else’, did indicate a slightly higher level of creative activities than consumer, with the participants specifying that they were actively involved in the activities shown in Table 24.

Table 24*Activities Listed Under 'Doing Other Things' - Survey Response (N=67)*

Activity	Number of responses
<i>Communication</i>	8
<i>Taking and/or editing photos</i>	5
<i>Animating</i>	2
<i>Drawing</i>	3
<i>Reading online</i>	3
<i>Listening to books</i>	6
<i>Doing puzzles</i>	1
<i>Minecraft</i>	5
<i>Checking school timetable</i>	4
<i>Designing things (eg on sketchup app)</i>	1

The account of device usage was corroborated closely by the tweens who shared personal stories during interviews and focus group discussions. When given the opportunity to discuss their activities, the participants demonstrated greater involvement in creative pursuits. This could be in part due to the tweens not having the time to fully reflect on their previous day when taking the survey, but also could reflect the timing of the responses, with most being completed during school time during the school week. The data shows a high degree of devices being used for schoolwork (72.9%) but also a similar figure for tweens stating they listened to music on their devices (72.6%) and watching videos on YouTube (68.9%). Worth noting is that the figures presented were a reflection of the activities mobile devices were used for, not specific amounts of time, which could have proven to be a useful breakdown of the responses.

In the focus groups and interviews, the tweens shared more explicitly the activities they had been involved in, with many demonstrating that although the activity may have been labeled as consuming, for example, watching YouTube, often the reason was for further development of other creative interests. The stories shared provided greater insight into how the tweens will often be immersed in apparently (just) consuming information via

YouTube, Pinterest, Instagram or other social media, but at least some of that time they are consuming directly to learn new ideas that will be implemented in their own creativity endeavours. The reflections from these discussions are summed up in Table 25, with the consuming activities and creative outcomes side by side to demonstrate the alignment between the two events.

Table 25

Tweens' Views Of Consuming And Creating Digital Content Using Mobile Devices

Consumption	Creation / Generation
<i>I watch and think whoa, that's a really cool art style (Jimmy)</i>	<i>Well, on my laptop I use photoshop...if I'm out with my friends, I might take a photo and then change it so it looks cool (Jimmy)</i>
<i>When I make videos for my tumbling, I'd like to be able to make the music, but I don't know how, so I just find music that I'm allowed to use that and add it to my video (FG)</i>	<i>So I used to have my dad video for me, but he isn't that good at it, so I worked out how to video myself and then after I've done my tumbling, I can edit the video (FG)</i>
<i>I watch lots of people who have tumbling accounts and I get ideas (FG)</i>	
<i>I watch YouTube videos and learn how different types of music is put together (George)</i>	<i>I make my own music for fun...like some of the music I make I just put in a folder and occasionally I'll come and open it and listen to it...it's cool...(George)</i>
<i>I spend hours on Instagram looking at videos people have made – and seeing what others have said about my videos (FG)</i>	<i>I spent twelve hours last weekend editing a video – not for school, just for fun – I made the music for it too (FG)</i>
<i>I'm obsessed with music and with dancing...I watch videos about people dancing all the time (Tessa)</i>	<i>But I can video my own dancing and then look to see where I'm not doing things right (Tessa)</i>

When investigated further during analysis, the survey data from those tweens who completed the survey on a Monday or Sunday, also reflected higher levels of creative activities in the previous 24 hours than their counterparts during the school week. This indicates that during the week, the tweens are spending more time using their devices for school related activities, whereas on weekends, they may have more time for creative focused interactions.

4.4.1. Tween Mobile Interactions at School

The same categories of questions as discussed in section 4.4, regarding the key focus of mobile activities were asked again of the participants in the survey, this time reflecting interactions over the previous week during school time. Similar patterns of use and interactions were reflected in these responses as the participants had previously shared (Figure 4.7)

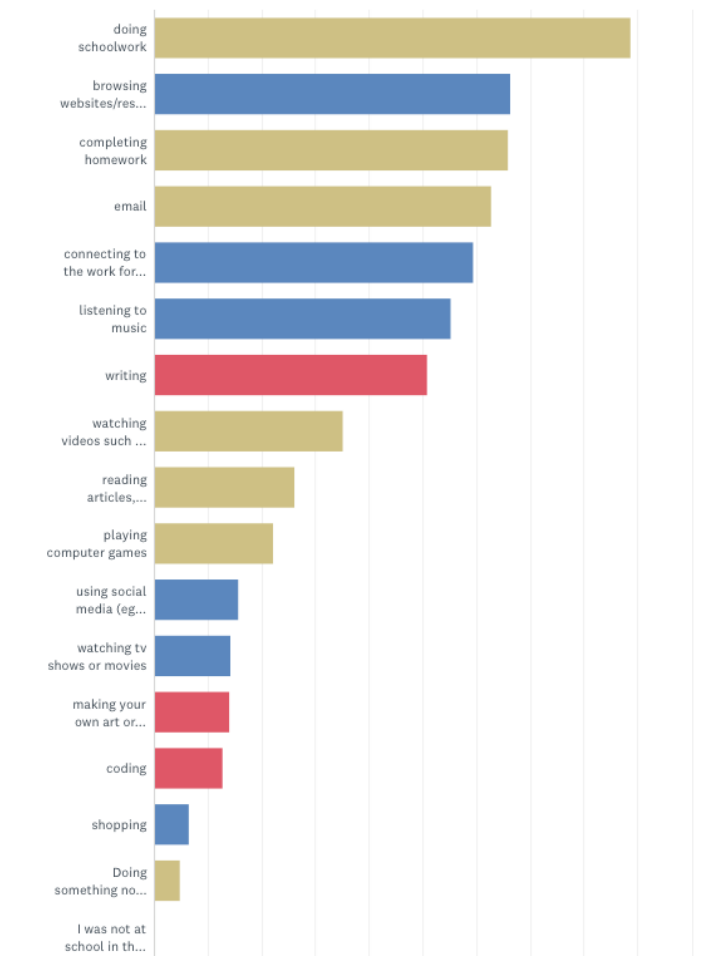


Figure 4.7 Tweens' activities using mobile devices over previous week at school (n=950)

Consistent colour coding as used previously has also been used in this graph (Figure 4.7), with beige indicating an inability to determine if the activity was consuming or creating (for example, schoolwork), blue consuming and the red graph bars indicating creative activities. Once again, the majority of activity using mobile devices appears to be either consuming or some degree of consuming and creating, estimating that at least some of the time spent doing the 'beige' activities would be passive, rather than active. However, as

noted previously, the activities highlighted are not necessarily being experienced alone and the students may be doing several at one time, thereby making the dissemination of consumer and creator activities harder to determine. Additionally, the questions did not specify time spent on the actual activities, with the indications being more about the types of activities rather than the degree to which they were undertaken across the day or week. The participants were able to provide additional explanations for their selection of ‘doing something else ’at school using mobile devices. The key responses are collated in Table 26.

Table 26

Tweens' Explanations Of 'Doing Other Things' During The School Week (N=54)

Activity	Number of responses
<i>Communication with others eg. texting</i>	10
<i>Taking and/or editing photos</i>	4
<i>Reading</i>	5
<i>Drawing</i>	3
<i>Duolingo/languages</i>	8
<i>Being tested</i>	12
<i>Presentations</i>	4
<i>Minecraft</i>	5
<i>Checking school timetable, time</i>	6
<i>Making or editing movies</i>	7

Of interest are the number of responses (8) where the participants note they “*did not use a mobile phone at school*” or that “*we’re not allowed mobile phones at school*” indicating that despite the instructions denoting that mobile devices included a laptop, mobile phone, tablet or smartwatch, that many respondents might have continued to infer that mobile related more specifically to smartphones rather than the whole range of devices.

4.5.Confidence And Capabilities

Although the tweens reflected that their focus on creating style activities is quite low, they have indicated that they are able to do many of these activities if required and are quite confident when using a range of devices. In Table 27, the responses focusing on general digital capabilities using mobile devices indicate strong skills across a range of technologically focused undertakings from the participants.

Table 27

Reflections Of Technology Capabilities From Survey Responses (N=1,010)

Capability	Yes	No	Not allowed
Create a document	98%	1%	1%
Find & save images online	96%	3%	1%
Create & use spreadsheet	87%	12%	1%
Create a video & post to YouTube	47%	12%	31%
Create a multi-media presentation	77%	18%	5%
Write/draw on digital text	78%	20%	2%
Submit work online	94%	5%	1%
Use a mobile device to practice skills	81%	17%	2%
Use a mobile device to create a product that uses text/video/audio	73%	23%	4%
Search for information online	97%	2%	1%
Collaborate or chat online with other students	85%	10%	5%
Find a book & read online	74%	24%	2%

Functional skills are well represented, with the vast majority of tweens demonstrating skills that might possibly be completed for school based activities such as creating a document, creating and using spreadsheets and submitting work online. Lower numbers were reflected for the creative focused capabilities such as creating a video, multi-media presentation or annotating text (write or draw on digital text). The numbers presenting for

tweens not being allowed to do specific activities are quite low overall, with the greatest numbers coming from posting to YouTube and creating multi-media presentations. Closer analysis of the data showed that most of the “I’m not allowed” responses came from the younger children in the group (9-10 years). These responses reflected age related permission from parents to partake of the activities, thereby not necessarily reflecting skill levels. Also, the question did not separate ‘making a video ’and posting the video to YouTube, which may have resulted in different levels of response from the participants, both for the ‘not allowed ’response and those who selected they are unable to do the activity.

The capabilities of the tweens were also reflected in their responses to questions about confidence when using technology. There were very few submissions from respondents indicating they had low levels of confidence, with most participants reflecting that they are either moderately or highly confident when undertaking most of the activities questioned (Table 28).

Table 28

Tweens’ Confidence When Using Mobile Devices Across A Range Of Activities (N=1,010)

Activity	High confidence	Moderate	Low
Using any mobile device	87%	12%	1%
Using the internet	88%	11%	1%
Finding & reading information	74%	24%	2%
Selecting resources	78%	20%	2%
Connecting with others	77%	19%	4%
Sharing resources	62%	32%	6%
Doing online homework activities	89%	10%	1%
Learning new skills	65%	32%	3%

The tweens of today are confident when using technology. They were provided an opportunity to contribute longer responses immediately after the questions about their confidence. Most of them spoke quite openly about how they love to use their devices to

access information, helping them to develop stronger skills in other areas. Their confidence grows across the use of the mobile devices and in the activity of interest. During the interviews, some of the tweens offered the following insights:

"I love to use the internet to read the news, I do it on the train a lot, I hated it at first, then my mum encouraged me to go on with reading because it provides me with so much extensive knowledge that my friends in my art class nicknamed me 'thesaurus of random facts', now I love it, even when my mum doesn't make me, I do read the news." (Hamish)

"I enjoy watching videos that are made by people with similar interests, I like to learn ideas off (sic) them. Like art ideas for example" (Harriet)

It would seem from the responses, that where the tweens have to use technology for functioning (perhaps learning activities) they have a lot of confidence and capability, driven by their perceptions of usefulness and desire.

Confidence and interest do not always align, and the tweens clearly indicated that just because they like using their mobile devices and being immersed in technology, doesn't mean they like *all* technology things. Some of the tweens indicated that they don't have skills in some areas of technology use, not because they don't have the capability to learn, but because they have limited interest or attraction to the endeavour.

This was indicated by Cassidy who explained that even though she's seen as quite clever and 'techie' by friends and family she just doesn't 'do' coding – something many people are surprised about when they ask: *"It's not that I can't code, I'm just not interested. Everyone thinks I should be, but I just don't see the point. My brother loves it and he's really quite good. He can already use some of the harder coding systems and he's only 9 years old."*

And from Issy: *"I am not confident when it comes to coding and photo shop but that's because I don't really like doing those things. The things I like doing, like making videos, I'm really confident there. I use some online editing software and can do some pretty cool things."*

4.5.1. Personal Relationship With Mobile Technology

Further comments presented by the survey respondents provided additional insights into their perspectives regarding their use of technology. While not indicative of all activities and pursuits, the excerpts below provide a glimpse into other actions that are undertaken by the tweens, particularly relating to their general well-being, mental health, sense of personal development and ‘just for fun ’(Table 29).

Table 29

Tweens’ Insights Into Personal Connection When Using Mobile Technologies

Focus	Views / Sample participant comments
Personal	<p><i>Not sure if this is supposed to be productive stuff or not, but I browse the app-store to find games I might like and put them on my wish list for later</i></p> <p><i>I like to research new things because I’m always curious</i></p> <p><i>Gaming has built my character as a person and it is a large part of who I am.</i></p> <p><i>Because I use it [YouTube] to learn how to do scooter tricks</i></p> <p><i>Because I love watching with my sister in bed after dinner</i></p> <p><i>I love writing short stories about a special person that has come into my life and has made me feel so much better than I used to</i></p> <p><i>It lets me interact with a completely different world, and I can become so many different things</i></p>
Wellbeing	<p><i>I like to find funny videos when I am sad.</i></p> <p><i>It makes me happy and I’m still able to work and do my daily activities, but music makes me feel confident</i></p> <p><i>It calms me down and allows me to work in a kind of silence to me</i></p> <p><i>It is relaxing because I cannot hear others yelling and mucking around.</i></p> <p><i>I enjoy listening to music as it calms me, and it is efficient to do so on my phone</i></p>
Fun	<p><i>I like to pretend I am doing a YouTube video or an ad, but I don’t post it. I do it for fun.</i></p> <p><i>I like to make fun vids to laugh at and have fun doing it</i></p>

Focus	Views / Sample participant comments
Entertainment	<i>I like to watch videos for fun and to find out new things</i>
	<i>Because it provides entertainment and can make me laugh</i>
	<i>I like to see what it's like in someone else's world and it keeps me entertained</i>
	<i>Because I can play with my friends, and it's really relaxing especially if I've had a long day or something like that</i>
Connecting	<i>I think YouTube is a fun platform because you can explore what you like and watch people you like do things you like</i>
	<i>Because I can talk to my friends when I am not with them</i>
	<i>Because I can talk to mates after and before school and during the weekend</i>
	<i>I like using social media to see funny memes and talk to my cousins and family or friends from my old school who I don't see much anymore</i>
	<i>I play games on my laptop so I can play with my stepdad</i>
	<i>I like the using messenger and Instagram because I get to speak with my friends about their day and see what they're up to</i>
Creative	<i>I like Social Media because is great to see what friends are doing and it's nice to chat to them when not at school</i>
	<i>I get to express my love for kpop and creativity through the use of editing apps such as picsart</i>
	<i>Playing games helps my brain think and get ideas for designs or games of my own.</i>
	<i>I enjoy watching videos that are made by people with similar interests, I like to learn ideas off them.</i>
	<i>I am into photography and I edit a lot</i>
Convenience	<i>Because I want to edit and make edits of NRL players as a way to entertain people</i>
	<i>I really like to read eBooks on my phone while I am public transport because then I don't have to carry around a heavy book</i>
	<i>I enjoy reading but don't go to the library often so I can read on my laptop and iPhone</i>
	<i>The laptop has a bigger screen than a mobile phone so it's better for games</i>

The comments made by the tweens show great diversity of interests and reasoning when explaining why they select certain activities when using their devices. It appears that the tweens use the technology that affords them the experience they need at the time. Very few of the responses identified the device used; rather the emphasis was on the experience and the value of that experience. They don't appear to be cognisant of the technology as the key object, but rather the focus is on the endeavor they are immersing themselves in at the time. Much of the emphasis in the tweens' reflections was on the connection with friends or family and noticeably a substantial emphasis on personal well-being.

In the interviews and focus groups, similar themes became evident as the tweens shared their experiences. They spoke about how and why they use the technologies that are always within reach *'it's in my pocket, it's with me all the time'* (Kristina) and from Millie: *"I read on my phone because it's just in my pocket and when I'm on the bus, if my friends aren't there, I can just read."*

The findings in this section provide rich insights into the diversity of activities the tweens have displayed through their responses. Through the innumerable experiences shared and multiplicity of the affordances of mobile technologies, the pre-adolescent experiences a world vastly different to those who lived in pre mobile times. The implications and further investigations into these concepts will be explored more broadly in Chapter 5.

4.6. Spaces And Places

In the survey, interviews and focus group discussions, the responses across the age ranges showed a diversity of interaction from the tweens across time, space and place, when using their mobile devices. Responses for the question asking *"where do you use your devices"* are depicted in Table 30.

Table 30

Places Of Use For Mobile Devices - Survey Responses (N=1,011)

Location	Response rate
Home	98%
School	78%

Location	Response rate
In my bedroom	72%
Other places in the house	76%
In the car	58%
On the bus/train	60%
In a library	34%
Other	4%

In addition to selecting from the spaces and places provided in the question, participants could choose to add a location of their own. Forty-three tweens chose to contribute demonstrating a wide range of locations – their responses are shown in Table 31.

Table 31

Other Places Of Use Identified Or Explained (N=43)

Other places of use	Location
Outdoors	Park, or beach
	Walking home/from sport to the boarding house/
	Backyard
	In the garden
Indoors	Shopping centre
	Restaurant
	At a friend's house
	Toilet
Other places	When I'm training
	Everywhere I go/pretty much anywhere
	At skating/dancing/

The inquiry about *where* mobile devices are being used was followed by a question focusing on *when* the tweens are using their devices. In this question, the types of devices were separated so that patterns of use might be further identified (Table 32).

Table 32

When Tweens Are Using Their Mobile Devices (N= 1,010)

Time of use	Laptop	Smartphone	Tablet	Smartwatch
Before school	17%	61%	10%	23%
On the way to school	4%	59%	2%	20%
During school	85%	58%	4%	22%
On the way home from school	6%	63%	2%	19%
After school	83%	80%	36%	22%
After dinner	57%	52%	23%	15%
In bed before going to sleep	13%	31%	11%	12%
Never	2%	7%	52%	70%

The tweens were offered the opportunity to further explain some of their responses to this question about when they use their devices. The following comments summarise the key explanations submitted (Table 33).

Table 33

Further Explanations By Tweens For When They Use Mobile Devices (N=38)

Device	Explanation (temporal aspects)
Smartphone	<p><i>Mobile Phone I use during the weekends</i></p> <p><i>I also use my phone after school walking to different activities</i></p> <p><i>I use my phone occasionally at school (with permission) - to check whether I catch a train home</i></p>

Device	Explanation (temporal aspects)
Smartwatch	<p><i>I don't use my Apple watch in any of the above times, I use it rarely during the day</i></p> <p><i>Put my smartwatch on and check times during school and check notifications before and afterschool</i></p> <p><i>I always use my smartwatch</i></p>
Tablet	<p><i>Tablet I use during the weekends only</i></p> <p><i>I use my tablet during school time for note taking instead of using paper. You can handwrite on the iPad</i></p> <p><i>iPad - Rarely use, if I use it, I use it on the weekends</i></p> <p><i>For tablet I only use it every so often randomly, so none of these boxes tick</i></p> <p><i>Only use a tablet on the holidays</i></p> <p><i>I normally use the tablet just to find sheet music when I'm at music rehearsals</i></p>
Other	<p><i>I'm not allowed to use electronics during the week, only on the weekend</i></p> <p><i>Weekends only – I'm not allowed during the week</i></p> <p><i>Nintendo Switch after school</i></p> <p><i>Weekends for relaxation purposes</i></p>

In the interviews and focus group discussions the tweens also revealed where and when they use their mobile devices. As was presented in the survey responses, the tweens reflected that they use their different mobile devices across the range of the day, transversing a diverse array of locations and for a multiplicity of purposes. The tweens reflected on the reasons for where and why they use their devices. It was suggested in one of the focus groups: *“During the day, I use my laptop the most [it’s what we have to use at school], and then second to that is my phone”* while from Jennie: *“Seriously, I don’t know, I just use whatever I need to use at the time.”*

For many of the tweens, their use of the mobile devices is effortless and organic. The devices are with them at all times, so the concept of where and when they use them is not necessarily something they consider deeply. Location is something they can reflect upon but is not something they think about at the time. They are more conscious of what they're doing, than when and where they use their devices.

4.7. Screen Time

Screentime data is a relatively new application feature on smartphones and tablets, becoming available in 2018 on all iOS devices and via apps on Androids. Most participants were easily able to locate and share this data. Nevertheless, as a back-up for those taking part in the interviews and focus groups, a video was made to demonstrate how to do this on both iOS and Android devices. This video was available to the parents and child when they accessed the consent form for the interviews (see Chapter 5, section 5.11)

Data shared by survey respondents and those who participated in phase 2 of this study was varied, with no specifically identifiable patterns of use regarding time, notifications, pick-ups or apps used most. Examples of the data from tweens' smartphones is shown in Figure 4.8.

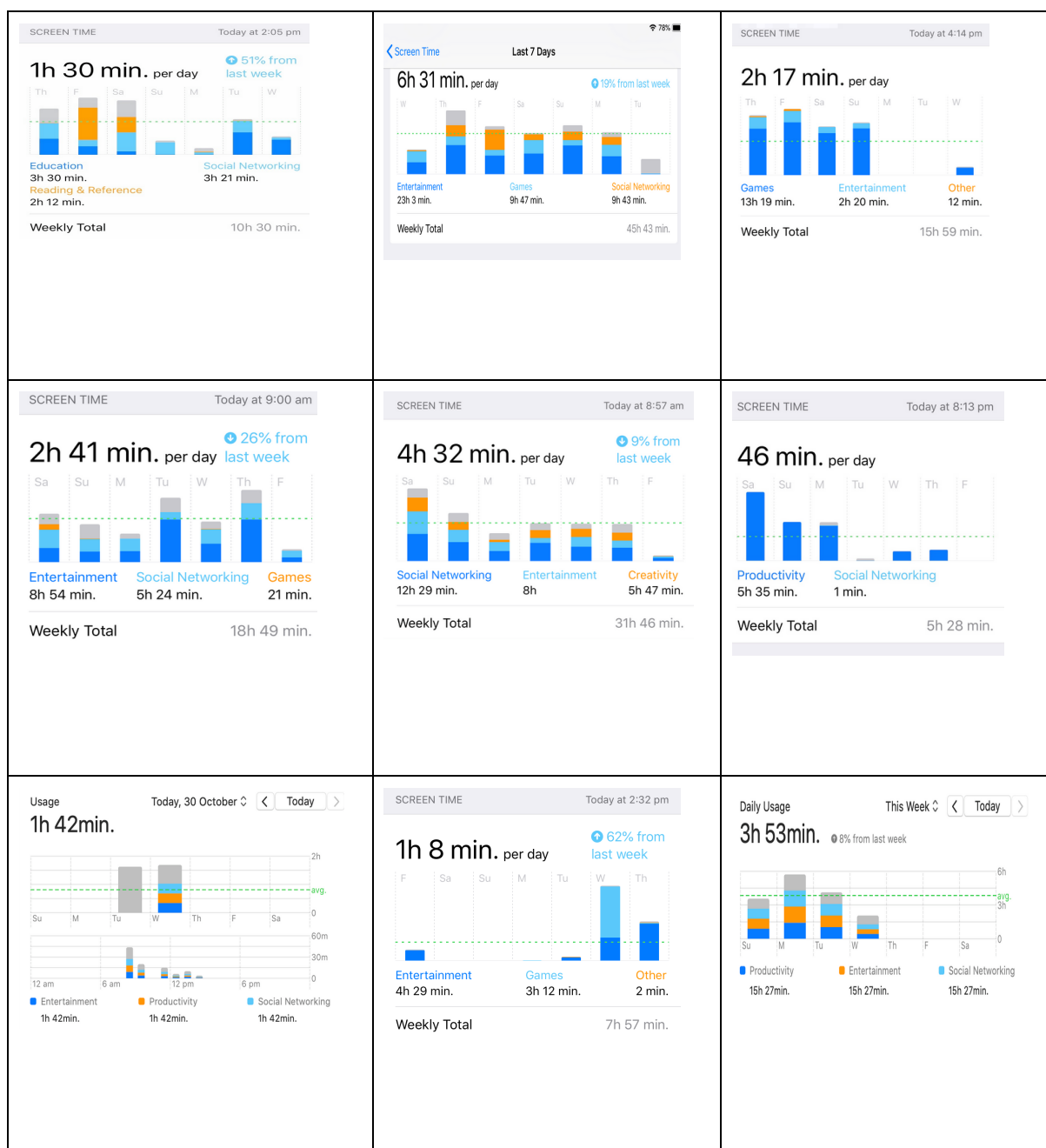


Figure 4.8 Sample participants' screentime data for previous week

The screenshots in figure 4.8 demonstrate the diversity of the data shared by the tweens and the richness of the information automatically generated by the operating systems of the different mobile devices. Overall, this data was most useful to demonstrate the individuality of the tweens' use of their devices and for visual stimulus during the interview and focus group discussions. Each data set provides information about the length of time the devices have been used on a single day and/or over a week, with the

average time spent, applications used and time of day the different interactions were undertaken. Further review of the screentime data recorded is discussed further in Chapter 5.

4.8. Implications Of Device Access

The tweens were asked about types of mobile devices they use – and why. The data contributed about the types of devices used by the participants, overwhelmingly favours iOS devices. The tweens explained that for most of them, this was about how everything connects together – and because most of their friends have the same devices, they can communicate more easily. It appeared from these responses that social acceptability; connectivity and interoperability are major factors in the selection of the brand and type of device used.

Many of the students also indicated that their devices, particularly smartphones, were hand-me-downs from older siblings or parents, so there had been limited personal choice made for decisions about the actual device being used. Essentially, because of their age and place in the family structure, it seemed they had to make do with what they were given when older siblings or parents updated personal devices. Harry responded with:

“This used to be my sister’s...and that got mum and dad thinking about if I could put the phone in my bag and just leave it there...they said, why don’t we give Maddie [not her real name] our old phone and we can give you Maddie’s...and they agreed to do that together.” From both Issy and Millie: *“mum was getting a new phone, so she gave me hers”*, and from Alice: *“I’ll be getting a phone of my own when I turn 15, but for now, I have to keep this one, it used to be my dad’s.”*

Ninety-one respondents added ‘other’ devices, with the majority of these being FitBit (fitness measuring) and kindle-type devices (for reading eBooks). A number of responses to ‘other’ for the types of mobile devices used, included the Nintendo switch, Xbox or PS4 (all game-based devices). While these devices are not technically ‘mobile’ the tweens identified them as part of this genre. Perhaps, for some of the tweens, the concept of ‘mobile’ was not a considered factor, as others included their gaming PC and smart televisions within these responses.

During the interviews and focus groups, several of the tweens who use these devices, provided further explanations, clarifying that they can connect with friends and socialise with others while playing a game on the device. The tweens' responses indicated that for there may not be any one specific item that constitutes a mobile device, but rather that any technology that enables connectivity, socialisation is seen as being within this genre.

The tweens discussed how they are able to connect with others (known and unknown) while playing games – this might be through their game devices or using laptops and phones as a game device through different apps: *"You see random people and they can voice chat with you... You can meet them if you want. It never went too serious. It's just people asking questions about the game."* (FG). Hamish also explained how using his various devices for games and connecting provides him with the social associations he enjoys, indicating that the device could be his mobile device – or might be his specific game devices. The device decision was not his concern; it was more about time, place and availability of the game.

The mobility of access to the game appeared to be more the driving factor in this aspect of technology use – where and when could the game be accessed. When several devices were available, then the decision would be for the one that provided the best game playing environment (bigger screen, higher quality sound cards). Hamish suggested: *"It's purely just playing the game...I play it on the bus on the way home from school, it's okay. But when I get home, I go onto my Xbox and then I can play with my friends from other schools. We can just all hang out together"*

As the issue of game playing and associated social interactions emerged as a significant theme throughout the tweens' responses, this issue has been explored further as an additional aspect of this study. Games (as a consumer and creator) as an element of the tween digital ecology will be explored in more detail in section 4.12.

During the discussion groups, the students also considered the differences between the devices they owned or had access to outside of school and those provided by the schools. This issue was raised when discussing where and when the tweens use their devices. The majority of school-supplied devices were said to be tablets and small laptops, usually not the same as the ones the tweens would use at home. Data about devices used at school was not sought in the survey so there are no comparative figures available. Nevertheless, when the tweens discussed their perspectives about the school supplied devices, they

indicated that they preferred to use their own devices if possible and that those provided at school were often not readily available or did not function as they would like.

Furthermore, many school devices were considered dated and inefficient, as reflected by Kristina: *"The laptops at school are really old, and I can't do anything on them. They take ages to start up, which means you lose class time and most of the time they just don't work properly."*

The sense of connectivity between their own devices (not available when using school devices) was also a factor suggested by the tweens when exploring this issue.

Harriet who added: *"I just like the way all my own things connect"* and from Jimmy: *"My watch and phone connect together, and I can get all my schoolwork, books and other things across all my devices."*

Tweens in one of the focus groups also mentioned that *"the laptops from school don't connect to the internet very well, so we don't really do much with them in class"* and from Cassidy: *"I can't use the devices at school, because they are so old, and our internet is blocked. So, we just use our phones to look stuff up if we need to."*

The tweens appeared quite pragmatic about the differences between what they could do at school and what they do at home, although Hamish was less than enthusiastic about his experiences:

"Well, yeah we have computers in the library for us doing work that's quite boring. Really. We have laptops in our library when we actually need such things. And then we have a big box of iPods that will go around from class to class if we need them. But they're pretty old and they don't have much on them that you can use. It's pretty frustrating really. But we're not allowed to bring our own laptops or phones."

An alternative experience shared in a focus group, reflected that there were high expectations from the school, for all students to be connected and technically capable – but with occasional implications: *"You are expected to kind of have a laptop and that laptop [is] your main way of getting all the information you need for classes. Everything is on the school portal."* The group however, also noted: *"When Wi-Fi cuts off at school, they just tell you to do homework or something, but most homework is online. So that's*

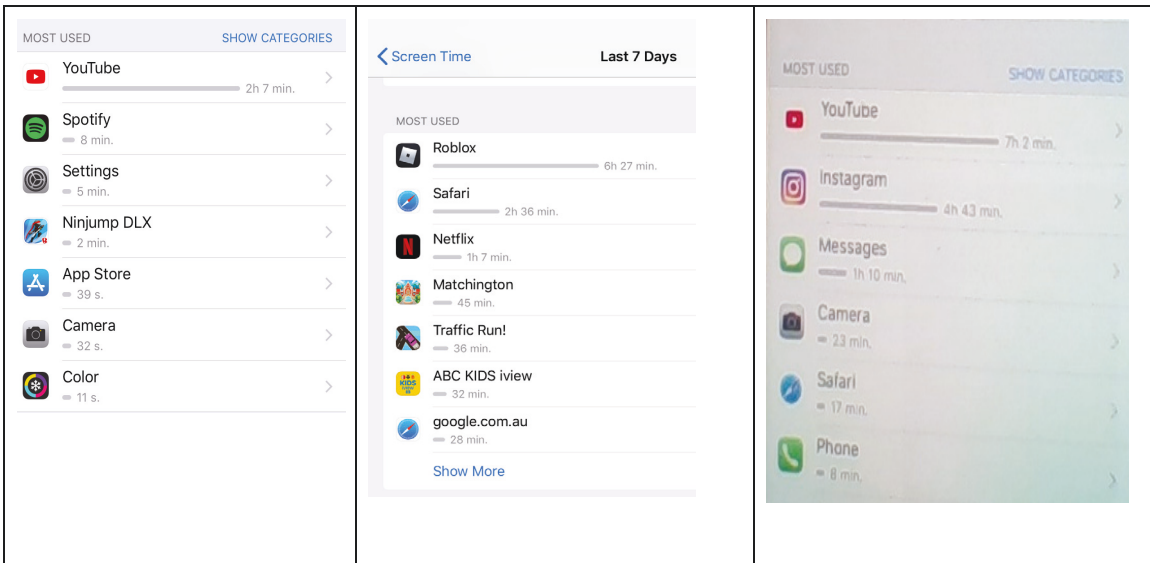
not happening.” One person in the group suggested: “I just connect to my phone even though we’re really not supposed to – but what else is there?” (FG)

In an interview reflecting on a different experience, Millie recounted that while at home, she was creating games and doing coding, at school she used the computer to type up her poem she had written – then she would email the poem home and create an interactive e-version on Book Creator (eBook development app): “I just type it up at school so I can take it home and make better.” When questioned about presenting that at school, she indicated this was not done, but rather she would publish her poems online for family and friends to read.

This divergence in home and school experiences was a key finding during analysis, with many of the tweens recounting the things they would do at home or outside of school time and note that they had little or no opportunity to do these things during the school day.

4.9. App Choices And Preferences

The tweens also submitted data from their smartphones regarding the apps most used (Figure 4.9). As per the screentime data, no specific or identifiable patterns were displayed, with individuality and personalisation being the key indicators reflecting tweens’ app usage and preferences.



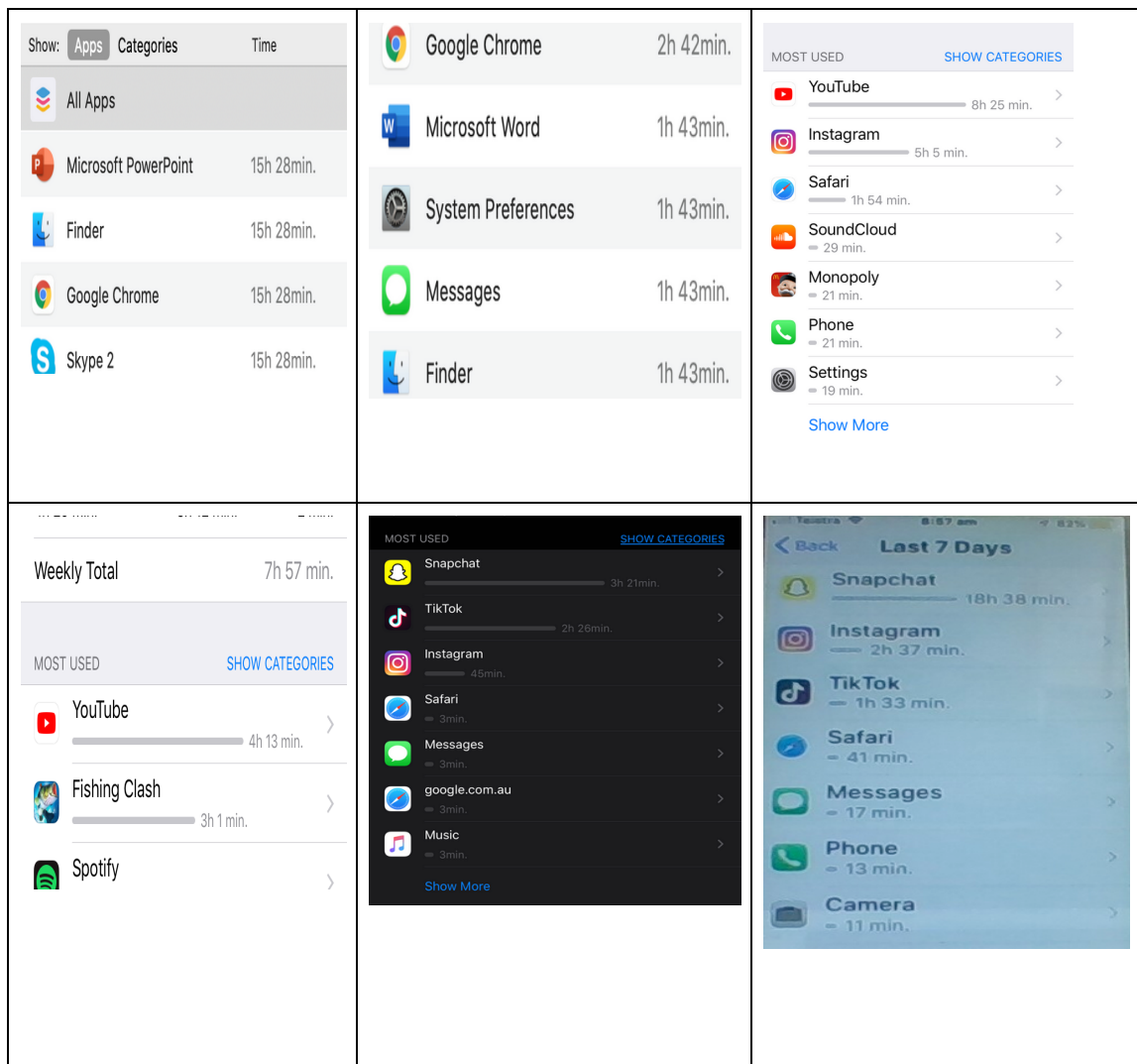


Figure 4.9 Most used apps - survey and phase 2 responses

The respondents to the survey were also asked to contribute three apps they liked to use most. In all, there were in excess of 3,000 individual responses, with 1090 respondents contributing three apps apiece. Table 34 depicts the most frequently contributed apps by the tweens overall, grouped into those submitted 100 or more times and those between 20 and 100.

Most Frequently Submitted Apps Contributed By Tweens (N=921)

App	Number 100+	App	Number <100
YouTube (video)	445	Whatsapp (communication)	79
Instagram (social media)	440	Clash Royale (game)	74
Snapchat (social media)	218	Chrome (browser)	73
Spotify (music/social media)	188	WeChat (communication)	44
Tik Tok (social media)	137	Roblox (game)	43
Google (search engine)	130	Pinterest (social media)	41
Netflix (online streaming)	127	Facebook (social media)	25
Minecraft (game)	104	Fortnite (game)	20

The following word cloud is a visual representation of all the apps submitted by the participants (Figure 4.10). In a word cloud, the larger the word, the more frequently it was submitted, with smaller words being contributed a minimum of five times through the survey responses.

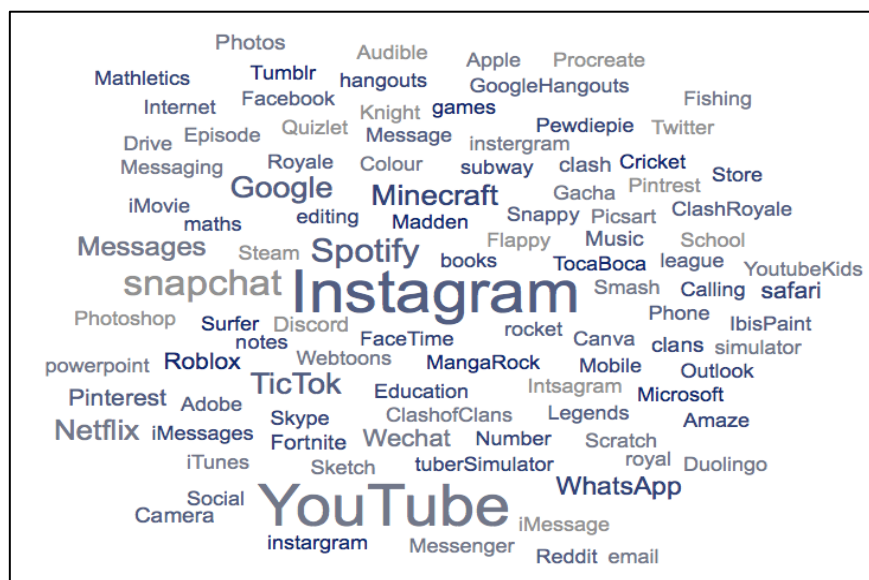


Figure 4.10 Apps I like to use - survey responses

As was observed in screentime data on the participants' devices, the apps submitted through the survey demonstrate a wide range of interest, covering many different types and purposes, implying high levels of individuality and choice. There are some more frequently suggested apps such as YouTube, Instagram, TikTok, Minecraft, Snapchat, Netflix and WhatsApp, as depicted by the size of the words in the word cloud, but there are also a great number of apps that have been shared only a few times, demonstrating diversity and personalised approaches to the use and experiences of mobile technologies by these young people.

From a range of responses regarding the use of mobile devices, YouTube and Instagram featured highly among the apps indicated by the tweens. Of interest is the relatively low number of contributions from some 'popular' apps that might have been considered commonly used among this age group, such as Fortnite. In the focus groups, the tweens discussed games such as this and indicated that while some of them do play the game, they would not necessarily list one particular game as their most commonly used app. The tweens indicated they did not give this question a lot of thought, but rather just added three apps they use, rather than prioritising them.

The broad range of apps in these responses reflects that many are used across the day for different purposes. The demographic of these users was also highlighted by the app choices with explanatory comments such as: *"Facebook is not really for young people; mostly older people use that"* (Alice). YouTube and Netflix are the most popular choices for watching videos and entertainment media with Millie suggesting *"I don't really watch the actual television much these days, most of the things I watch are on my laptop or phone...it's easier and I can just watch what I want without bothering anyone else."*

Tweens use apps, and often devices to suit their purpose. They will use an app if it gives them the experience they are seeking, as suggested in a focus group session: *"We all have I think called hangouts and it's a texting app...I joined because all my friends said 'you need to join hang out. We all have it,'" and "I wanted to talk to someone I didn't actually have an apple [using FaceTime] and you can't if they have a different phone...So you can have an android and he uses it on his computer [because he doesn't have a phone]."*

Hamish also indicated that the apps he selects are for a particular purpose: "Well I use Instagram quite a bit too I talk to some of my friends that are at other schools" and "On YouTube they usually look like some people playing video games I like."

YouTube rated highly on the apps selected by the tweens. There are a number of reasons given, primarily entertainment and learning, but at times for more personal reasons (Table 35).

Table 35

Youtube As A Key App Choice – Tweens' Perspectives

Key focus	Perspective
Entertainment	<p><i>"I watch YouTube videos that are Q & As ...so if it's even if it's like a mundane kind of question someone will be funny, and they'll do a funny answer. Yeah, it's entertaining.</i></p> <p><i>I can be entertained and watch other people play my favorite game</i></p> <p><i>I like watching what other people think and the videos can be funny</i></p> <p><i>It entertains me while I draw or do my homework</i></p> <p><i>It provides entertainment and can make me laugh</i></p> <p><i>Because when I watch a TV show [on YouTube] I am relaxed and calm and also entertained</i></p> <p><i>I like to see what it's like in someone else's world and it keeps me entertained</i></p>
Learning	<p><i>So, you can go in there to the YouTube and you can look at the way other people play it. ["Halo" game]. There's also people doing theories about what happens and doing funny things you can like to do in the game or like mods and glitches.</i></p> <p><i>I like to just watch the games I play on YouTube. I learn heaps that way</i></p> <p><i>Because you can watch funny, entertaining, and educational videos and talk to friends</i></p> <p><i>I can watch a mix of informative videos and videos for fun</i></p> <p><i>I watch videos about astrophysics, because that's what I'm interested in at the moment</i></p>

Key focus	Perspective
	<p><i>Because you can watch videos if you are struggling to do something and the videos are interesting and fun to watch.</i></p> <p><i>I like watching YouTube because it's interesting to watch some videos, I enjoy watching the videos about challenges and DIY's.</i></p> <p><i>I like watching challenges so then I can teach them to my sister and then we can play them.</i></p>
Personal	<p><i>I like watching people explore and travel around the world and do things maybe that I can't do</i></p> <p><i>I have been watching videos since kindergarten using iPads. I had a huge obsession with Minecraft and DIY videos and then I started getting into anime so I started watching on YouTube then I use YouTube as daily entertainment for kpop and other things.</i></p> <p><i>Watching YouTube is a thing that you can do without using your brain a lot. It can help you relax and relieve from stress.</i></p> <p><i>I watch YouTube because it's relaxing and it's my me time.</i></p> <p><i>I really like watching YouTube videos as well, but I love my music and playlists more. When I'm not doing something that requires a lot of concentration, I will always have music playing in the background. It fills the silence and makes things more enjoyable.</i></p>

The tweens' reasons for watching YouTube videos are as varied as the other explanations given across many reflections in this study. They connect the tweens, provide entertainment, personal enjoyment, adapted learning opportunities and enable them to reach the outside world as they choose.

Other video creation apps such as TikTok are also quite popular. The tweens reflected that they liked these apps because they are quick, fun to watch and easy to make: *"I like to watch and make TikTok videos and technically I can watch and make them so that's two in one."* (FG)

The students discussed how sometimes, with apps like TikTok, they just downloaded the app because everyone else had it (social acceptance/pressure) and then it 'hooked' them: *"This app is like social media and it's called TikTok where you make funny videos...then*

you get addicted and then you try to become TikTok famous. You just use hashtags and people can follow you.” (FG).

The difference with TikTok from YouTube is the social interaction and creative element. Overall, the tweens seem more focused on the entertainment significance and social aspect of TikTok, both during creation and the humour value in the videos created. Where YouTube is seen as a source of entertainment as well, there is recognition given to the additional value in the app, summed up by the comment from one of the focus group sessions: *“Watching [YouTube] videos doesn't always have to be for leisure. It could be useful when you want to learn how to do something or a place to find out what's happening.”*

4.9.1.App Purpose And Range

Apps or activities are sometimes perceived to be for younger children: *“I used to do that when I was little” (FG)* or for times when they are with siblings *“ My brother and I make heaps of movies during the holidays when we have a lot of time, especially when our parents are at work, so we make trailers ...and we once made a parody.” (FG)*

There appears to be interplay between social intersections, peer connections and personal choice when tweens are selecting and using apps and different resources on their devices. While many are for entertainment and social reasons, some tweens also reflected that they have apps they like to use for other reasons. The apps suggested are numerous, each with a personal reason for it being a choice for the tween. Table 36 reflects examples of the extent of reasons given for the selection of apps.

Table 36

Tweens’ Perspectives On The Range Of Apps Used

Focus	Reflection
Personal	<p><i>Instagram is my favourite because there is a lot to do on it such at text/call friends... I can express myself in a good way.</i></p> <p><i>I like listening to music when I'm in class as it helps me focus and calm me down</i></p> <p><i>Because I love music a lot...it helps me focus</i></p> <p><i>I can write music wherever I am</i></p> <p><i>I use an art app because t's nice and calming and doesn't make a rubber (eraser) mess</i></p>

Focus	Reflection
	<p><i>I like to use messenger because I can connect with my friends wherever I am.</i></p> <p><i>Language apps are good because you can hear yourself say the word and then listen to how it should be said.</i></p>
Creative	<p><i>I love to take photos and make them unique and make what I pictured in my head</i></p> <p><i>I love filming myself and I love putting in special effects on the videos I make and videos from my past</i></p> <p><i>I like creating things and drawing... It is a very different experience compared to drawing on paper or on canvas</i></p> <p><i>I selected this activity because I do use Messenger and I love talking and chatting with my friends and maintaining my old relationships even though I moved away from my home country.</i></p> <p><i>I like imagining stories and writing them.</i></p>

In the themes that emerged, there were two overarching focus themes – personal and creative. In Chapter 5, the reasons for which tweens select and use different mobile technologies across the day and how these experiences intersect with learning opportunities will be discussed more extensively, using the findings to explore the perception of multiplicity and how this supports the notions of polymedia and polysynchronicity in the everyday experience of the mobile and wired pre-adolescent.

4.10. Device Management

In recent times, there has been significant debate on the need for management of devices that are used by children of all ages, with a large number of schools and education sectors making the decision to ban phones in the classroom and/or totally on school grounds (see Chapter 2). In recognition of these issues, the tweens in this study were asked for their understanding and perspectives of control mechanisms, both enforced and personally implemented, and on the issue of allowing smartphones and other mobile devices in the school environment. Each of these issues has been discussed separately, although there is a definite crossover between the perspectives of the tweens on these issues, each situation impacts on the tweens in different ways. The tweens were asked to respond to questions

in the survey and then given further opportunity in the interviews and focus groups to expand their thinking around these concepts.

4.10.1. Parental Management And Control

Survey responses for perspectives and knowledge of parent controls on devices were mixed, with some students reporting a high level of involvement and management, while others did not appear to have the same level of communication or restrictions. The majority of tweens shared strong perspectives on the matter of parental management, with associated high levels of family communication and device control. In each group of questions, there was an option for the respondent to select that they weren't sure if their parents had any management strategies in place. In each individual question, there were at least a small number of tweens who demonstrated they were not aware of these control measures or restrictions.

The participants were asked in the survey the extent to which their parents talked with them about how they interacted online, and about making sure they knew how to manage themselves in an online environment. The data provided a good overview of how the tweens viewed their parental communication and involvement in their online interactions. It is important to note that the responses are the interpretations of the tweens and might not necessarily be the same perspective of the parents. In this study, no parents were surveyed regarding these issues, although this would be valuable as a comparison in a future study.

Tweens' views of parental involvement indicated strong communication discussing issues such as being responsible and safe online, the types of media approved for viewing and the amount of time spent using mobile devices. The tweens' reflections of these viewpoints are shown in Table 37.

Table 37*Parental Communication And Knowledge Of Tween Activity Online (n=933)*

Have your parents talked about...	Yes	Do your parents know about...	A lot	Some
Staying safe online	91%	What you do and see online	43%	38%
		What you do on social media	42%	19%
What types of media you can watch	77%	The types of video or computer games you play	53%	27%
		The TV shows you watch online	51%	29%

While close to 100 percent of tweens indicated their parents have talked to them about staying safe online, only 43 percent indicated that their parents know a lot about what they are doing when they are online. Nevertheless, by the time the data for parents knowing “some” of what the tweens are doing online are added to the “a lot” group of responses, this equates to 81 percent of the children indicating some level of parental awareness. The difference could plausibly come down to interpretation of the questions by the tweens and without cross referencing with parents may not be indicative of the differences that are apparent from analysing the raw data.

This issue is further expanded by the data submitted regarding parental control over devices. For many years, laptops and fixed computers have been enabled with restrictions for access that parents could enforce that block specific links, locations and material (Mengel, 1997). Based on specific criteria, some access to sites and information that parents decided was inappropriate could be filtered, preventing access. However, these filters required regular checking and upgrading to reflect new descriptors or modifications and therefore were not always effective in preventing undesired or inappropriate materials or sites being accessed (Rosenberg, 2001). In more recent times, mobile devices have proven to be more challenging regarding control of access, particularly when blocking was done via network filters in a home or school. As most devices today have their own sim cards or can be “hot spot” internet connected through another device, circumvention of filters has become an easily attainable process.

Parents have become more able to monitor and observe their child's online activities through facilities on mobile devices through the use of screentime data, location tracking and time control features (McNally et al., 2018).

The tweens had quite mixed perspectives on parental control. Approximately 30 percent indicated that their parents had some controls in place, with approximately 45 percent claiming no parent controls were being used and another 26 percent who did not know if their parents had any control measures in place. Data regarding screen time restrictions and perspectives on these controls are presented for comparison in Table 38.

Table 38

Parental Control Over Device Use (N=933)

Response	Parental control?	Should parents have control?	Screentime restrictions?	Should parents enforce restrictions?
Yes - on all devices	14%	12%	14%	10%
Yes – on some devices	16%	28%	15%	30%
No – not at all	45%	38%	55%	39%
I don't know	26%	18%	15%	18%

In the interviews, focus group discussions and open-ended responses in the survey, the tweens indicated that their parents employ the following types of controls over their mobile devices. Themes that emerged included device specific, app downloads, parental management and time regulations. Table 39 provides a snapshot of the types of controls parents have implemented on the tweens' devices, from all data collected.

Table 39

How Parents Control Tweens' Mobile Devices

Type of control	How is the control implemented?
App management	<i>Apps that I can purchase – I can't download anything they don't approve</i> <i>Well, not on devices, but apps, Netflix and YouTube mainly</i>

Type of control	How is the control implemented?
	<p><i>My parents make me ask permission before I download an app. But that is the only thing they restricted me to doing</i></p> <p><i>Safe search is on all my devices, and my parents talk to me about purchasing apps</i></p> <p><i>My Dad set up this thing where, when I want to download apps it needs my Touch ID and I need to request (notification sent to phone)</i></p> <p><i>My parents manage things on my telephone, it sends a message through to their phone when I ask to download an app</i></p>
Time & access management	<p><i>Wifi restrictions – I can only use wifi up to 9pm</i></p> <p><i>Gmail account (i have a kid version where my mum monitors it)</i></p> <p><i>Turns of wifi after a certain amount of time I've been on my computer</i></p> <p><i>My parents time limit my phone, and take away my iPad and phone at night so it's out of my room</i></p> <p><i>Our pact, my parents shut off all our screens at 7:30 pm</i></p> <p><i>My younger brother and sister's devices have a screen time lock – I don't have anything on mine</i></p>
General device management	<p><i>Just my iPad and iPhone – not my laptop</i></p> <p><i>iPhone and sometimes my laptop – mostly they need to see the history</i></p> <p><i>Mobile phone restrictions (set when I was ten and they don't know how to remove them)</i></p> <p><i>I have parental controls on all my devices except my computer</i></p> <p><i>I have restrictions on my iPad - not sure what restrictions they are though</i></p> <p><i>Restrictions are only on my laptop, and maybe iPad. I can't really do anything bad on my Apple Watch</i></p>

Type of control	How is the control implemented?
	<i>MacBook Laptop- restricted: on the Laser Tablet - They [parents] don't know about it [how to set controls]</i>
	<i>Smartphone is controlled, not on my laptop or drawing laptop</i>

The control measures used by parents vary from quite tight control measures where the tween has little or no personal input to restrictions in place on just some devices. Many of the measures appear to be quite specific, such as wifi limitations, time boundaries and app download constraints. There was limited evidence provided through the open-ended responses about whether these restrictions were enforced by parents through negotiation with the tweens. The view of negotiation or discussion between parents and the tweens was not elicited in this question, however further discussions in the interviews and focus groups indicated a range of approaches being used, some accepted by the tweens and others less favoured.

Table 40 displays the survey responses that compare tweens' opinions regarding whether parents should be able to control their mobile devices and the degree to which the tweens are aware that restrictions or controls have been put into place.

Table 40

Parental Control On Mobile Devices - Survey Responses (N=930)

Perspective	Do your parents have parental controls on your device?	Should parents use parental controls on tweens' mobile devices?
No parent controls used	43.7%	37.6%
Yes, on all devices	13.9%	12.1%
Yes, on some devices	16.2%	28.3
I don't know	25.9%	18.5%

In the interviews and focus groups, the tweens openly discussed strong opinions and perspectives on parental controls, reflecting many similar responses depicted through the survey. These perspectives are presented in Table 41.

Table 41*Tween Perspectives On Parental Control Of Mobile Devices*

Perspective on parental control	Tween views
Agree with parental controls	<p><i>I think it depends on the child; some are addicted to gaming etc so they need restrictions but others are mature & self-aware & they can take care of it themselves</i></p> <p><i>I think it's a good idea to have controls but sometimes they're annoying if I'm trying to do something</i></p> <p><i>Yes - on all devices, but at home it does not work as it slows the internet down and sometimes disables it.</i></p> <p><i>Depending on how old you are and what you are doing on your devices</i></p> <p><i>My parents already do that for me [have time restrictions]. I think yes because it does help me get a better rest for the next day.</i></p> <p><i>I wouldn't mind if my parents used parent controls on my devices</i></p> <p><i>Yes, until you are old enough to not have parent control</i></p>
Disagree with parental controls	<p><i>I don't think that I need parent controls however it would be okay with them as I don't do anything bad on my devices</i></p> <p><i>No, I'd rather they communicate in person and confiscate when necessary</i></p> <p><i>No, I am responsible enough to learn and experience the online world by myself without restrictions by my parents</i></p> <p><i>No, I am respectful and don't do stupid things so they trust me</i></p> <p><i>It makes me frustrated...that my dad has all that power over my phone. I don't want him to have that much power. I should be allowed to make my own decisions. But I understand why he's doing it - because he wants me to regulate myself.</i></p>
Other perspectives	<p><i>I already tell them a lot of what I do online</i></p> <p><i>For people less responsible - my parents know I'm responsible</i></p>

Perspective on parental control	Tween views
	<i>I don't think you need to unless you're under the age of 12 and if you have never had bad an experience online then you don't need it to</i>
	<i>I think children should be trusted at first with no parental controls but if they do something wrong (or if they are very young) eg. looking at inappropriate things then parental controls should be installed</i>
	<i>Depends on what kind of child they're dealing with</i>
	<i>I don't care / I don't mind</i>
	<i>I believe my parents know that I am smart enough to stay 'cybersafe' and don't need to restrict me</i>
	<i>[Yes] If we have got into trouble they can for a few weeks, then they can leave us alone</i>
	<i>It is an invasion of privacy</i>
	<i>It depends on the person's behaviour and what they do. I think that it should be common knowledge to people but it should definitely be a choice between the parents.</i>

The notion of screentime controls was explored specifically in addition to the broader question of parental controls discussed previously. Screentime management is a reasonably new feature on mobile devices, available on smartphones and tablets predominantly. This aspect of parental control was presented as one that the tweens were quite divided about, becoming apparently more contentious as the tweens transitioned into secondary school and closer to their adolescent years. Table 42 presents the feedback from the survey regarding screentime controls.

Table 42

Screentime Controls – Tween Perspectives from Survey Response (N=930)

Screentime control	Tween perspectives regarding screentime controls
Smartphone	<i>They encourage not to overuse our phones</i>
	<i>They use restrictions on my mobile</i>
	<i>My phone - sometimes my parents take my phone away for at least 2 weeks</i>

Screentime control	Tween perspectives regarding screentime controls
	<p><i>I have 5 minutes on my phone for free-time – that's all I get each day</i></p> <p><i>I have screentime lockout on my Smartphone, my laptop and drawing laptop have unlimited usage</i></p>
Apps/online	<p><i>They [my parents] restrict my time on YouTube</i></p> <p><i>I have screentime on my phone for using everything – even apps for school. If I want more time, I have to send a request to my dad and he can decide</i></p>
Time screentime controls	<p><i>I have restrictions. Not before 6:30am or after 8:30 pm</i></p> <p><i>Off 30mins before bed at mums (Parents are split)</i></p> <p><i>Yes, I have screentime restrictions by my parents – I'm not allowed past ten on school nights</i></p> <p><i>All tech off by 8 pm unless homework – no screen control on the device, my parents just tell me it's time to stop</i></p>
Multi device considerations	<p><i>Just on my laptop and iPad, but that doesn't include schoolwork, [I'm only allowed] only 10 minutes per day for fun</i></p> <p><i>We have time restrictions on my laptop and family iPad as well as [on] my sisters</i></p>
Laptop related	<p><i>Not on Computer Because I'll be doing homework or studying but yes [restrictions] on my phone</i></p> <p><i>I have screen time restrictions on all my devices except my computer</i></p> <p><i>Sometimes I can only use my laptop for a limited time, but this is when my parents put their timer on, there are no controls on the laptop</i></p> <p><i>I have screentime restrictions on my iPad – I used to have restrictions on the laptop, I think that was called parent controls</i></p>

Screentime control	Tween perspectives regarding screentime controls
	<i>Time restricted on Laptop (parent control thing); Phone and Tablet - Parents don't know this is possible</i>
General	<i>I have only about 15 minutes, so I use my phone only when having a break and then going back to do homework</i> <i>I must always save some time to do other useful things. If I don't do them, my parents will shorten some screen times or remind me that I must do them</i> <i>My younger brother and sister's devices have a screen time lock – but I don't have anything on mine</i>

The indication from most of the survey responses is that screentime is used for phone and tablet management while laptops, on the whole, seem to be managed independently, with parents using external timers to limit usage. Laptops can also be managed regarding the time spent using the device, but this did not feature as prominently as the controls on phones.

This could be related to the observation of the smartphone being used more for entertainment, social media and communication whereas the laptop is more considered to be for learning or work. This perception was reflected in the tweens' responses earlier in the chapter where the majority of time spent on the laptop was demonstrated as being for schoolwork while the majority of time spent on the smartphone was depicted as 'not' for schoolwork. Some tweens also reflected that their parents do not know that restricting screentime is possible – in the interviews, several children reflected that their parents were unaware of the possibility of screentime controls, and they would not be letting them know this could be done.

Some of the tweens also indicated that social media and other apps could be flexible during school holidays and then tightened up again during the term. They did not want the apps deleted because in some (especially games) you reach a level and then if the app is deleted, "*you'd have to start all over again*" (Issy). They felt that it would be better to put time restrictions on again during the school term.

There were also reflections from the tweens about the impact of time restrictions when using some apps, for example: “*The whole time you are using the app [Wordscapes], you are feeling under pressure because you know the app will close if the time limit is reached*” (Cassidy). Many of the participants indicated they’d prefer to be given more flexibility and that they could manage the time control themselves, including putting their own screentime restrictions on their devices. Some of the tweens were already doing that as shown in the following responses (Table 43).

Table 43

Tweens’ Self-Imposed Screentime For Device Management (Interview And Focus Group Reflections)

Focus	Tween views on personal screentime control
Time management	<i>I put screen time on my phone but my parents did the password.</i>
	<i>I set my own time restrictions – I’m responsible for managing what I do</i>
	<i>I have screen time restrictions I put on myself</i>
	<i>They don’t put time restriction limits but I do it myself</i>
Device management	<i>I set my own screen time on my phone</i>
	<i>On my device that I tell them [my parents] I am the most distracted on</i>
App management	<i>I have personally placed screen time restrictions that only allows me to use certain apps for 5 minutes</i>
	<i>I put my own on for YouTube</i>

When given an opportunity to give a personal perspective on the use of parent screentime controls, the tweens articulated a sense of developing personal responsibility, articulating some agreement and understanding as to why parents might feel screentime restrictions are necessary, but also a growing awareness of wanting to have the responsibility for managing this themselves. A collection of the tweens’ responses presenting a range of viewpoints on the enforcement of screentime controls is shown in Table 44.

Table 44*Agreement And Alternate Viewpoints Of Tweens Regarding Parent-Enforced Screentime Controls*

Agreement of screen control perspectives	Alternate perspectives of tweens
<i>I think parents should control some devices, so then they can make sure that their kids are being responsible</i>	<i>I think my parents should be able to trust what I do as we have spoken about it before.</i>
<i>It is good to have restrictions to let your kids have more interaction time with the 3D people in their life</i>	<i>I'm not sure if I need parent controls because my mum controls my technology use verbally</i>
<i>It can restrict the amount of time we use our devices ...but not my laptop as it is mostly used for schoolwork</i>	<i>I think this, because parents shouldn't restrict all devices, so then kids can have a little freedom</i>
<i>It is good to trust your parents in everything by telling them everything</i>	<i>It is our device and we should be able to do whatever we want to on it!!!</i>
<i>I think it's pretty good overall ...but think I deserve to have privacy.</i>	<i>It's kind of ... annoying? And it sort of invades privacy</i>
<i>I think my parents should stop me using technology too much</i>	<i>I can control my own time and they [screentime controls] are a hassle</i>
<i>It's important to have limits with addicting technology</i>	<i>Parents shouldn't do this because I don't use any apps that I'm not supposed to use.</i>
<i>Yes, [parents should use screentime controls] because then my parents know what I'm doing</i>	<i>If I have screen controls and my time has run out, sometimes I might not be able to get to something when I need it</i>
<i>It is a parent's decision whether they want to use parent controls or not</i>	<i>I don't want my parents to have control over my devices, but it might be good if they do</i>

Underlying these responses from the tweens appears to be evidence of a growing need for trust and personal freedom or privacy.

From the various responses were also contributions from the tweens about their parents' management, their own personal actions and behaviours when interacting with mobile devices, and how they feel about these issues on a broader level. Table 45 depicts these viewpoints of the tween and also their arguments for greater levels of trust from parents.

Table 45

Tween Perspectives On Parental Management And Screentime Controls

Focus	Tween perspective
Personal	<p><i>Because I want to be able to do whatever I want [at home] 'cause at school we are restricted</i></p> <p><i>It is kind of creepy how they know what you are doing every minute and every second</i></p> <p><i>I feel like children should learn self-control by themselves and not get controlled because that often makes children anxious, but if they learn to control themselves, they would want to rest their eyes by themselves. I feel like you should make them understand while telling not to do something</i></p> <p><i>They are very overprotective and the one I have, can see EVERYTHING I do</i></p> <p><i>I think that if your parents are constantly watching your screens you will never make mistakes and if you don't make mistakes you will never learn.</i></p>
Trust	<p><i>Because I would never lie to my parents and do not use my devices excessively</i></p> <p><i>I think that I can use self-control and I don't need the parent controls because I will turn off my phone or laptop after use</i></p> <p><i>I believe my parents trust me enough to give me the freedom to roam the internet with freedom</i></p> <p><i>Because as a child we should be trusted by our parent and I know my mum can trust me and I don't think there is a need for her to control my phone through hers</i></p>
Responsibility	<p><i>If you restrict everything on your electronics then it basically doesn't give you a chance to take responsibility</i></p> <p><i>Because my parents trust me to be responsible with my devices</i></p> <p><i>Because they know I'm not going to do anything wrong and I'm responsible about stuff I do on social media</i></p> <p><i>I think my parents should be able to trust what I do as we have spoken about it before</i></p>

Focus	Tween perspective
Understanding	<p><i>Because I have learnt that being on technology is bad for you, so I think it is good that parents can help stop kids from being brought up badly</i></p> <p><i>Checking what your child texts is okay, but at the end of the day, it is the child's phone. If the child spends a lot of time on their phone, or behaviour changes then I would look at [their] phone</i></p> <p><i>It allows me to restrict myself from spending too much time on social media and watching videos, it also allows me to sleep and get work done.</i></p> <p><i>You can't just play games for hours upon hours, it's bad for you but doing schoolwork on the laptop is fine, so I know why my parents use them [screentime controls].</i></p>
Ownership	<p><i>Because I spend a lot of time on some of my devices</i></p> <p><i>Because sometimes I don't come out of my room for like 4 hours</i></p>

Personal responsibility and trust were significant factors suggested by the tweens in not wanting to have screentime restrictions. Many of them were quite strongly opinionated regarding their ability to manage themselves without parental interference or guidance. The responses also presented some perspectives that demonstrated an understanding of the need for parental control and ownership of how they might otherwise overuse their devices.

In the interviews and focus groups, the tweens were able to unpack these sentiments further, providing well-considered responses to the questions posed about the use of screentime controls. At the same time, from a large number of the tweens there is a demonstrated respect for the decisions that parents are making regarding their safety and well-being. In the discussions that occurred, the tweens showed a developing maturity in their approach to screentime management, being able to discuss their understanding of what parents seem to want to do (and why) their own frustrations at being restricted and their desire to demonstrate responsibility.

Cassidy, a thirteen-year-old who took part in the interviews, was particularly convincing in her argument for her perspective on the need for change in the implementation of parental screentime control mechanisms. At the top end of the tween demographic, she

discussed personal viewpoints about the amount of restriction she was experiencing and how she would prefer to have this situation handled as a reflection of her age and developing independence:

Well, then dad knows the maximum of what I'm allowed to do... I think it's a way of controlling you...it does teach you time management, but it doesn't teach you really how to not be on game apps or things like that, just how to be on them for shorter amounts of time. I'm okay with some restrictions – right now, I just get fifteen minutes a day but I'd like to be given an hour to use in the week and then it would be my decision to use it or not. I could work out how to use the time in my own way. I'd like to be able to show my dad that I can control myself and not be on it [my smartphone] too much...I should be allowed to show them that I am responsible at my age. Perhaps we should have more restrictions on social media and less on games...and I think during the holidays if you don't go away, so for those two weeks I think you should be allowed more entertainment, so you don't get bored...and when school starts again, you just put the restrictions back on, because if you delete the app, you lose all your progress [in the game] and it's frustrating because if I'm playing words with friends, and the levels are getting higher, most of my time is spent thinking of the words I am trying to make...which makes it a lot of pressure because the five minute timer comes up and I know my time is nearly up”

Other tweens also shared their perspectives about having restrictions, the impact it might have on them personally and how they would like to see this managed differently. A compilation of responses from either individuals or focus group conversations reflecting these sentiments include (Table 46):

Table 46

Tweens' Perspectives On Device Restrictions

Respondent	Reflection
Focus group	<p><i>If there was an emergency, and you didn't have screentime or access to the app and your parents weren't home it would not go well</i></p> <p><i>Like if the parents say that you have ten minutes and then you argue with them and say 'but I'm not done' ... after a while they start saying well you just can't you're your own screen time unless you can listen to us</i></p>
Hamish	<i>When I have to ask for extra time, it's quite frustrating because that time is only given for now – you can't save it for later.</i>

Respondent	Reflection
Cassidy	<i>If you don't use the time, it's gone...so if you get called to help with something or to do something for someone, you've lost the extra time given to you – there's nothing you can do about that.</i>
Tessa	<i>My younger brother, he's 10, should have more restrictions because at that age they don't know how to control themselves, so restrictions are fine until they realize that you actually can control your behaviour and yourself</i>
Katie	<i>It has to be approved through him [dad] which...means that he obviously control what we have and then there's nothing like if I actually downloaded snapchat or something and then mum found it without her permission there's no like blow up or questions about so why did you get it</i>
Tilda	<i>It can be slightly frustrating because the other day I needed a geography app on my laptop and so I kind of needed to send dad a text at work and say I'm really sorry but I need to get this app for geography. By the time it came through the lesson was half over</i>
George	<i>I can control my own time and would prefer not to have to hassle my parents...trust me, it stops you having fun</i>

Across the age group, the young people appeared to understand management issues and why parents might have these in place. In one of the focus group sessions, there were several young people involved who were strongly concerned with the need for being able to demonstrate their ability to manage their own time, while still adhering to parental guidance. They openly discussed how they wanted to be given greater levels of trust as they were getting older, with many of the tweens heading towards year 9 in secondary school. They felt that perhaps parents needed to relax the restrictions a bit so they could demonstrate their own levels of management. Aligned to this was the frustration the tweens felt at being not recognised for their transitioning into teenagers and young adulthood. In some of the interviews, the tweens reflected similar sentiments, discussing their need to “*not be treated like little kids*” (Issy), but also that they wanted the opportunities to “*make our own mistakes and learn from them*” (Jennie). The sentiments of many of the tweens in this study are summed up quite well by Alice:

...I guess it depends like I'm sure if our parents said to us like I guess it's also a level of trust in your child. So, if we kind of push the boundaries and then mum and dad said you know we're really sorry but you're not paying attention to us or you're not doing your homework or you're falling behind in school we're going to have to put app controls on,

and I'm like okay that's fine. But at the same time, I guess it also depends on age I guess because maybe like younger kids need that extra bit to know they can't just be online with their friends all the time...But I feel that the older you get that responsibility should be with you, but I guess it kind of what your parents are like a lot on the family decision.

Further responses and perspectives from tweens about screentime control and management, can be reviewed in Appendix G.

4.10.2. School Management

Currently, there is much debate about whether or not children should have access to mobile devices during school time (see Chapter 2). A number of participants across different aspects of this study attend schools that have or are considering implementing a whole school ban on mobile phones or controlling the use of mobile devices for specific activities. Whilst there are no appropriate methods of listing these schools in this discussion, it can be reported that all schools associated with the study were considering at least a partial control measure or consideration of a complete ban on mobile phones. The schools did not identify if they were considering other mobile devices such as tablets and smartwatches, as the emphasis appeared to be focused more specifically on smartphones at that time. The proposed bans appeared to be in response to much media focus on poor class behaviour and a decision by many state-based education departments in Australia to implement school-wide bans or restrictions on mobile phones within a period of time (NSW Department of Education, 2019; The Conversation, 2019; Victoria Department of Education, 2019). In the earlier stages of this study, there were also several schools that declined to participate in this study as they had already made a decision to ban mobile phones and reflected that they were not interested in either the study or the findings.

In the survey, the tweens were asked to give an opinion about whether they felt students should have access to mobile devices during school time. The devices were individually profiled, so the emphasis was not on all devices as one, affording the opportunity to generate separate perspectives.

The responses from the survey participants indicated a mixed range of opinions as indicated in Figure 4.11.

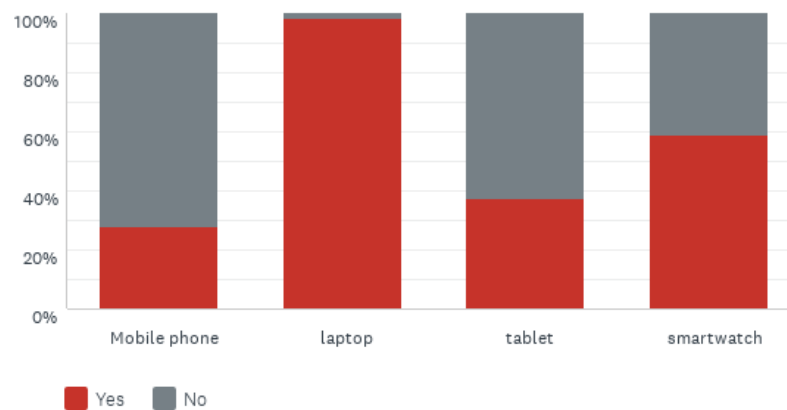


Figure 4.11 Responses by survey participants (n= 687): Should students have access to mobile devices during school time?

Overwhelmingly, the data from this question supported the students using laptops during school time. On the other hand, and somewhat surprisingly, the tweens were less favourable about having mobile phones in the classroom. This question was towards the very end of the survey and was not answered to the same extent as most previous questions (n= 687), therefore may not represent the full range of perspectives of the participants in the survey. Nevertheless, many of the views were supported in the focus groups and interviews, lending greater support to the data generated.

The following table is a synthesis of the responses submitted in the survey, providing a broad view of the tweens' explanations as to why they felt mobile devices should be allowed in schools (Table 47).

Table 47

Students Should Have Access To Mobile Devices During School Time -Tween Perspectives (N=584)

Issue/focus	<i>Tween perspective – should have devices in school</i>
Learning	<i>The laptop helps you learn and we need it and the other ones [phone and smartwatch] because sometimes we sit and do nothing in class like after test and we can communicate without being loud.</i>
Usefulness	<i>I think it is very useful to use a laptop or tablet as it is a good life skill and is helpful when studying</i>
Skill development	<i>People get to know how to handle devices at a young age and it will really come into use when you get older</i>

Issue/focus	<i>Tween perspective – should have devices in school</i>
Personal	<i>I think students should be allowed to use phones in class because if they forgot something at home, they can call their mum</i>
Safety	<i>I think you can use your phone because if there was an accident you could call someone</i>
Entertainment	<i>I think you should be able to have things in the classrooms because electronics are fun to play on [when there's nothing to do]</i>
Device specific	<i>If you need to work on research or spreadsheets a laptop is best, better than having to write everything by hand</i> <i>Laptops are [best] for schoolwork and can be used for research</i>
Flexibility	<i>We can do our work much more easily on laptops, and we can also take photos of the board or classroom notes with a phone</i>
Management	<i>You can use smartwatches to check the time, and your laptop to create documents</i> <i>Laptops are things that are needed, in fact, grade five plus in my school uses laptops – they are compulsory</i>
Convenience	<i>It is also easier to share things with your teacher or working partner or group for a project</i>
Interoperability	<i>I can get my work from any device, so even if I've forgotten something, I can still do my work during class</i>

From the responses in Table 47, it can be seen that the laptop is viewed quite favourably amongst the survey respondents, considered predominantly as a more 'serious' and work related resource than other mobile devices. Additional positive responses for using mobile devices in school focus on personal connectivity, convenience and the need for developing appropriate skills for current times and into the future.

The tweens also had the opportunity to submit explanations as to why they had selected some devices not suitable for having at school (Table 48). Their reasons varied, but many focused on issues such as distraction and personal impact.

Table 48*Students Should Not Have Access To Mobile Devices During School Time - Tween Perspectives (N=584)*

Issue	<i>Tween perspective – should not have devices in school</i>
Distraction	<p><i>Phones and iPads will distract kids from work in class</i></p> <p><i>Especially as a teenager or tweenagers – most will get distracted with phones and tablets</i></p> <p><i>Mobile phones in class...can distract you and you could be doing something [you] shouldn't be doing with tablets and smartwatches</i></p> <p><i>Because you would text your friends in class and it would stop you from concentrating, tablets - you can play games</i></p> <p><i>No, because if you had a phone in the classroom, you will 99% of the time be distracted with it</i></p>
Interruptions	<i>No phones and iPads because they would interrupt the lesson when someone tries to call you</i>
Cheating	<p><i>I don't think students should use a mobile phone in class because they can easily play games or even cheat in exams</i></p> <p><i>I think that we shouldn't use smart watches because you can easily cheat with them, but something such as a mobile phone is easier to catch</i></p>
Device specific	<i>Children are more likely to play games [on devices other than laptops] because they play games on it at home meaning they will be tempted.</i>
Underhandedness	<i>The mobile phone and smartwatch and tablet shouldn't be allowed because you can play games on [them] but if the teachers are standing far away, they can't see any difference between if you're working or playing video games</i>
Bullying/wellness	<p><i>No, because when you have your phones in class you can get cyberbullied</i></p> <p><i>Tablets and phones are not useful in school or class and can get addictive</i></p>

While smartphones, tablets or smartwatches were indicated as distracting or primarily used for communication and entertainment, very few students indicated issues of distraction or 'doing the wrong thing' when using a laptop at school. It appears that the tweens themselves have a view that the laptops used in school are less likely to be

distracting as they are considered more as a resource or tool suited to classwork, research and learning activities.

However, the possibility (and probability) of distraction was raised in many of the open-ended responses when tweens justified their reasons for all choices (n= 626). When analysing the data, a search for the word 'distract' was undertaken, identifying 258 instances this was submitted in the open-ended responses. The issue of distraction will be explored further in section 4.10.4 as the matter was raised notably during the interviews and focus groups, with deeper explanations offered from the tweens at that time.

There were other perspectives shared that did not specifically support either side of the debate, but rather provided a viewpoint that broadened the scope of the discussion about the inclusion or exclusion of mobile devices in schools. The perspectives if the tweens focused significantly on concerns around distraction, management communication and behaviour. A summary of these comments is demonstrated in Table 49.

Table 49

Additional Tween Perspectives About Schools Banning Mobile Devices (N=584)

Focus	Perspective
School control	<i>I don't see a difference having to put your phone in the locker because everything is now connected through our laptops...everyone's just messaging anyway.</i>
Device specific	<i>I think it's a good idea to use laptops and iPads for the smaller kids but not a smartwatch or phone</i> <i>I think students should have a laptop in class and nothing else that is technology because if students use them, they will get distracted</i> <i>I don't think that we should use smartwatches because they can be very fiddly</i>
Management	<i>Smartwatches I just use for the time and alarms so I think they should be allowed as it doesn't distract me from my learning</i> <i>Students should be allowed to use their mobile devices for emergency needs,</i>
Communication	<i>Phone should be allowed because what is someone got injured in school, and instead of walking to the school care they can just pick up their phone and call their parents.</i>
Social	<i>Only [allow phones] at morning tea or lunch to show your friends some stuff and your friends will learn more about you</i>

Focus	Perspective
Personal	<p><i>Grade five [at my school] isn't allowed smart watches, while other grades are, which is unfair</i></p> <p><i>We should have the freedom to do so [use devices at school]</i></p>
Behaviour	<p><i>It is important to learn new skills and activities in...but that doesn't mean students have the right to interrupt or use mobile devices during class all the time</i></p> <p><i>If students were allowed to use personal devices such as phones, they could hide it under their dress or something and use it in class</i></p>
Teacher awareness	<p><i>The teachers will know if you're watching videos on your laptop</i></p>

Through these comments, the tweens have reflected that they understand the key arguments in the debate about having mobile devices but have also considered the issue from a viewpoint that can only be articulated from within the particular group of stakeholders with their unique perspective. They do not appear to be one-sided about this debate and alternatively, have presented significant reasons focusing on careful management or control of mobile devices.

The comments contributed by one of the interview participants, Katie, summed up many of the individual perspectives on the inclusion or exclusion of mobile devices in schools:

I think that, in class, a phone and/ or tablet would be extremely distracting and unnecessary. Any information or access to resources for class can be done much more easily on a laptop. It is okay for a teacher to have a mobile phone for the case of emergencies and, also, they know to control themselves with it. I think that a smartwatch would be necessary because, as it is 2019, technology is developing, and smartwatches are an interesting, engaging way of embracing this technological development. Smartwatches are so small they can barely be distracting and wouldn't negatively affect a student's performance in class and, also, smartwatches come in handy for all sorts of little uses.

Hamish echoed these sentiments, although he also presented some specific reasons and thoughts about the impact of not having access to mobile devices:

With mobile phones, you might not talk to people and socialise that much at recess or lunch. But it would be much easier to use them in class for projects and filming. [Our] school doesn't allow mobile phones, which is pretty annoying. With laptops, it's much easier to do individual work and find things on the internet faster. Smartwatches are fine as you can check the time if you don't have a clock in your classroom or if the clock is late. It also can be used to remind yourself when you need to head off to the next class.

A third reflection, contributed by Tessa, provided further perspectives regarding how mobile devices might be useful in school, but also some strong feelings about the effectiveness of some of these devices – and personal concerns:

I do worry a bit about being bullied online, so that's why I'm not sure about mobile phones. But mobile phones could be useful for certain situations such as being used as a calculator or a quick way to find information. And on laptops you are able to write out documents instead of writing by hand which can get tiring. Tablets are a bit too bulky to be used in class and in my eyes a just a bulkier phone which is not useful. And apple watches can basically only be used for social media, games, and communication so serve no educational purpose.

Negative responses regarding mobile devices, other than distraction included the possibility of cheating, texting, being cyberbullied and doing things other than classwork.

They also spoke of the drawbacks for the way they have learned to operate in the classroom if phones are no longer allowed in the school. These comments were not about social activities or contacting parents, but directly related to their need to be able to function as a learner:

"But the only thing that I'm a little bit upset about is the fact that we sometimes need to take photos of the board for information that we need. And I don't really like the idea of having to carry a camera around." (FG)

This comment referred to how the students find it easier to take a quick photo of the board, including homework notes that are often not added until close to the bell time. They felt it would be an issue if they couldn't use their phones to take a photo as they packed up to move to the next class and added:

"[it's] convenient to have a phone in your pocket to take photos of information you need when you get home instead of writing it down really quickly, messily, and then not understanding whatever it was that you need when you are learning at home. Because I just personally find it easier that way to perform." (FG)

Personal safety and issues with not being able to comply with parental safety expectations were also raised by tweens in the focus groups where phones were to be banned on the school grounds. Regardless of how this might eventuate, the tweens expressed concern about how they would manage if they could no longer contact their parents as they had been doing using their phones, from within the safety of the school grounds:

"And the issue I have is that is sometimes I need my phone in school grounds to contact my mum before I leave the school each day, because once you're out of the school gates you can't come back in. So, my mum likes me to stay inside school while I wait to find out where she is. And so, I'm finding that a bit of an issue and how I'm going to contact my mum to find out where she is." (FG)

Another group of tweens referred to how they use their phones to check bus or train timetables or when there's a classroom change at the last minute. Currently, these changes are available via apps on their phones. The students commented that if they can't have their phones in school, they'll have to use their laptops which they saw as inconvenient when trying to find their class or leave school quickly at the end of the day:

"Now we'll have to take out our laptop and open it. It's been like five minutes to open and find the link. Then you'll be stressed because you know you're gonna (sic) be late." (FG)

"And another thing is like it [the phone] can tell you where you need to be for say period two, because they can change locations at the last minute. If it changes like all of a sudden, I need to know about it, otherwise, you'll go to that room and no one else will be there and you won't be able to find your class." (FG)

In one of the interviews, Alice contributed similar sentiments about the issues with not having a phone to check timetables during school time and the impact this had on not just attending classes, but also assessment and performance:

"I lost my phone and I was late for a maths assessment because I didn't have the changes for that day. We'd had an assembly and didn't realise it changed our recess time. And so

that we went to the wrong classroom and having missed half of the math assessment by the time we found the classroom. And we didn't get to redo it. I was really upset.”

It appeared that the general consensus from the discussions was that personal safety, learning and function during the school day were more of an issue to the tweens regarding the notion of having phones banned from school, than their potential or need, to be on social media or other apps during the day. Throughout the discussions, the concept of social media or entertainment was rarely raised when considering the issue of phones at school. For many of the tweens in these discussions, social issues related more directly to friendships and how they would (or wouldn't) be able to connect with one another during class breaks, if phones were banned from the school:

“Finding your friends might be really hard when we are all in different classes. Like at lunchtime, sometimes your friends move places because like the tables were taken in the area where you normally meet. If I don't have my phone, I'm simply wandering around school for like 20 minutes with nothing to do and I won't be able to find my friends. If I can look on my phone it really changes everything. Well, I can also call some of my friends and say, 'where are you' and they can send me a message. I won't be able to do that – I can't really open up my laptop and try to find them that way.” (FG)

The tweens were aware of the reasons why schools might want to ban phones on the school grounds, showing a strong awareness of the potential issues. Many of the tweens demonstrated considerable anxiety about how to manage the proposed changes. However, their concerns were not just about their personal perspectives and how this might impact on their learning, but also because they felt that no-one had asked their opinion – or that they were not aware that any student input had been requested:

“It's really just that no-one even asked what we thought. Just one day we had an assembly saying this was going to happen. I think if they'd talked with us, we might have found a better way to manage how we could still use our phones and not have any problems. I think they [teachers] just think all we do is stupid stuff, but that's not really true.” (FG)

Concern about having to adjust was also on the minds of the tweens in the focus groups. As the discussion concluded, one of the students summed up by saying:

"I just I'm just a bit worried about knowing how to check classes in the first few weeks when you're trying to figure out how to do this another way. Yeah, and you know we'll have to get a printed timetable every morning to confirm the changes for the day. The only problem with the printed timetable is that it doesn't show changes that happen during the day. We get a lot of changes. It's just it's just going to be a little bit hard to kind of figure out ways to get used to that kind of issue, so I know what classes I have. But I have [smartwatch] so I might be able to use that I suppose, unless they say we can't have those either." (FG)

In other focus groups and interviews, some of the tweens offered a different perspective, indicating that they felt it might actually be better to allow phones to be brought to school for transport and communication but not have phones during class time. Harriet summed up these sentiments:

"I feel like they [students] should be allowed to take them [phones] to school because we sometimes need to make transport arrangements, so you need your phone. But right now, everyone is so tense about not having their phones in class. I think that's really good. Because they're such a distraction I feel. Mostly for us because of social media. And you can also get distracted on your laptop when you're working. To be honest, I do too...yeah. But feel like phones are at that extra level because they're easier to use quickly and to hide. So, if we could just get rid of that that would partially solve the issue."

On the whole, the tweens were quite rational about how mobile devices can be both a useful tool and resource, while at other times a source of distraction. Jennie's comment about phones and other devices presents a summary of some perspectives shared:

"I truly disagree with having phones in the classroom. I think it's a bit of a huge distraction. Unless it's for educational purposes like they need it to record things then I'm all for it. But I think it's just really not a good place to have a phone."

Kristina's view of the removal of phones from the classroom was more pragmatic, noting that it wouldn't really make much difference to how the tweens interacted during class time as all their mobile devices are interconnected and multi-functional

"I don't see a difference having a phone in the classroom because everything is now connected through our laptops - everyone's just messaging via their laptops. "

Some students were concerned about the impact of having phones in the classroom on social interactions and their friends, just as tweens from previous years before mobile devices might have been:

"I know some people pretend not to be doing other stuff, but they're really on social media or texting their friends. Sometimes they're being mean about other [students] and I don't think that's good. I worry about how this upsets some of the [students]. So, if we could just get rid of that [phones] that would partially solve the issue. Okay so what's the extra layer that the phone has over the laptop. So, it's just more available. It just adds more distraction because there's like this device that we think needs our attention." (FG)

Personal maturity and management were additional topics that were brought up by the tweens when considering the prospect of phones being banned or allowed in the classroom. George noted:

"So many of the kids just have their phones in their pockets and they are trying to hide [using them] behind their laptop. I don't do that, mine stays in my locker."

And from Tilda:

"I truly disagree with having phones in the classroom. I think it's a bit of a huge distraction. Unless it's for educational purposes like they need it to record things then I'm all for it. But I think it's just really not a good environment to have a phone."

The perspectives of the tweens regarding the possibility of banning phones from schools were as varied as many other viewpoints of the tweens regarding their use of mobile devices. The confidence and honesty with which the tweens presented their opinions were noteworthy, summed up by this final comment from Alice:

"I feel like some older people can get a bit confused about how we use [mobile devices] and that's fair enough because with they did not grow up with an understanding [about] technology. I think they just don't understand that for us, all of this is just the stuff we know because we've always had them [mobile devices]. We're not always doing the wrong thing. It's just sometimes, I think they don't really know what we are doing."

4.10.3. Personal Management And Tween Perspectives

The tweens were open about most of their actions and behaviours, sharing some interesting perspectives about how they manage their time and use of mobile devices. The survey responses about parent management through screentime control and other management strategies provided a clear picture that the tweens overall understood that parents need to keep them safe, but that they would like more responsibility. The following excerpts are taken from several of the interviews and focus group sessions, where the tweens provided detailed commentary about parental management of their mobile devices (Table 50).

Table 50

Tweens' Perspectives On Parental Management Of Mobile Devices - Millie

Interviews – Millie (12)	Perspectives on management
Is there a need for screentime controls?	<i>They [parents] should put controls on for young kids so that they have a bit more control over what the young kids are doing.</i>
How do you think you'd manage that?	<i>I'd put little reminders on mine, so I'd set a time on how much I would like to watch</i>
Do you think all your friends would be able to do that?	<i>Maybe possible. half of them....but others...no</i>

Hamish was twelve years old when this study was undertaken and had some strong views about the impact of parental control over his mobile technology interactions. As with many tweens, particularly when heading towards the teenage transition, Harry expressed the need for greater personal responsibility and demonstrated a desire to be given an opportunity to show he could do this – and frustration at the impact of time limits stopping him in the middle of an activity. The perspectives shared by Hamish were reflective of the viewpoints of many of the other tweens (Table 51).

Table 51*Tweens' Perspectives On Parental Management Of Mobile Devices - Hamish*

Interviews – Hamish (12)	Perspectives on management
Do your parents set screen time?	<i>Yes, they do. It's quite annoying actually.</i>
Tell me about what's annoying about it.	<i>Oh, just um I might be in the middle of something and then it'll just shut down and my time's over. I can't do anything.</i>
Explanation	<i>I would prefer to not have screen time limits and I can tell the time, so I'll be able to tell when I've had too much time and when I haven't</i>

One of the younger tweens, Harry, who was ten when participating in this study, seemed quite grateful for the fact that he was given access to mobile devices. He reflected that his parents had strong control over his access and an awareness of the consequences for inappropriate usage (Table 52).

Table 52*Tween's Perspectives On Parental Management Of Mobile Devices - Harry*

Interviews – Harry (10)	Perspectives on management
Access - laptop	<i>Dad set me up with an account on our monitor. He has the password - I can do my work, but I can't log myself in</i>
Access - smartphone	<i>We sat down together off to dinner and talked about the responsibilities of the phone, why I was going to have it and what I was allowed to do - if I was caught doing the wrong thing it would be taken away.</i>
Controls enforced	<i>It's been locked down back to factory settings and I can't put any games on it</i>
Perspective	<i>I'm really privileged to actually get a phone at my age because my sister didn't get a phone. She was about eleven. I think.</i>

Very few of the tweens spoke about restrictions on their laptops, particularly time restrictions. This seems to align with the perspective that laptops are generally considered more work devices whereas smartphones and tablets may be viewed as being more likely to be used for entertainment or social activities. Harry had mentioned that he could not

use his unless an adult used the code to unlock the laptop, but the other tweens focused mostly on the screentime controls on their smartphones and tablets.

The tweens generally seem aware of the implications for excessive screentime use, although there were responses in both the survey and discussions that were underpinned with annoyance at having an adult (albeit a parent) enforce these controls. The following comments are a synthesis of the key comments made by tweens during focus group sessions, reflecting the general sentiment of many tweens across different survey instruments (Table 53).

Table 53

Tweens’ Perspectives On Parental Management Of Mobile Devices (Focus Group Sessions)

Focus Group (ages 12/13)	Perspectives on management
Management of own screentime	<p><i>I feel like if you're kind of if you're responsible and you can actually think about getting stuff done you shouldn't need restrictions. I can manage myself.</i></p> <p><i>My parents put time restriction limits but I do it myself, I know it's not good to be on your device all the time</i></p>
Trust from parents	<p><i>I think my parents shouldn't use parent controls because they can trust my use and they can give me an app that helps monitor how much time I am using.</i></p> <p><i>If I do the wrong thing then they should put controls on – if not, they should trust me</i></p> <p><i>I like to be given the chance to download my apps so I can show my dad I didn't need to have restrictions and I can control the way I use my devices</i></p>

Trust was a perspective that was raised across all data collection instruments in this study. The tweens demonstrated a strong need for trust from parents, indicating that they were becoming responsible enough to manage their own screentime. This was particularly evident as the tweens transitioned more towards adolescence, an indication of growing maturity, need for independence and greater responsibility. These tweens had also moved from the primary school environment to secondary school, with many of the participants towards the end of their second year of high school when this study was undertaken.

The tweens' opinions towards their peers' mobile device management were often described with less trust than they themselves expected to be given, as described by Millie during her interview: *"There are controls parents can use on your device, but some kids are really sneaky. They find ways to get extra time."* There were several comments made about others cheating, being sneaky and knowing how to *"get around the controls that are put there by parents and teachers"* (FG).

The tweens reflected that they could learn to manage their own devices because they were *"no longer little kids"* (FG). The general consensus was that they should be given the responsibility of management and that if they demonstrated an inability to do this effectively, then control measures could be enforced.

4.10.4. Distraction

The concept of distraction was also discussed, with a focus on wanting to understand what this meant from the tween perspective. The tweens were asked what it might feel like to be distracted and what might cause the disruption. Their responses were open and forthright, describing openly how they perceive the notion of being distracted (Table 54).

Table 54

Discussing Mobile Distraction - Interviews And Focus Groups

Focus	Perspective
Distracted by others	<i>If I'm looking at someone else's screen from behind I might get distracted. I try to look away...I just know I'm not getting my work done and I can't help it</i>
Hiding from teacher	<i>I think I can get back in focus pretty well. But if the teacher's coming you just swipe that off. I've done it a few times</i> <i>Usually, I feel like a lot of guilt when I'm distracted because. It's. Because like if I'm doing something I shouldn't be doing.</i>
Personal distraction	<i>I definitely find if I have my laptop open, I don't learn as well if I have it as if I have it shut. I just find like a notification or pop up or I'll say an email and I'll be like 'oh I'd better look at that email'.</i> <i>YouTube is probably the biggest distraction for me when I'm at school and at home because I have access to that on my laptop and it's just the visual engagement that really distracts me and having all these videos to choose from.</i>
Personal management	<i>One to two minutes before I realized that I'm distracted and then I try and get back to my work and get into that zone again.</i>

Focus	Perspective
	<p><i>Well, I don't really get distracted too much anymore, I think I can get back in focus pretty well.</i></p> <p><i>I don't really have a big problem with my phone distracting me</i></p>
Peers being distracted	<p><i>I have some friends that get distracted so easily. So, you know they'll be looking at something and you know something will pop up and then they'll go down that course and then another video pops up and they just keep going</i></p> <p><i>Sometimes I find it like really annoying that other people are being distracted</i></p>

The tweens seem to be aware of the potential for distraction and how even those who would normally try to not 'do the wrong thing' can be easily sidetracked by either their own devices or those of others. In a classroom, other students' screens that they can view exacerbate this, and their inquisitiveness seems to overwhelm their sense of attention to their classwork. In some groups, tweens also spoke about the messages sent from teachers throughout the day to provide class updates and other essential communications. Regardless of whether these messages are important for that day, they felt compelled to read them as soon as they received an incoming notification. They also reflected that the distractions are more accessible because they feel the teachers are not aware of the possibility of having multiple screens operational at one time. Laptops and smartphones were discussed as being equally capable of receiving and sending messages as smartphones, so the issue of locking phones away during the day was deemed ineffective and redundant.

The following explanations presented by the tweens in interviews and focus groups further assisted in demonstrating how the tweens perceive the notion of distraction and for some, how they manage this issue (Table 55).

Table 55*Tweens' Opinions And Perspectives On Distraction And Personal Management*

Focus	Explanation/perspective
Opinion	<p>All mobile devices can message – not just phones</p> <p>Checking emails is not really like being distracted – I'm not on the internet or YouTube</p>
Mixed messaging from teachers	Teachers sending updates and emails for classes through the day – how can we know what they want if we don't check the emails during class
Student managing teacher surveillance	Students will have multiple screens open and just swipe from one to the other when the teacher comes – most teachers don't know you can do that
Peer distraction	<p>I usually ignore [others distracting] but if I'm really annoyed then I'll just tell them to stop.</p> <p>When I'm at school I'll glance at what someone else is doing they might be doing the wrong own thing and then I look and see what they're doing and I am more interested in that.</p>
Notifications	Pop-ups on the screen create a lot of distraction if you let yourself keep going and going.
Concern	I feel like I'm not being as productive [when I've been distracted] and then when I reflect back on the lessons, I feel like I've not done as well as I could have.
Personal management	<p>I am a very anti-social person so not many people text me unless it's important.</p> <p>I just find it so much easier [to have my devices away] because then the temptation is also not there for me.</p> <p>I usually catch myself doing this. And when I do, I just take a break take a break away from my devices for a bit and then I go back to work. So, then my mind's like reset.</p>

The tweens displayed a strong awareness of how their devices can be distracting, openly discussing what it was like to be sidetracked and off task without meaning to. The following comment from Kristina, sums this up well: *"I just see something that pops up and looks interesting, because it's just there...I'll just find myself heading off somewhere*

else. Sometimes that has nothing to do with whether I think the other activity I was working on was important...but maybe it's less interesting."

Katie's perspective added another outlook:

"I know the phone can be a distraction – and obviously just the temptation of being on a desk or something and then you hear of something [and] I wonder what that is and go and look it up. And then you can kind of get distracted, because then you realize you haven't heard the other things everyone was discussing that you should have been listening to. It's not like you're really doing the wrong thing, it's just not where your head should be at that time."

For some of the tweens, they reflected that was that sometimes they might look like they were off task or being distracted by their mobile device, but they didn't see this behaviour the same way as the teacher: *"I just get bored when I've finished my work, so I start looking up interesting stuff,"* and *"sometimes I'm just looking up my timetable."* (FG)

Most of the discussions about distraction were related to when the tweens were meant to be completing schoolwork or homework with no comments specifically made about being distracted immersed in other activities not related to formal learning. It appeared, therefore, that the tween perception of distraction as a concept, relates primarily to when they consider they are off task – the task generally being schoolwork. During the discussions, there were some reflections about distraction during family occasions, conversations, when walking, travelling or other activities where one could plausibly become distracted from events happening around them. At times, the tweens reflected that older or younger siblings might be less responsible, but this was minimal and outwardly not significant to the participants. The tweens also did not comment on their particular groups of friends being distracted during peer social interactions. They did, however, reflect that when using devices, they or others might be disassociated from the world or people around them at the time. Different perspectives were offered, with Katie's viewpoint being:

"I see girls getting out of the car [with their headphones in] listening to music and I kind of think to myself why would you listen to music when you have someone that's willing to drive you... I love my Thursday mornings just in the car with Dad...just getting to talk to

him like we're humans, it's my special time. You know there's other mornings I get to do that [listen to my music]."

Alice provided another perspective: *"We often just sit together and everyone is listening to their own music. Sometimes we text each other and share songs, but mostly it's just the way we hang out together"* and Tessa: *"I usually have my headphones in from when I leave school. I like being in my own world and just thinking about my own ideas. We're not allowed to do that [have headphones in] when we're having dinner, though."*

The concept of distraction was also deliberated from an alternative perspective by some of the tweens, relating more to how the use of their mobile devices helps them to stay on task, thereby helping to mitigate other distracting behaviours. At various times throughout the interviews and focus group sessions the tweens made reference to how using their devices was part of how they focused on studies or stayed on task in other activities, including running, exercising, doing chores or waiting for someone/something. These perspectives were shared by tweens in the focus groups: *"If I don't have my devices, I asked my brother to put on music from his room so I can stay on task – I'm much better when I have music to listen to."* And: *"I am not the kind of person who can stay on task cleaning my room so sometimes I'll watch Netflix while I'm doing it. If I have my iPad [when I'm supposed to be doing something] I can play music and sometimes I FaceTime my nan and pop."*

4.11. Social Connections

The tweens' digital ecology comprises all the connections and experiences that occur across the scope of the day. Throughout all aspects of this study, the theme of social media continued to emerge with a range of perspectives shared that present the range of tweens' attitudes towards social interactions using mobile connections. Tweens have the capacity to be online throughout all parts of their day – they are 'wired' at all times, through a range of networks, everywhere they go and across the full scope of the day and night. It was edifying to be presented their narratives communicating the where, when, how and why of their networks and interactions.

4.11.1. Social Media

The use of social media for connection was frequently mentioned throughout the survey, discussions and interviews – more than anticipated due to the age of the children involved. There were many perspectives and reasons for using social media presented, with a range of apps and resources used.

The following table (Table 56) summarises different types of social media used by the tweens and their rationale for using the resource.

Table 56

Tweens' Perspectives On Social Media Use

Purpose	Perspective
Connecting	<i>When I use social media, I can contact my friends and entertain myself or I can ask them how to do a certain homework task or question.</i> <i>I feel connected to the world and that I know what is happening around</i> <i>I like to see what my friends are up to and it gives me some ideas about what I could do to interest myself.</i> <i>I use whatsapp for messaging people who don't have an apple phone – they can't use messages or FaceTime.</i> <i>We play Minecraft at home – you can chat while you're playing</i>
Online publishing	<i>Instagram is my only social media site. It's where I put all my drawings...a lot of people like my stuff</i> <i>I use Instagram and Snapchat. I put on stuff about scootering...people like what I've done and add comments. My mum can see everything I do.</i>
Personal	<i>I usually just see what other people are doing. I don't really feel comfortable sort of sharing things that like anyone else could see.</i>
Feedback	<i>I use Strava – its where you record the fitness stuff that you've done. It's like Instagram except you post activities that you've done...I can get feedback on what I can do [to improve my time].</i> <i>I put my games on RoBlox and others tell me how to make them better</i>
Social gaming	<i>I spend like time playing Minecraft and watching one of my friends who has a YouTube channel.</i>

The tweens who participated in this study primarily indicated they used social media for connecting with friends, obtaining feedback and for the distribution of videos, artwork or other publishable works in an online space. In other discussions, the tweens spoke about how they made their own YouTube channels where they might share a series of videos about how to do something like scootering or tumbling. Many of the tweens indicated they used multiple accounts such as YouTube and Instagram for the distribution of their videos. Some of the explanations involved serious discussions about how they manage their safety online, with most of the tweens in this study reflecting that their parents had full view of their accounts and helped them to maintain privacy. The steps taken for safety included parent passwords, tween pseudonyms: *"I don't use my real name, no-one except my friends know it's me"* (Alice), noting that it is important not to have any information online that tells anyone else your personal information.

Although most of the tweens appeared to accept parental decisions about social media restrictions or management, one of the interviewees, Cassidy (13 years), spoke candidly about how she put social media onto her phone (before she had app restrictions). She indicated that even though usually she does the right thing and understands why her parents had not allowed her to have an account (Instagram) she just wanted to *"explore a little bit."* Peer conversations had piqued her interest and curiosity about the significance of having social connections. Cassidy said she only had it for a few weeks – but once she had it, it was not as interesting as she thought it would be. *"I don't think I'm the same as all tweens – I have a friend who has about 3 hours set by her parents, but she knows the screen time password...she said the time she's given is not nearly enough. I was like...what do you do on social media that you spend that long on it?"* She indicated that some things were cool – she follows National geographic, but that other things were boring after a short amount of time.

4.11.2. Social Connections

One of the key methods discussed by the tweens in this study for social communication or interacting was through instant messaging. The tweens use a range of different apps and resources, driven largely by the devices and apps used by their immediate peers and/or family members. Throughout the data generated through all instruments used, the tweens reflected that they text and message a significant amount during their day, at all times and all locations. This supports the notion of polysynchronicity where time, space and place

are inconsequential to the mobile tween where interconnectivity is ubiquitous and multifarious.

The following comments summarise the key reasons given from the tweens about how and why they use instant messaging, with most of the focus on connecting, convenience and availability. From Tessa: *"I text a lot to stay in touch with my friends. It's nice to know what they are up to."* And from Hamish: *"It's just an easier way of staying in touch – it doesn't matter if I'm busy, I can reply when I have time."*

The tweens indicated they text whenever they think about something they want to communicate to their social networks, whether this is to family or friends. Because their mobile devices provide them with ever-present connectivity, they expressed that sending a message to someone is not something that they make a conscious decision to do, using the device: *"I just think...oh, I'll tell [my friend] that, and so I send a message...I don't think about where I am or if I should or shouldn't send a message"* (Kristina).

The seamlessness of interplay between the mobile connectivity of the tween and their lived ecology further supports the notion of the tween *being digital*, and how their mobile enabled *modus operandi* (methods of operation) - their *MEMO*, does not consciously disregard the structures of a traditional pre-digital world but operates in a sphere beyond the boundaries of that world. The nature of the tween *MEMO* emerged as significant in the study, revealing the shape of their mobile enabled experiences and operational processes as they navigate through the day.

4.12. How Tweens Are Learning

Throughout the key phases of data collection, the tweens discussed how they learn things in different ways, enabled by their devices. Some of these have been explored previously in this chapter when considering the apps they use and the games they play. In addition to those experiences, the tweens talked about their processes of learning and how this is different because of the technologies they have available.

Immediacy is a key factor in learning for these tweens. Harriet explained that when she visited Wales (UK) and thought Welsh looked like a cool language she immediately started learning it on her phone using Duolingo (language app). There was no period of waiting, signing up to classes or indeed the disappointment of not being able to find a

class available. Similar stories were shared by other tweens who were learning languages of interest or who saw someone do something and thought it looked interesting. The tweens reflected that as soon as they were interested in something they could start learning it. The information and tutorials were immediately available, and they were not limited to one source of information – they could search for the resource that best suited what they want, and just use the parts of the tutorial that they needed. These reflections were also suggested as being how the tweens would like to learn in school.

“I like to just do thing until I am happy with what I have learned and then I can ask about something else. When I’m learning how to code, for instance, I understand the theory because I’m learning that as I work out how to do the coding. It just all fits together and makes sense. And because I’m actually making something, like a game, I’m not just doing something I can’t see the point in doing. I like doing stuff where you can actually do something rather than write pages and pages of just nothingness.”

Some of the tweens discussed how they like to use their devices to work with because of the different functions available. The following thoughts were presented by Alice who had previously discussed:

“I have a different mindset when I’m writing. I just like with the laptop I can just sort of all the information’s right there and I can sort of copy paste and move my information my notes my hand so that everything sort of works together whereas. When I’m writing it’s just like I can’t physically move it to like the page or down the page and just sort of bunch my information together.”

And from Issy: *“When I have my laptop and I have an idea I can just quickly write it down. But if I’m doing it by hand, I’ve lost the thought in my head.”*

The tweens also discussed the disconnection between what they are able to do with technology and what they may be required to have to do at school. Jimmy commented:

“I am obsessed with dancing and I am obsessed with music, and I make videos and write my own music all the time... and so when we do like music lessons [at school] there’s the kids that don’t know anything about music and so for me it kind of gets boring. We all just have to do the same thing, and no-one really asks what I can do.”

Several tweens suggested that they would like to be given more opportunities to do things in a way that really interest them. In the hours outside school time, the tweens were creating music (and selling it online), sharing their art on Instagram to get feedback from others, making videos of their tumbling and putting them on Instagram or YouTube, coding using Unity (coding program), C+ (coding language), making beats for others ' music.

Many of the tweens indicated they learned new skills through the internet. Harriet showed a cardboard chair she was making for a change the world project she'd been working on for school. She'd learned how to do what she wanted using pictures on the internet to expand her own ideas and had then recorded a time lapse of putting the cardboard chair together to share her project at school using the camera feature on the smartphone. In the focus group discussions, tweens also shared that when they needed to find out something, they would ask Google rather than do a more traditional search: *'You know, you just say, Hey Google 'and then you just ask your question.'*

Survey responses about how tweens learn new skills are presented in Table 57.

Table 57

How Tweens Learn New Skills (N=1,099)

I learn new skills by:	Percentage
Searching Google	71%
Work it out for myself	68%
Ask someone for help	58%
Use videos online	57%
Work it out with friends	56%
Other	2%

The 'other' ways tweens learned are shown in Table 58.

Table 58

Additional Ways Tweens Learn Skills (N=24)

I also learn new skills by:	Percentage
Learning in school	16%%
Tips from my phone	10%
Ask Google	10%
Accidentally	10%
Mum/dad/siblings	30%
Non-specific	24%

Some of the comments about learning made by the tweens are presented in Table 59. The reflections give several perspectives, from how the tweens would like to learn differently with others raising concerns about the implications of learning with mobile technologies (Table 59).

Table 59

Tweens' Perspectives On Learning Differently

Focus	Perspective
Choice	<i>I use YouTube a lot and I like to learn new things buy watching channels about space...I'd like to be able to learn like that in my classes – find out things I want to know.</i> <i>It would be better if we could use the apps we want to use – not the ones the teacher wants.</i>
Personal interest	<i>I've been reading about astrophysics because I'm interested in that, but at school you can't study that topic until year 11. But I'm interested in that now.</i>
Flexibility	<i>It would be good if we could be more flexible with how we learn. Like a while ago, I was really interested in coding so I just used Khan academy. You can cycle through the lessons and go back and do previous lessons to remember the stuff if it gets tricky.</i>

Focus	Perspective
Trial & error	<i>Mostly I'd like to learn through trial and error, like when I started using garage band. If I got stuck, I could just look up how to do the thing I didn't know or ask my dad or a friend.</i>
Collaborative	<i>I make videos about things I'm good at – and some of my friends are really good at coding or music. It would be good to learn from each other or do things together.</i>
Authentic learning	<i>I'd really like to do more coding – but not just for making a sphero (robot) go around the room, I'd like to solve some real problems or make things that work.</i>
Concerns	<i>I've lost my ability to write it a lot. I find it a lot harder to end right now because it's a lot slower and not as convenient. And I'm not really that well versed in finding resources outside of my laptop so going to the library is really foreign to me.</i>
Conflict	<i>[In classes] you're typing nonstop. And then when you come to exams you have to write it all by hand and then it's really hard – and you can't think the same.</i> <i>What concerns me is the HSC (final school exam) is written. And just if I lose that ability to just be able to write really quickly with my hand then what's going to happen when I won't be able to get all of my information down on the things I want to write.</i>
Inoperability	<i>If the wifi goes down, we can't get any of our books or other resources. Then we don't have any way to do our work.</i>

Overall, the tweens reflected the desire to be less constrained by traditional approaches to learning. They expressed a longing to be flexible, have choice and be able to work within the *MEMO* to which they are accustomed (See Appendix L for examples of tween *MEMO* in action).

Interestingly, one of the main things the students were concerned about was not being good at handwriting because of all the typing they do on their devices. None of the tweens who raised this issue suggested that completing exams digitally might be a solution. While they wanted to be able to learn differently, there seemed to be a strong connection with expecting exams and assessments to be completed traditionally by pen and paper.

4.12.1. Social Learning

The findings show a significant crossover for the tweens with their interactions online through a range of different social media and games. The notion of students communicating through games has been discussed briefly in section 4.8, but in this section, the broader perspective of how games, both for consumption and creation are integral as an under-layer of learning experiences for many tweens, will be demonstrated in light of the perspectives presented (Table 60).

Table 60

Social Learning Through Games - Tween Perspectives

Focus	Tween perspective
Personal	<i>I'm able to express my feelings to other people and build my skills in social settings. Gaming has built my character as a person and it is a large part of who I am.</i>
Wellness	<i>When I feel mad with life, I like to escape into my other lives in these games, where I can hide behind my screen and a firewall, sink into the world of cyberspace, yet stay where I am, just live another life, while living my own.</i>
Entertainment	<i>I love gaming. It's entertaining though I do like doing other things too, it would still be my No. 1.</i>
Learning	<i>I play games like wordscape because I can challenge myself with other people and try to improve my vocabulary</i>
Challenge	<i>Well, this isn't really a game, but in Duolingo, you kind of play against other people and there's a leaderboard so if you're not on it, you want to try harder</i>
Creative	<i>I can make anything I like – I just create games for fun</i>
Feedback	<i>I like making games and seeing if others can play them – that's when you know you're getting better – especially when other people make comments like 'this is a great game'</i>

Many game platforms, for example, Duolingo, Halo, Fortnite and Minecraft also have social media components. This enables interchange between the game and social connections, where the tweens, as they play, can connect with other players, sharing game tips, strategies and in some games, hobbies or just social chatting. Learning appears to take on the shape of the experiences, not bounded by external parameters, but a

reconstruction of the processes of acquiring skills and understanding as the interactions and networking during the game find their course.

Millie discussed how she makes games using Roblox but also uses the social media aspect of the game to learn how to improve what she has made. She indicated that she just makes random games and then people comment, so she can fix things that are wrong. But she also reflected that most of what she does is just purely for her own entertainment. Hamish discussed how he is quite involved in a game called Halo and how he uses social media and texting to find out tips and ‘mods ’to learn how to play the game more effectively. This study did not explore the issues that may be connected to online game playing, rather, but rather, investigating only if the tweens were using online games – or creating them, and the skills or literacies that developed as a result.

From the responses submitted, there was a strong correlation with the findings in a study done in about how children play and develop games undertaken at a school in New York in the US, focusing specifically on the connections between game playing and design as a new paradigm for learning (Salen, 2011). In Salen’s study, the following core practices that align with the findings from this study were identified. The core practices are listed alongside the comments collected from tweens in interviews and focus groups in Table 61.

Table 61
Core Practices Identified (Adapted From Salen, 2011)

Core practices	Tweens’ perspectives
Interacting with others	<i>When I’m playing games, I can think about things in the world work and connect to people who are interested in the same things</i>
Experimenting	<i>I can take risks when I’m creating games – and when I’m playing</i>
Inventing solutions	<i>I can solve problems when I’m designing and making games - I have to understand how the game is played and invent different ways of doing things sometimes</i>
Playing & reflecting	<i>I guess I’m reflecting when I play, but mostly on how I can make things work better</i>

Theorizing & testing	<i>When I'm making games, I just keep trying things, if they work, they work, if they don't, I try something else</i>
Practicing in context	<i>My friends all play the games I make, but we can also add the games to the site for others to see if they work properly</i>
Giving & receiving feedback	<i>I put my games onto the site so other people can tell me if things work. Sometimes they also make suggestions for how I should do things differently. This helps me improve what I'm able to do – it makes me feel good when others are playing my game.</i>

In addition to the key findings about social learning through online games, there were several broader examples of how tweens may be amalgamating their digital and physical worlds across a range of experiences and activities. Harry discussed in an interview how he plays a game called Forge of Empires (based on medieval times) online, but how he loves medieval history and plays a lot of medieval games at school at lunchtime. He connects the games together, learning from the online game to be able to “*play more real medieval stuff*” (Harry).

In conversations in focus group sessions, two of the tweens discussed how they have taken an online game played frequently on mobile devices and created their own physical game to play with friends and/or siblings.

From this game, the tweens had invented a “real life” physical game that was played with peers over a period of several days. The children had used some of the features from the online game and expanded those into the physical space.

Reflections from the children included: “*Yeah, we just started to make the game up...we kept thinking about how we could make the different parts of the game and just used whatever we could find for the different parts.*” And: “*We play the game online and then we can develop the clues and scary things we do when we play the game for real – it's pretty cool.*” (FG)

These findings implied significant interplay between the physical and virtual, with increasingly blurred boundaries crossing the lived space, the imaginary space and the virtual affordances of mobile interactions.

4.12.2. Tweens' Perspectives Of Teachers' Digital Capabilities

The tweens didn't discuss teachers' capabilities with technology often during the focus groups or interview discussions. However, when they did, their perspectives were interesting. Jimmy noted that he felt teachers should be able to use technology, not just expecting that the students will be able to do it without guidance – or draw on the skills of the students in the class: *"They should know how to use it if they're going to like get their kids to do it – or find someone in the class who knows. We could teach the other kids and the teacher."*

George suggested a slightly different perspective: *"Most of the time we should be left to just work stuff out. Teachers could do that with us and not make us go through them teaching us how to do something we can probably already do."*

In the focus group discussions, one of the tweens stated that they had spent a long time editing a video for a teacher because they didn't know how to do editing: *"No, not during school it was on a weekend. The teacher said so here's the video for you...it took about 12 hours. I don't mind, I'm pretty good at editing."*

The tweens reflected that the smaller devices are harder for the teacher to detect when they might be doing the wrong thing. Their responses indicated that they are aware that teachers cannot always see when they are doing something other than classwork with their devices because it's not obvious from other parts of the classroom.

The tweens also spoke openly about how when they use their mobile devices, they can hide activities quite easily in the classroom when not on task, and often the teacher is not aware of this happening. From the focus group sessions, contributions included: *"I just flip my app off the screen if the teacher comes nearby"* and *"it's easy to flip to a new screen on your laptop so no-one can see you've been doing something else...most teachers don't know you can do that."* (FG)

At the same time, the young people indicated they are aware of their responsibility to use devices properly during class time and that they know that *"kids doing the wrong thing is why teachers think technology is bad"* (FG).

The final comment in this section is one presented by a tween responding to the survey question about the use of mobile phones in school: *"Mobile phones and social media are*

a curse to teachers. Laptops are already widely used and convenient. Tablets can be used for art and watches are useful, anyway.”

While this study did not seek the perspectives of teachers regarding tween use of mobile devices, this would, in a future project be useful data to collect. As previously stated, the data for this study was deliberately focused only on the perspectives of the tweens. This study used a person first approach to understand the experiences *of the tween*, not *about* the tween. Nevertheless, with the data generated through the project undertaken, it would be also useful to seek the perspectives of parents and teachers to be able to contribute to this area of significance on a wider scale.

4.13. Summary and Conclusion

Of additional interest in this study was a comparison of the data from the survey, where the majority of responses were contributed during two ‘quarters’ (three-month segments) in the calendar year with the first series of responses (Group A) coming from a range of gender and education sectors, with the contributions in the second ‘quarter’ (Group B) by tweens from one independent, all girls’ school over the following few months. This gave cause for further consideration of the perspectives that were being presented, as it could be expected that the demographic from the second group might have alternative views and experiences from the first group. Group B was an homogeneous group, with similar experiences and essential demographics, while group one was drawn from a range of demographics including gender, school experiences and geo-locations. The desire for establishing data integrity was also based on the number of participants in the groups, with group A contributing to just under 40% of the overall responses with group B, providing the greater contribution of almost 60%.

In an effort to establish that there was little or no impact on the data collected, the two sets of responses were separated for comparison using data trends analysis. While this part of the data analysis is not designed to specifically address the research questions, the trends observed provided a way of examining the data submitted to establish consistencies of responses across the different participant demographics.

The results explored in this section suggest that factors other than gender, demographic or the influence of schools attended influence the perspectives of the tweens regarding their use of and experiences with mobile technologies. These specific factors were not

addressed in this study but would be valuable to explore further in future examination of tween mobile technology experiences.

Several sets of data were selected to demonstrate the similarities between the two groups of respondents (Group A and Group B). The data presented were selected randomly from those questions that related more closely to perspectives of the tweens. Figures 4.12 and 4.13 show the comparison of responses from the tweens in each group regarding parental screentime restrictions.

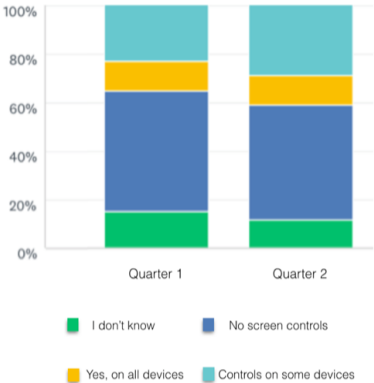


Figure 4.12 Comparison of responses regarding parental screentime restrictions on the tween's mobile phone (n=1,103)

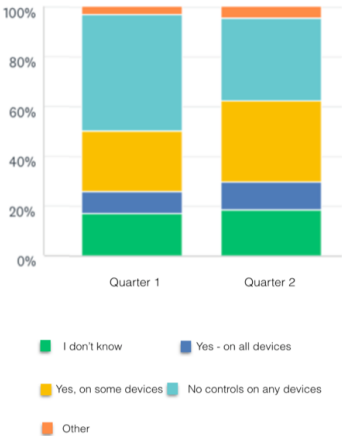


Figure 4.13 Should parents use screen restrictions - group comparisons (n=1,103)

In the graph the two sets of responses closely represent one another, with very little variation between the groups regarding the degree to which the tweens knew about the screen controls their parents had and how much control they considered should be applied.

Two further sets of data were compared to determine consistency and data integrity between these main groups of survey participants. The questions where the tweens were asked to consider how much time they had used a mobile phone the previous day (Figure 4.14) and what the key activities were focused on (Figure 4.15), indicate corresponding data responses, with quite closely aligned hours of use and purposes for the activities experienced by the tweens.

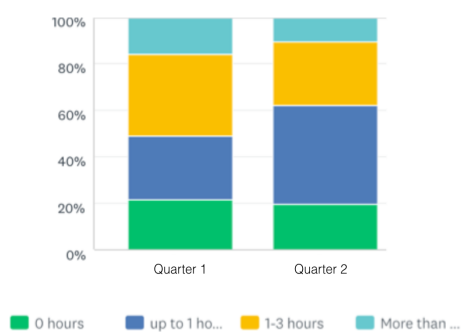


Figure 4.14 Yesterday, how much time did you spend using a mobile phone? (n=1,188)

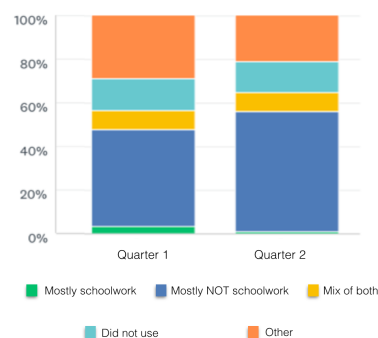


Figure 4.15 What was your mobile phone use mostly for? (n=1,189)

One final set of data entries has been considered for this comparison, as the questions focused on an area that could have potentially demonstrated a difference between the groups, that is, what the tweens do online and how much their parents know about what they do. By comparing the two sets of data, it can be readily recognised that the responses presented are reasonably closely aligned in all aspects of the question and possible answers, thereby demonstrating confidence in the consistency of responses as a reflection of the experiences the tweens were presenting in their responses to the survey (Table 62).

Table 62

Comparisons Of Answers From Groups 1 And 2 - Survey Responses (N=1,104)

Questions asked	Group A	Group B
Do you...		
Watch videos for schoolwork	84%	87%
Watch videos for fun	94%	95%
Follow people on YouTube	37%	33%
Watch videos to learn something for yourself	81%	71%
Search the internet	93%	93%
Use social media	76%	70%
Do your parents know a lot about...		

Questions asked	Group A	Group B
What you do & see online	47%	41%
If you use social media	56%	56%
What you do on social media	42%	42%
What you do on the internet	44%	39%
Do your parents talk to you about...(Yes)		
How long you can use mobile devices	62%	66%
Media you can use	76%	77%
Staying safe online	92%	95%

This study did not attempt to compare the different sectors through these comparisons of question responses, but rather, used the data to determine that the tweens, regardless of their demographic or school sector, have responded with similar patterns throughout the survey. Having the two distinct sets of data from the 'quarters' used to filter the responses has provided an interesting opportunity to make these comparisons, enabling confidence in the study data generated throughout the survey instrument.

Throughout Chapter 4, the findings from this study have been presented with data from the survey, interviews and focus groups used to represent the triangulation of data collected throughout the research project. The focus has been on extrapolating the essential narrative of the tweens who participated in the study, concentrating on a person centred perspective (see section 3.13) and ensuring that the data examined was a deliberation of the tweens' perspectives. Throughout the chapter, the data collected has been presented in thematic components, presenting the key focal elements identified during the process of analysis, coding and categorising.

In Chapter 5, the data collected and analysed, and the findings presented will be further scrutinised, demonstrating the contribution this study has made to existing knowledge, and how it has added new perspectives and understanding to this field of research. The themes identified in the findings will be explored thoroughly, considering 'what is happening' when tweens are interacting with mobile technologies.

5. Discussion

5.1. Study Overview

This chapter discusses the significance of the key findings from previous chapters, examined through the lens of this study's research questions. The contributions of the study will be explored, examining both the findings and the consideration of future research stemming from the study. The study examined the relationship between the tween of today and their mobile experiences from their everyday lives. This study emphasises the perspective of tweens and not an observational point of view. Findings are focused on the interplay between the mobile and wired lives enacted by the tween participants, and the literacies and capabilities they develop as they use mobile technologies.

This study acknowledges that there are current concerns raised globally regarding issues related to excessive or inappropriate use of mobile technologies by tweens. There are frequent media articles presenting the dangers, concerns and questions around the use of mobile devices by children. There is also significant research examining the use of mobile technologies and children – from both sides of the pitfalls and benefits debate, but few that have addressed the mobile use from the perspective of the child or looked beyond the time spent online, the impact on children's behaviours, dangers online and mental health issues. There is a dearth of studies investigating what else might emerge from these mobile experiences. Additionally, the study has recognised that much research has previously focused on children as a broad group, small children (0-4) or teenagers, but little, to date, addressing the young 'tween' person transitioning from childhood to adolescence, a focus called for by some researchers in recent times (see Chapter 2).

Equally, the purpose of this study was not to examine the aforementioned issues or to determine their value, appropriateness or effect, but rather to better understand what is happening in the unobserved layer beneath the observable behaviours, interactions and characteristics of tweens' (pre-adolescents') experiences with mobile technologies. A key component of the research was to disconnect from the judgment of appropriateness or importance of the experiences and activities being undertaken, focusing with intent on the attributes, processes and skills the tweens exhibited, drawing on these to develop a deeper

understanding of the *modus operandi* of the pre-adolescent child. This study has investigated the potential interrelatedness of the experiences that tweens are immersed in as they shared perspectives and information concerning practices, social networks and exchanges, management and associated activities from their everyday mobile interactions. This study examined the mobile device interactions of tweens on a broad scale through a survey instrument that elicited responses from 1,142 participants from a range of independent, government, Catholic, homeschool and school of the air sectors (see chapter 4). Additionally, 14 tweens were interviewed in 1:1 online sessions, sharing specific, individual data about their mobile device use, while focus group participants took part in group dialogues, and some individual tweens submitted reflection recordings, sharing their perspectives, interactions and opinions for the study (see section 4.2 for details about study participants and demographics).

The overarching research question that framed this research study was:

How are tweens experiencing and constructing meaning as they interact with mobile technologies in their everyday lives?

Aligned to the research question are themes that emerged from the data during further analysis of the findings.

These themes were:

- the mobile and wired tween
- the tween digital ecology
- time, space and place
- formal and informal learning connections; and
- management of mobile technologies

Further to the thematic elements, the methods employed in this study have proven to be significant, demonstrating novel approaches used for the generation of data and the contributions of study participants. The methods applied have addressed the call by other researchers to find new ways of considering the implementation of more sophisticated processes in data collection addressing the inadequacy of existing data collection methods when investigating technology use (McDougall & Jones, 2005 as cited in Falloon, 2015, p. 55). Furthermore, in recent years much focus in studies investigating mobile technologies has been on finding appropriate methods for capturing data on the go

(Falloon, 2015; 2018) exploring effectual processes for eliciting a deeper understanding of dynamic mobile literacies in action (Potter & McDougall, 2017).

5.2. The Tween and Mobile Technologies

This study recognises that the tween is a child developing physically cognitively, emotionally and socially as they transition from childhood to adolescence (see Chapter 1). During this time of personal and physical development, with or without mobile devices, the child will acquire many new skills and competencies that prepare them for greater levels of social interaction and independence as they head towards their teenage years. This time of transition is not the same for each child; therefore, this study recognises and reflects that the experiences, skills and literacies mentioned in the findings may not represent all tweens. The tween experience described in this study is, however, representational of those children who participated in this research, appearing to align to similar data gathered across the globe in other studies as explored in the literature review (see Section 2.3). The findings from relevant past studies have been used to compare with those from this investigation where appropriate, whilst recognising that in qualitative studies, there are many factors that impact on data generation, rendering true cross analysis or exact replication improbable.

5.2.1. Ownership And Preferences

During the process of data gathering and analysis, the study undertaken considered the significance of tween device ownership including why this appears to increase with age as the children move from childhood towards adolescence.

In Chapters 1 and 2, reports from the Australian Bureau of Statistics (ABS) and other studies were analysed to gain a better understanding of existing information about mobile device ownership and access. During analysis of the information gathered from this study, two primary sets of data from this study were compared with data from the ABS (see Figure 5.1). Overall, the statistics are reasonably comparable, with the exception of tablet devices, where access to tablets in this study shows as being significantly higher than the ABS data. As smartwatches were not included in the ABS study, they have not been included in the data displayed below in Figure 5.1.

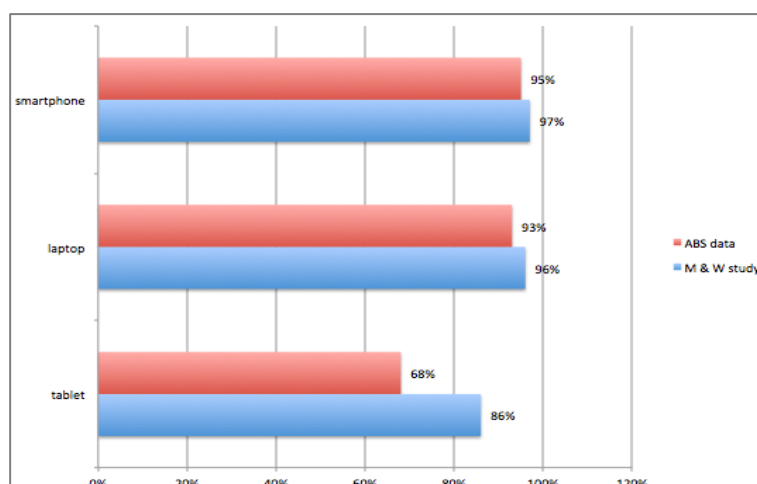


Figure 5.1 Access to mobile devices in this study's survey respondents ages 9-13 compared to Australian Bureau of Statistics data (adapted from ABS, 2019)

In Figure 5.2 statistics showing comparable ownership between smartphones and tablets for children in the UK are demonstrated, aligning to the shift towards smartphones demonstrated in this study as children transition towards adolescence.

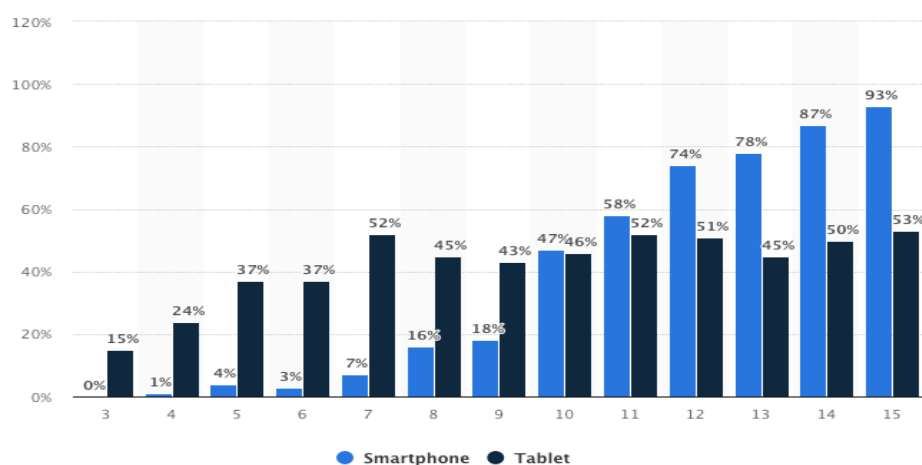


Figure 5.2 Share of children owning tablets and smartphones in the UK (Statista, 2019)

The final set of data shows smartphone access for children and adolescents in the US in 2018 (Figure 5.5). Graphical information regarding tablet ownership was not available for tweens' ownership of tablets, but this is noted by Rideout and Robb (2019) at around 56 percent in 2017.

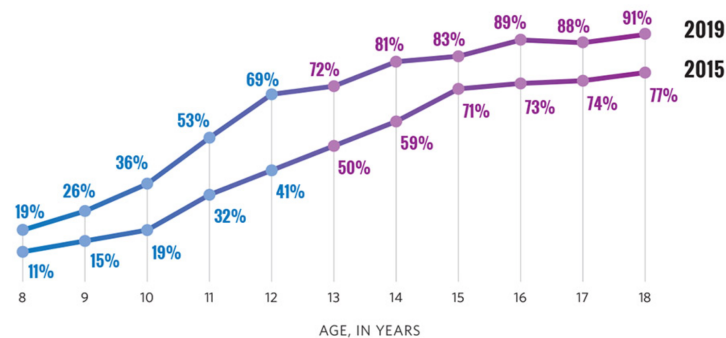


Figure 5.3 Increasing ownership of smartphones in children and adolescents in the United States (Rideout & Robb, 2019)

Comparing the sets of data in previously examined in Chapter 2, using information for 11 year olds (the common age group available across the majority of reports and studies) it appears that the ownership of smartphones for tweens in this study is relatively comparative (see Table 63.

Table 63

Comparison Of Smartphone Ownership In Tweens At 11 And 13 Years Of Age

Country	11 years	13 years	Growth
Russia	74%	N/A	N/A
United Kingdom	58%	78%	20%
United States	53%	72%	19%
This study	60%	85%	25%

The evidence from this study illustrates the trends for smartphone ownership of survey participants to be reasonably similar to comparative countries. It would seem then, that the data collected in this study generally reflects global trends demonstrated in other studies for this age group.

The significance of device ownership may be associated with the way in which the tween’s view use of the device, especially personalised features of the device. Data from

interviews and focus groups indicated that that device ownership (as compared to access or sharing devices) increased responsibility aligned to increasing levels of independence as they grew from children towards adolescence. This study reflected that the growth of smartphone and other mobile device ownership occurred during the last year of primary school (around 11-13 years of age) and into the beginning of high school at 12-13 years of age. Personal ownership increased across all device types, with the exception of tablets that continued to be high on the shared category within the family structure (refer to section 4.4.1).

Survey data about device ownership showed a trend that indicates a greater number of Australian tweens owning three or more devices by the time they are nearing adolescence, than from when they were beginning the tween transition around 9 years of age where personal ownership of multiple devices was somewhat lower. The increased access to devices does not dictate how tweens use the technologies available, but rather enables greater flexibility and interactivity, as will be unpacked in the ensuing sections of this chapter.

5.3. What Lies Beneath

This study did not seek specifically to determine the specific value of tweens using mobile technologies, nor to judge specific behaviours, interactions or investigate the issues potentially associated with the use of these technologies. While not ignoring the importance of studies relating to these issues, the goal of this study has been to explore the layers underneath the observable actions and behaviours developing a deeper awareness and appreciation of the dynamic literacies that may be developing during these experiences.

To demonstrate the findings from this study visually, the use of a metaphor depicting a sapling (representing the tween) growing above the ground and the roots beneath the surface has been used to present concepts relating to observable and non-observable behaviours and/or skills that have emerged during the course of the research undertaken. The analogy relates to how what is observed (above the ground) is a sapling with branches and leaves that indicate to the observer all that they see and assume or ‘know ’ about the plant (tween). In Figure 5.4, the observed behaviours and actions include ‘seeing ’ the tweens constantly connected, and addicted to their devices, distracted and

disconnected from the world around, off-task and always online, consuming media ‘mindlessly ’(Donald et al., 2020).

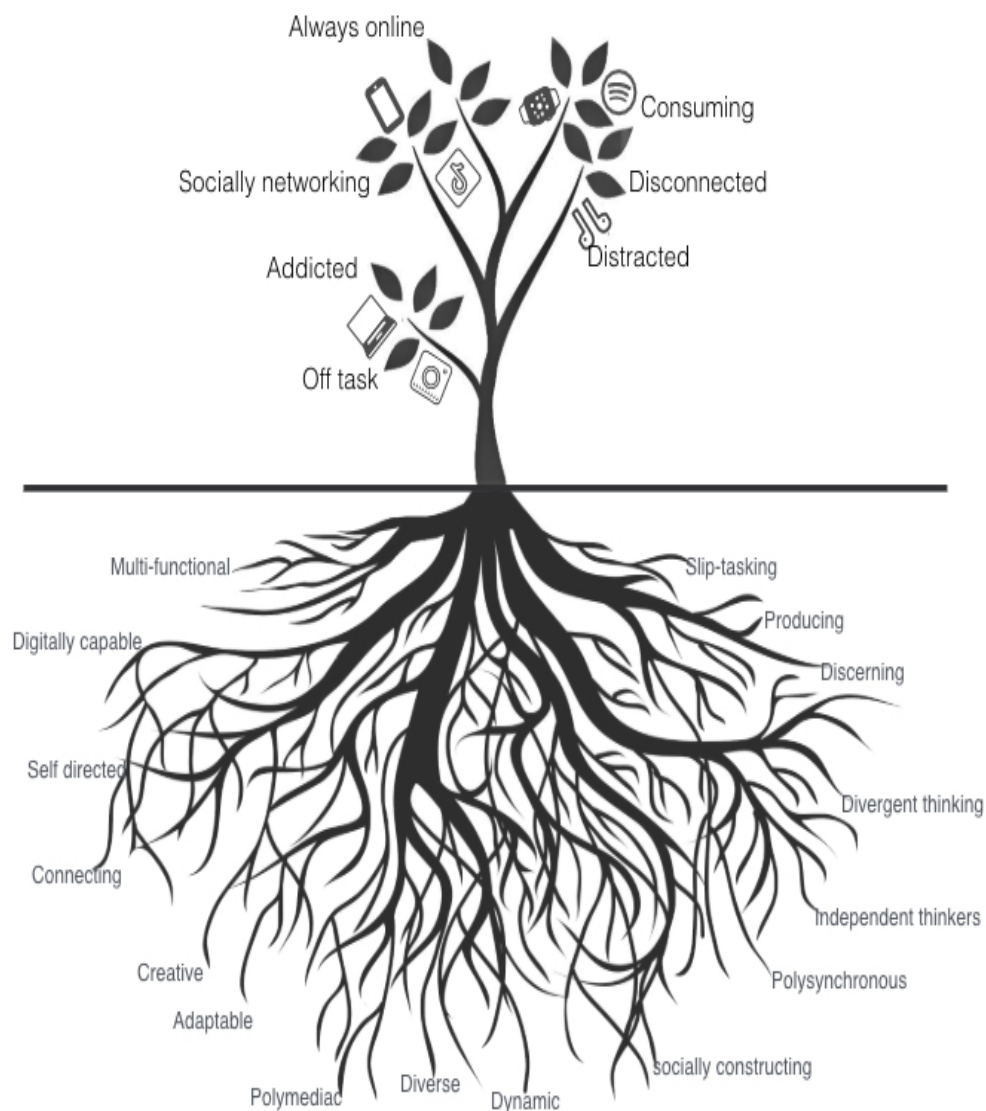


Figure 5.4 “What lies beneath” the mobile, wired tween – aspects uncovered in this study include ‘unseen’ actions, values and attitudes of tweens through using mobile technologies

Beneath the surface, after the top layer has been ‘scraped away’, is a complex ecology of interwoven literacies, capabilities and ways of operating, enabled by the affordances of mobile technologies. This study has sought to scrape beneath the surface, uncovering the essential aspects of this ecology to understand more extensively *what is happening* when tweens are experiencing mobile technologies in their everyday lives.

In the following discussion, the various areas of investigation in this study and the thematic elements that emerged through analysis of the findings will be considered in light of what is happening ‘beneath’ the observed actions of tweens as they engage with mobile technologies across their day. While the elements at times are considered separately, this is done so with the understanding that all components of the tweens’ ecology are unperceivably connected, synonymous microorganisms that contribute to the development of skills and literacies that may have value for learning if recognised and enabled.

5.4. The Tween Digital Ecology

“The Internet is not just something children access when they want certain bits of information; it is an essential and intrinsic part of the world they inhabit” (House of Lords, 2017, as cited in McDool et al, 2020, p. 1).

This study has responded to the proposal by researchers for the need to consider the use of mobile technologies in children (Falloon, 2018; Potter, 2017; Radensky et al, 2015; Weninger, 2017), expanding on the earlier proposal by Sharples (2007) to examine the use and affordances of technologies in real time.

The perception of the world inhabited by tweens, their digital ecology, is explored in this section in the light of the data generated in the different phases of this study. Fundamental to the themes that emerged from the findings the participants did not demonstrate an awareness of the separation between their digital and non-digital practices, at times finding it difficult to explain or identify these interactions during interviews and focus group discussions (as reported in pages 165, 166, 175-178). The participants often seemed unsure how to specify their response when asked to explain when and why they used a particular device, or they had to carefully consider how to clarify why they had made a particular choice or interaction.

These interconnected processes were demonstrated without obvious intent by some of the students during the online interviews, wherein at the same time the student was sharing their device and/or app use, they might receive a message from someone or an update from a friend’s social media. Without hesitation and as an observed auto-response, the participants would sometimes side-step into the message received, reply and then come back to the activity they were doing online – while still maintaining the interview discussion. This flow of movement from one activity to another was demonstrated in

additional ways with other participants either looking up additional information or jumping quite quickly into another app on the device, then returning to the original demonstration without interruption to the conversation.

The tweens in this study displayed high levels of spontaneity in their everyday processes that could be described as ‘polymediac’ signifying the transmission of interactions from one type of media to another, using apps and resources on mobile devices as integral components of a complex social network. Polymedia is a notion presented by Madianou and Miller (2013) who proposed the multiplicity of operational possibilities for a user who has access to a range of technologies and social media. This dynamic model enables the construct of “converging communicative opportunities” (p. 1), and relationships that connect users and the technologies applied. For the purpose of this study, I have used the term polymedia to refer more specifically to the tweens themselves, as the focus of this study was on considering their perspectives. Therefore, as use of the word in this study is tween oriented, the emphasis must shift from describing the environment (polymedia) and aligning it with purpose to the actions of the young people in this study (polymediac). This view is supported by other researchers who have associated the notion of polymedia as being integral to the exploration of diverse media usage within an individual’s navigation of technology-based experiences (Madianou, 2015).

Aligned to the impression of the tweens being polymediac, it is conceivable by further examining the findings from this study, to define their interactions with their mobile technologies as ‘slip-tasking’. This term is presented to describe how the tweens in this study may be observed as being off task but might be occupied in activities not seen by the observer. The notion of being off-task has been raised in existing studies (Bell, 2019; Hendry, 2019; Pirani & Hussain, 2019; Small et al., 2020). When observed as being off-task (or multi-tasking) the tween is seen to be involved in a number of different media-related activities at the one time, that are perceived to be unrelated and therefore distracting.

However, from the data gathered across this study, it would seem that much of the time the tweens reflect they are not off task, but rather slipping within one integrated action to another – often within the same task. Whilst this may seem to be similar to multi-tasking or being off task, the notion of slip tasking is seen by this study as a more appropriate description as the tweens’ actions are part of a cycle of interactions through which they ‘slip’ as they utilise the affordances of the different media and devices. There is a flow in their actions that is implied by the term slip-tasking that is not inherent when described as

multi-tasking or being off-task. The activities and tasks being undertaken are frequently interchangeable, building on the task at hand, rather than detracting from it, or in themselves, being isolated tasks, unrelated to one another (see Figure 5.5).

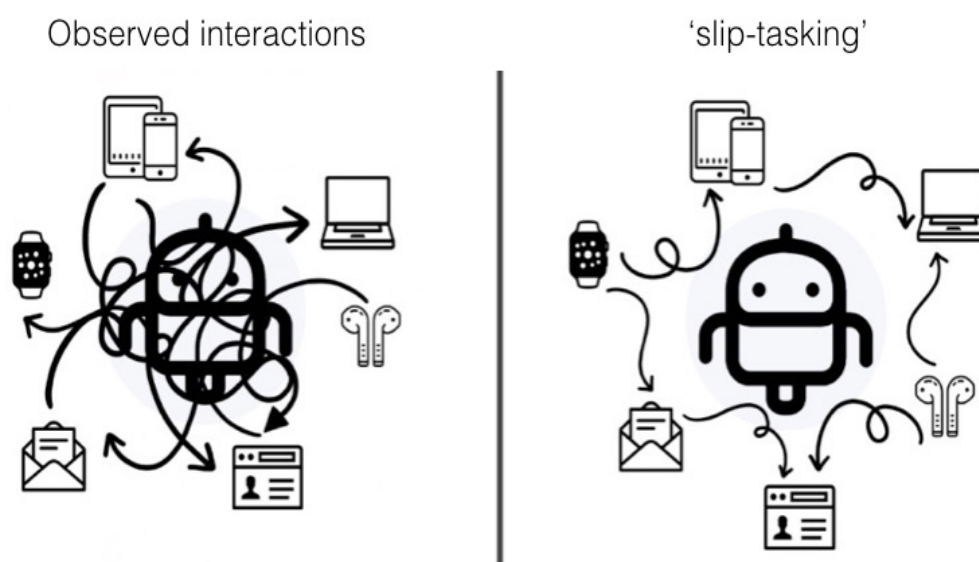


Figure 5.5: Visual diagram showing notions of tween observed interactions and slip-tasking

The tweens themselves identified that at times they might also be interacting within a range of tasks, still slip-tasking but including distracting interactions and being ‘off-task’. The two types of behaviours are conceivably difficult for the observer to differentiate, with one set of actions adding to the efficacy of the task and the other, distracting focus and potentially taking the tween off-task. The tweens in this study indicated their awareness of being ‘off-task’ and distracted, with many indicating they had strategies in place to mitigate these situations, or at a minimum, demonstrating a consciousness of these occurrences. The awareness of the difference between these *MEMOs* is noteworthy and has an impact on the construct of the learning environment and processes. It is critical that with a deeper understanding of the notions of slip-tasking and the tween *MEMO*, that educators and other adults do not assume that because a tween is using a range of mobile media they are ‘off-task’; with the challenge being to provide opportunities to slip-task, facilitating alternative learning opportunities.

The tweens also provided insight into how their body language changes when they are on-task and slip-tasking or off-task. They readily shared descriptive demonstrations of the way they look and associated actions such as putting their device down beside them, eyes moving quickly and sometimes note taking if slip tasking, whereas when off-task or multi-tasking, they may hunch over or sit back with the device partly/fully obscured, staying focused on one thing for a while and perhaps ‘writing ’on the device. They mentioned that even their facial expressions may look different, but how to a teacher or parent, this may look the same, suggesting that an aware of their body language and behaviour might mitigate judgmental management.

The tween digital ecology is filled with interstitial interactions, where the young people slip between activities intuitively, that is, they do not specifically determine which mobile tool, app or resource they are going to use in many circumstances, but rather the interaction appears to be an unpremeditated response. The polymediac interactions of the tweens are integral to their digital ecology, a complex environment interwoven with social exchanges, information finding, networking and the construction of meaning at the time and for the context of experience.

5.4.1. *Being Digital*

The tweens in this study are evidently operating in a technological world that is organically integrated into their experiences. Consequently, they did not always exhibit an awareness of the perceived differences in the way they communicate, interact and expect to function within their mobile existence. The concept of difference has to be related to being different *from* something else. Therefore, it is plausible to consider that if the experiences of the tween have only ever been associated with mobile technology, there might be a limited awareness of what *different* might pertain *to*. While this study does not subscribe to the “digital native” debate, it is essential to acknowledge that the data gathered throughout the research project does align to the concept of *being digital* (Chaudron et al., 2018). In the enactment of *being digital*, the tweens in this study frequently presented a non-separation of digital and non-digital activities, articulating mobile device experiences as an integral part of their normal daily functions.

To help describe the notion of *being digital* for this study, the following explanation may be useful: For a person born in the “baby boomer” generation, turning on and off electricity in their house is an action is not necessarily deliberated, but rather an expected process enabled by the technologies accustomed to since childhood; Similarly, a

‘millennial’ person (born between 1980 and 2000) using a remote to change channels on the television does not recall a time when these processes were done manually and directly on the television itself and therefore, may be less intentionally aware of the decision for using the device than for someone less familiar with the appliance. The individuals in these examples grew from childhood to adulthood with the aforementioned technologies, not having experienced a world without the affordances offered and not consciously making decisions about their use. Unlike previous generations, their norm was to switch lights on as a room was entered or to change television channels without leaving the chair – they have come to know a world of convenience afforded by the technologies available. (For more about the theory of *being digital*, see Chapter 1, section 1.3)

The participants in this study who have grown up with mobile devices readily available, have indicated they have a limited concept of life without mobile technology and that they do not deliberate on the use of these technologies in the same way as individuals who have not experienced them from birth might conceivably do. For the tweens in this study, the idea of a world without texting, multi-location communication, capturing and sharing images instantly and instant information finding may be unimaginable...something from ‘the olden days’. Further to this notion, some of the tweens indicated they would *ask* Google or Siri for information when looking for answers to questions rather than searching (typing questions) on the Internet. They did not describe this as being extraordinary or particularly exciting – it was reflected as just what they *do*. Home communication devices such as Siri, Google Home or Amazon’s Alexa have extended the tweens’ network for answering questions they have about things, an extension of the parent in the pre-digital child, but with the capacity to address as wide a range of questions as and when they come to mind.

The tweens shared that using voice-controlled technologies they don’t need to spend time “*searching for the small things I need to know*” (Kristina) and that they can also ask for actions such as having their music turned on or off and not having to interrupt the other activities they are doing at the time.

The implications for this phenomenon are many-fold, particularly for teachers and parents. The tweens are living a polymediac, multi-connected life – this is their everyday experience – their accepted norm. The tweens in this study reflected at different times, the divide they felt with ‘older people’ (the specific age group of ‘older’ was not defined in the study) who they perceive as not understanding the technologies the tweens use and as

lacking confidence with many of the functions and affordances mobile devices offer. Furthermore, the study findings suggest that for many of the tweens, the restrictions for their use of mobile technologies during school time is also an issue that needs to be explored from the perspective of pedagogy and education. There is a noticeable disconnect between the activities the tweens in this study do and the skills they embrace when using their mobile technologies for their own purposes, and the ways in which these technologies are enabled within the formal school learning environment. The young people reflected that they do not do the same things at school that they do out of school, such as generative game development or video creation activities. It is not so much that the tweens specifically want to do the things at school that they do at home with the technology, it appeared that the fundamental focus of the conversations was that they would like to learn the way they are able to learn, using their *MEMO* as an operational vehicle to accomplish desired outcomes.

This concept of the tween *MEMO* has progressively emerged throughout this study and has implications for the how tweens perceive time, space and place as they use the affordances of the mobile technologies available to them. The tweens should not be seen as singularly self-serving, merely wanting to use their mobile technologies and do things ‘their way’. Their approach to daily functioning and learning is a reflection of the enablement of the preferred processes as a result of the affordances of the mobile technologies available that have become integral to their everyday way of operating. The tweens slip effortlessly within their polymedia encounters, operating within the polysynchronicity of time, space and place in all aspects of their lives outside the school experience. This was reiterated by the tweens’ views elicited across all data collection instruments used in this study, with significant emphasis on the desired flexibility regarding personal preferences in operational practices using their mobile devices and the frustrations they experience when barriers that they perceive as unnecessary prevent them from doing so.

The notion of being digital also aligns to the impression of the tween being a bricoleur (Papert, 1980) describing the collective dimensions of an individual that reflect experiences, their intuition and learned behaviours, beliefs and practices (Kincheloe, 2005). The notion of bricolage and of the tweens being likened to being bricoleurs is integral to the ways in which they demonstrate the assembly of new practices as a response to the mobile technologies they access, the improvisational processes

demonstrated that enable the construction of novel ways of doing things created from a diverse range of practices.

5.4.2. Tween Mobile Time

Previously, in Chapter 4, data was presented that indicated the tweens' preferences for their different mobile devices and how much time they spend on each of these devices each day. It appears that the average tween spends around 3 or more hours a day on one or more of the devices to which they have access. Approximately 50 percent of the tweens in this study indicated that between their smartphone and laptop, they use mobile devices between 1-3 hours per day.

It appeared from the findings that the greater the number of devices, the more interwoven the digital ecology appeared to be for the individual tween, but this did not appear to impact greatly on the overall time spent using mobile technologies. The 'hours' using mobile devices, were not indicated as consecutive or cumulative, but rather, representative of estimated periods of use. The participants reflected that they were not actually aware of the time spent using any of their devices independently, and that the time they allocated in the survey was more likely to be spread across the day. The tweens suggested that they had guessed how long they spent when answering the questions, as it was quite difficult to know the specific hours of interaction.

To consider 'tween mobile time' analogically would be to compare the questions to asking how much time in a day an individual spends walking, talking, breathing or thinking. These actions are not done specifically for one period of time or another – and only at that time during the day, but rather, interspersed across all activities within the day. The notion of time spent using mobile devices is for the tween equally as immeasurable as most mobile exchanges are incorporated across and within the regular experiences of the day. These mobile time experiences of the tween appear to be an integral aspect of their everyday ecology, and that time, when considered in light of mobile device usage is, to a large extent, a fluid concept, more an array or spectrum of use than time as measured more traditionally. Other research supports the notion that individuals are challenged when required to accurately estimate time spent immersed in a particular activity (Orben & Przybylski, 2019), reflected in the comments made by the tweens in discussions prior to examining screentime data.

The number of devices did impact on the interactions the tweens experienced and the interplay between these experiences. The information assembled for this study did not

investigate if the time spent overlapped different devices – for example, if the tweens were using their laptops and smartphones at the same time; or for some respondents, were they using up to four devices at the same time, the data is only indicative of the reflections of the tweens as they responded to each individual question focusing on time allocations. This phenomenon emerged during final analysis of the data when ‘time ’spent and the tweens’ interview recordings were examined in light of one another. From the explanations given by the interview participants, it appears the activities they were involved with had greater impact on the amount of overall time spent using mobile devices, rather than the number of devices owned or accessible. During analysis of the data, it became clear that personal and social needs, wants and intentions were also a significant influence on both time and the interactions experienced.

It is at this point in the discussion, that the notion of mobile experiences being interstitially integrated across the tweens’ day is introduced as a concept, suggesting the view of being in-between, filling the spaces within practices, aligned to the mobile experiences of the individual across their day. The meta-dimensionality of immersive multi-spatial environments (Fratzeskou, 2012) in which the tweens subsist have been revealed through the findings, identifying different modes of interrelated layers of mobile interactions.

In the surveys and focus groups, when the reported amount of time spent using technology was reported, this was determined because the tweens were directly relating to an identifiable, and measurable, activity such as schoolwork or homework. These activities are measurable as they are focused on a particular outcome and experienced in a linear timeframe. There is a beginning and end to these endeavours, marked by timeframes that have a significant impact on the day of the tween. Of interest, was the specific identification of the hours spent doing homework, but no recognition of the exact time spent using the phone or watching YouTube videos. This supported the notion previously

The aspect of time was further investigated during the interviews when the tweens shared their screentime data and talked to statistics on display. Concurrent with the interstitial filling of spaces in the mobile tweens’ day is the suggestion of polysynchronicity, where time, space and place have limited boundaries exhibited.

Many of the tweens in this study revealed they were quite surprised by the actual amount of time they had been using their devices and various apps. The visual stimulus from the screenshots gave the children a great starting point for their discussions. Using screentime

data, the tweens talked about their days, noting that they were quite unaware of the number of times they had picked up their phones (identified through “pick-ups” in the screen data) or how often they had received notifications and used specific apps, particularly social apps. These elements were more aligned to quantities of time and overall time rather than time spent using the device.

With the data identified visually, the tweens were able to discuss how their devices were integrated and the ways in which they used the different device features. There was still little emphasis on specific times the devices were used, where although the tweens were using the data for reference, they did not really refer to the time identified as a significant focus in the conversation.

It may be valuable to consider if, having listened to the tweens discussing the use of their devices, if the actual time spent is of any real significance, or if this is a paradigm of parents, teachers and researchers who need to identify the use of time as a representation of something that can be denoted as either positive or negative. It would appear from the findings in this study, that time is not a significant factor to the tweens when using their mobile devices, nor considered in their reflections unless asked to do so.

Other aspects of these discussions such as the think aloud component that were afforded when the tweens explored the apps used more specifically will be addressed further in section 5.8.3.

5.4.3. Time, Place & (Third) Space

Tween perceptions of time, place and space do not have the specified mental or physical construct for the tweens in this study, no longer considered as major constrictors of social interactions, communication or learning for tweens, in comparison to pre-mobile paradigms. The perception of time and place has been identified as being fluid, with the individual tween not required to *be* in any specific physical location or at any specific time in order to connect, communicate or interact with the world around them or with other individuals - their world is polysynchronous.

This polysynchronicity of the wired tweens’ world can be viewed within the construct of the third space previously explored in Chapter 2 (section 2.7). From this study, it appears the separations between places and spaces of everyday experiences are blurring, with the tweens operating across the physical, virtual and third spaces at the same time, with little personal contemplation or awareness of the physicality of space or place in their daily

functioning. It could be said that for these young people, the third space is now their only space, an in-between space where they are connected to both the physical and virtual at the same time, across time.

At this point in the discussion of findings, it may be pertinent to explore if the third space is the new 'first' or the only space for the tweens as they co-exist with their mobile devices across the traditionally understood boundaries of both time and place. Evidence from this study's findings indicated that the tweens do not contemplate time, space or place as major factors as they interact with mobile technologies across their day.

Kupliainen (2013) referred to this re-orientation of time and space as "polychronic and polyspatial" (p.40). The idea of polyspatial aligns significantly with the notion of third space in that the tweens are operating within spaces that overlap, restructure and connect through a range of physical, virtual and relational interactions. The polychronicity of the tweens reflects the way they do multiple things at the same time through the affordance of the mobile technologies at hand. In the survey, over 50 percent of the tweens noted that they frequently use their devices in all of the following places and spaces:

- At school
- At home
- On the bus/other public transport
- In the car
- In their bedrooms
- In other parts of the house

The tweens in this study also indicated that they use their devices in other physical spaces, where either mobile technologies and/or non-digital resources could be used, such as public libraries, a friend's house or the shops. However, the 'other' places discussed by the tweens give greater insight into where they are using their devices outside the more traditionally physical locations listed previously, supporting the notion of a relational and in-between blended third space. Responses included a range of 'places' that are arbitrary and undefined such as walking to school, playing in the park, playing with my friends, hanging out or socialising. Some of these places of use are neither fixed nor bounded and

may be less about a definable space or place and more about the interaction that is happening.

It appears from the responses given in this study, that the tweens are not bound by the concept of place but rather, exist within a hybrid third space, embracing the notion of *being digital*. In discussions and focus group conversations, the tweens also explored the ideas of how and when they use their devices. In Chapter 4, it was suggested that the young people involved in this study do not appear to consider time, place or space of the use of their devices, finding it a challenge to determine where, when, how, why and for how long they use the different mobile technologies that are integrated into their lives.

The tween digital ecology is not separated from their 'non-digital' ecology, the threads of both woven inextricably together. Within these digital and non-digital ecologies are binaries of experience, with each defined ecology seemingly measured as a separate entity, polarised from the other. It would seem from this study, however, that these apparent binaries are not necessarily inherently marginalised (Wetherell & Potter, 1998, as cited in Midgley et al., 2011, p.3). Rather, the experiences and reflections of the individuals study participants, demonstrate that the tween digital ecology is a construct of deconstructed and merged aspects of previously acknowledged binaries, merged into a fusion that presents a synthesis of both.

Fraser (2012) proposes that we all transition between various spaces in our day, often without obvious thought or consideration as to why, how or what time we are spending in these spaces, with the interstitial gap between the spaces, suggesting the concept of third space. In addition to the physical spaces, our mindset in and between these spaces can also be viewed as transitional, with different microtransitional mindsets applied to different spaces, purpose and time.

In this study it became clear that the tweens operate within the third space enabled by their mobile technologies, without specifically being aware of the components of the spaces in which they operated. This was exemplified through the experiences of several of the tweens who reflected on the games they play through messenger apps (for example, Apple Messenger or WhatsApp). At any time, and from any location, the tweens can send another tween an invitation to play one of these games – or invite intergenerational family members to join. The tweens can send the game invitation or play their turn of the game

and send back to their opponent in their own time. They might plausibly be playing these games with several people on different chat locations or social apps contemporaneously.

The microtransitional mindset and polysynchronous view of time by the tweens in this study is demonstrated through the following example. One of the tweens who was holidaying in Nepal, reflected that they were playing games on messenger with another friend in Canada at the same time as a third friend in Sydney, Australia. Time and location were not of noticeable significance as the tweens would reply, playing their turn, whenever the message came through or the time was convenient. They reflected that there was no real conscious consideration about their friends' locations, simply that they could interact through the game together. In the reflection discussions, each tween knew their social game partners would respond when available. The games and discussions were multi-faceted and responses were not expected to be synchronous or asynchronous, which was seemingly unimportant. The time elapsed between plays was irrelevant as the games were responded to when and as notified through the mobile accessible connections available. The insignificance of time or place was evident, with the sole focus being the social relationship between users. This polyspatial outlook and interaction with time enabled by mobile dimensionality frees the tween from the constraints of the binaries associated with time, place and space, enabling flexibility, social interactivity and high contextualisation of communication contributing to the hybridity of the ecology in which they exist.

The notion of behavioural flexibility, referring to adaptive changes of individuals in response to changes in the external or internal environment (Kaunhoven & Dorjee, 2017), is further proposed as a tween skill that enhances successful enactment of polysynchronous transitions. This may occur with or without specific mindfulness of being in a defined physical or virtual space, where the tweens "adapt to variations in the environment" (Lea et al., 2020, p. 184). This notion is reflected by the findings in this study, most particularly the transitional flexibility demonstrated by the young people in their experiences with mobile technologies. Concurrently, the boundaries of transition appear to have blurred, with microtransitions blending physical and virtual spaces, where the tweens' actions and interactions are less specifically bounded by time and place, thereby confirming the emergence of the Third Space as reflected in the literature study (See section 2.8). The findings of this study indicate that the tween ecology is somewhat like a suspension, with droplets of all elements shaken together to create a new

understanding of everyday reality depending on the experiences of the moment, with little personal awareness of the individual components that make up the fusion created. The digital ecology of the mobile and wired tween is a state of being digital, where the gap between the interplay of digital and non-digital is imperceptible, a natural state of the everyday experience as they connect and interconnect across the boundaries of time and place. The hybridity of the contextual transience and relationship with mobile experiences for the tween has deconstructed and redefined the traditional understanding of time, place and space, establishing a new concept of the significance of these elements within the everyday happenings of the mobile, wired tween.

The interplay between the tweens' diverse ecologies and the construct of a digitally enabled third space is apparent in their views elicited in this study, seldom contemplating where they were using their devices, this seemingly of little importance to them, placing greater emphasis on how and why they were using different technologies when questioned. For the majority of the tweens, their mobile enabled ecology lies within the hybrid third space, with limited specifically identified components, but rather the construct of an interwoven environment interlaced by polysynchronous networks and processes.

5.4.4. Socially Connected

Communication and social interaction for the wired tween is different to that experienced by tweens in previous, unwired - or less digitally mobile, generations. It appears from the findings of this study that tweens expect to be socially connected at all times and that in being digital and having access to devices that are integral to their physical person, particularly the mobile phone and smartwatch, the tween of today is seamlessly connected to family, friends and the outside world on demand. At the same time, the tweens indicated they are not focusing consciously on these connections, but that these links are integral to their everyday experience and not consciously considered. This study has shown that the state of being digital is an accepted element of the world in which the tweens exist, connected in a mobile and wired environment as they transition from childhood towards adolescence.

Of significance are the ways in which the tweens discussed these issues with limited articulated mindfulness of an unwired, disconnected life. At the same time, they could articulate quite clearly how their parents might indicate that they need a break from their

devices, or that the devices be kept out of bedrooms during the night. But even in this part of their disclosure of understanding, the participants did not indicate the same level of distinction regarding the devices and their associated potential “issues” as is the broad discussion among adults at large. The tweens appeared quite matter of fact about their mobile connections, perhaps in the same way that in suburban homes in the 1960s many children were free to roam from house to house, visiting friends and “hanging out”.

Today’s version of hanging out with friends is more frequently virtual – and yet for the tween, does not seem virtual (nor was it depicted this way by participants). For these young people, hanging out via games, on Messages, WeChat, WhatsApp, Instagram or other apps and resources is their accepted norm...it’s the “I’m just going next door” of the 21st century.

...So, we use hangouts, it’s just a socially active texting app that is like Google...and we use that because some kids have different devices...that way we can all talk to each other whenever we want... (Hamish).

The difference is that the wired tween of today does not have to pre-check with a parent for these ‘visits’ with friends in the same way as their non-wired predecessor. There is no physical visibility to the visitation of friends via social media and less perceived time interference. Their operational normality is that if they need to communicate, tweens simply pick up their mobile device and send a message through their chosen apps or social media, with little disruption to other activities being undertaken simultaneously. In the interviews and focus groups, the tweens shared that this method of interaction is one that they use to complete work, play games, learn, share ideas and construct. When they are alerted to a response coming through they will look at it, respond and keep going with the activity of the time, operating inside a multitransitional blend of their physical and virtual worlds.

The tweens in this study demonstrated an awareness of the implications and complexities associated with social media. The use of social media was surprisingly high, although the majority of the tweens indicated that their parents were aware of their social media connections, monitoring them or ‘following’ their tween child to ensure safety.

The younger tweens in this study were more likely to be using social media to share things they had created such as art, music or videos of skills and sports: “*I have my*

tumbling videos on Instagram” (FG), while for some of the older tweens – those edging closer to adolescence, the draw of social media appeared more connected to the network of friends being cultivated. The concerns raised about whether the tweens should or should not have access to social media is one that is frequently raised in the media and in other studies.

In this study, the tweens who participated indicated a strong awareness of the concerns, issues and perceived dangers of being on social media, with references made to parental guidance, not using real names, only allowing known friends to be connected or blocking those who were unknown. What this study has focused on is what the tweens are doing, and the communication and networking skills the tweens are developing when they are using social media.

The tweens who discussed their social media interactions and explained how they might make videos of their sport or skills, for example tumbling or scootering and post these online to a social media site such as Instagram. They discussed how they received feedback from others in the way of ‘likes ’or comments and how this would help them to improve both their skills and their videos created. Similar discussions were shared by the tweens who posted their art or music online – the value in being ‘liked ’was a strong motivator (instant feedback) and they would endeavour to make the next posting even better following the number of likes and/or specific comments made. The power of peer feedback was shown to be hugely effective as a motivator and for the improvement of skills.

Other tweens used the social media component of games to receive feedback from what they’d been developing and to find out ways of learning new skills from others. The tweens networked deeply to improve their skills, always with an awareness of the boundaries of communicating with those they did not know. One of the tweens indicated they could get feedback from others, but would not chat with someone they didn’t know, citing parental guidance and supervision to ensure personal safety.

This study recognises that the social, online behaviours of the tweens may not be limited to those described and does not intend to minimise the potential risks or concerns related to young people using these online networks. There were discussions about the harmful impact of social media on friends with genuine concern raised about the potential for mental health issues related to this issue. However, from the tweens in this study, it

was clearly demonstrated that aside from the concerns, there is value in being able to publish digital content such as their art, videos, music, game development and the like, online to a network from whom they can receive feedback. Distilling this information down to the essential component is to recognise the ways in which the tweens suggested they were able to create artefacts, have confidence in sharing online to be evaluated by others.

5.4.5. Dynamic Digital literacies

The findings in this study subscribe to the notion that contemporary mobile and wired tweens have a diverse perception and practice of literacies, tightly connected to the ways in which they interchange with technologies and function within the everyday experience. There exists, a difference between the skills and capabilities that are demonstrated and the underlying literacies that may be developed. The concept of digital literacies has been explored comprehensively throughout this study and it has been implied that there are a wide range of ideas and definitions that encompass what is understood by the notion of digital literacies.

Through an investigation of the deeper micro layers of tween mobile interactions the impression of transdisciplinary literacies has emerged as a key demonstration of the dynamic nature of digital literacies being demonstrated. Notwithstanding the challenges discussed in section 2.5 in identifying a predictable categorisation of digital literacies, it is plausible to establish that the parameters are characterised by change, reflecting new ideas, processes and applications in response to the evolution of technologies available. Dynamic literacies should reflect literacies that are compelling, influential, progressive and productive, providing a framework for practices that involve the use of mobile technologies across a range of applications.

When considering digital literacies, the macro and micro aspects of tweens' use of mobile technologies have been studied so as to truly understand the depth and breadth of practices experienced. On a macro level, there are observable digital capabilities and skills that are apparent when the tween is using mobile technologies to 'do' things. These are the things we (observers) see the tweens doing, for example, we can *see* them texting, watching YouTube or taking selfies. What is not easily seen is the development of literacies that are synonymous with these activities. This study has looked more deeply at

what lies beneath the actions and interactions, and observable skills and capabilities, addressing the question: what's happening at the micro level of the tween *MEMO*?

Macro and micro interconnections were evident in situations from this study that included the tweens taking 'selfies' or making TikTok videos. In themselves, each action is observed as a psychological and technologically driven process aimed at self-satisfaction, personal indulgence and likeability. Underneath these actions, when explored on from a different angle, scraping away the observable pursuit and considering the deeper layers, a new understanding of the literacies of the tween becomes evident. The selfie is often taken numerous times, carefully constructed and then selected for 'publication' on a social media site, text message or device screen. Regardless of the nature of the selfie or the intended use, a range of these literacies are involved in the process. The tweens in this study indicated they have become discerning about the construction and presentation of these images, often going to great lengths to construct the exact image desired for dissemination. Isolating the practice from the behaviour enables the identification of associated literacies, providing opportunities to examine and interpret the possibility of application in other situations. In these mobile enhanced activities, cognitive aspects of digital literacies interconnect with the meta-awareness and socio-emotional aspects of the events that the tweens are experiencing.

A similar, but more complex process is undertaken with the construction of the TikTok videos demonstrated by the tweens in this study. As noted previously, contributing specifically to the debate about the appropriateness and perceived quality of these videos or the addictive nature of TikTok and similar apps is not the intent of this study. Instead, this study has focused on the literacies and skills the tweens are utilising and developing when manipulating media to produce the video they share on the resource – scraping away the surface behaviours and observations to identify the competencies of creating, synthesis, producing and publishing beneath the outwardly superficial actions.

The tweens in this study demonstrated an ability to quickly decide a theme, construct the elements required (dance or other movements), practice movements or actions, film, edit, add music and other elements and publish. Whilst the quality of the media produced may be observed by an 'older person' and judged as less than fabulous, for the tween constructor and peers this was often perceived differently. Desirability aside, the digital literacies demonstrated were complex and competent. The construction of ideas,

development of the 'story', filming, editing and production was done with speed and finesse. Additionally, the tweens in this study discussed the purpose of the video being created, demonstrating an awareness of their intended audience. Social-emotional awareness, self-direction, multi-functionality and discerning judgment were all evidenced in the short period of video production. The tweens were selective in their intent, deliberately exploring, interpreting and representing the story they considered would achieve the outcome desired.

The informal learning that occurs during these activities is extensive, where tweens are demonstrating capabilities wherein they can identify purpose, marketing, understanding the 'register' of text and visual messaging, as well as the application of digital competencies exhibited. Cognitive development of the literacies and skills demonstrated provides avenues for application in formal or informal learning situations, enabling the tween to operate within their *MEMO* to deliver intended outcomes.

5.4.6. Social Erudition

The data from the survey indicated that the tweens in this study appear to be principally consumers of media when they are using mobile devices. The data in this study reflected that the greatest proportion of time tweens spend using mobile devices is focused on watching videos, particularly YouTube entertainment including watching people the tweens follow online. The findings reflect passive interactions as being the primary use of mobile devices other than laptops, which are viewed predominantly as a work-related device.

The tweens in this study have demonstrated overall that they are digitally competent. They are generally confident and use diverse approaches to find out how to do things they don't know, such as peer support, searching for answers themselves and asking those they consider to be experts. Findings from other studies (Rideout & Robb, 2019), supports these conclusions demonstrating that for this age demographic, the time spent online watching videos has increased significantly in the past four years (Figure 5.5).

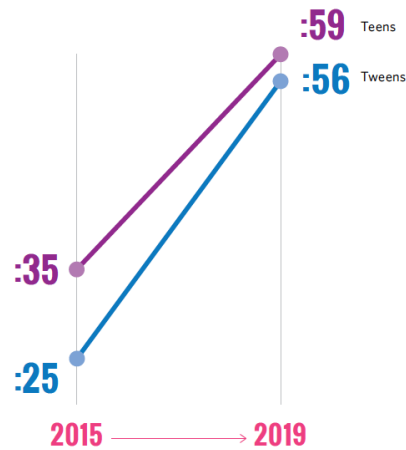


Figure 5.6 Increase in time spent watching online videos – average minutes per day for tweens and teens 2015 - 2019 (Rideout & Robb, 2019).

Of the different ways in which tweens might access online videos, YouTube was seen to be the most frequent source, over twice as popular as any other individual source (Figure 5.6).

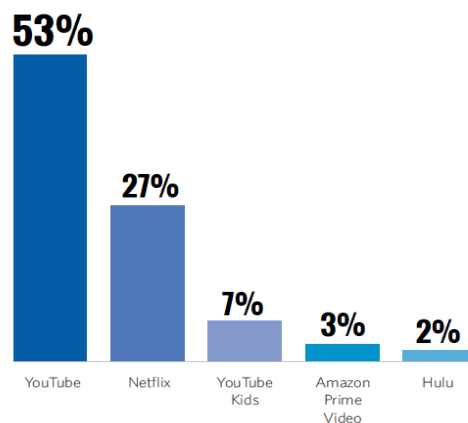


Figure 5.7 YouTube and other sources of online video watching (Rideout & Robb, 2019)

The participants in this study contributed similar views about their interactions and online consumption of media, with many of the tweens indicating they do spend significant time watching YouTube videos or searching the internet. However, when given an opportunity to explain further, the reasons for many of the tweens to be immersed into what is observed to be 'just' passive consumption (watching YouTube), were often more creative

or knowledge pursuits than was first apparent from the data: Responses included a range of activities from learning how to improve their bowling for cricket, how to be a 'better' YouTuber or how to develop their skills for the games they like to engage in. These explanations further develop an understanding of how the tweens might, in their seemingly endless pursuit of social media be learning from the videos they are watching online. The following comment from one of the tweens illustrates how different observed behaviour might be from the underlying purpose:

"At the moment, I'm trying to make a fairy garden, so I spend a lot of time watching videos about other people's ideas and finding techniques for how to make things. I just lose myself in the magic...[mum]just thinks I'm wasting time [on my device]." (FG)

This tween indicated a significant proportion of daily mobile technology use being 'online' and watching YouTube videos, therefore, easily identified as a primary consumer of media. The tween in this example was not seen to be transferring the apparently passive use of the device to creating something on the device, therefore, there was no indication in their data that they were also highly digitally creative. However, the child in the example was transferring the learned skills to other parts of their lives in the creation of their fairy garden. Similar illustrations were highlighted by other participating tweens, with examples relating to artistic development, sport improvement and the pursuit of other hobbies or interests. The mobile device was the conduit between the interest or passion and the skills required for development or construction. This aligns to the previously identified notion of a disconnect between observation of tween mobile behaviours and what's happening in the layers beneath these observations. Because this type of data is rarely collected in other studies, and not collected intentionally in this study in survey responses, the opportunity to align the consumption of data with creative pursuits may have been missed, therefore not identifying the full outcome the ways in which the tweens are interlinking the various aspects of their mobile interactions with other experiences. This example also provides grounds for the need to triangulate data collection through a range of instruments, as the survey data alone would not have provided the extended explanation from the tween, thereby potentially limiting the extended understanding of tween mobile experience.

The significance in what has been disclosed by the tweens as they've spoken candidly about their online activities, is how the perception from the data and questions asked, for

example, how much time do you spend watching videos online, does not always reflect the actual pursuit and interest of why the young person is involved in the activity, and they think some of these studies give a bad impression of what they are really doing. While, to some extent, the watching component remains a consumer activity, the purpose is often for the development of creative or other skills. From this aspect of the findings, it is possible to associate the tweens' social online interactions with the notion of social learning. The tweens reflected that this is how they best like to find new ideas and learn new skills, stating that watching a video made it more real and they connect at a higher level to the learning when they watch a video. *"It's not that we can't read the information...it just makes more sense when you can see it"* (Kristina) and *"I see what others are doing and it makes sense."* (FG)

The implications arising from the tweens' reflections offer a new perspective on how and why they might be watching videos online, and that it is not always for entertainment only. While, the tweens in this study indicated that they do watch videos (a lot) for fun and entertainment, there are often other reasons, but noted that the purpose cannot be judged merely through observation. The tweens expressed frustration at how they are judged in how they use mobile technology, indicating that others' impressions include the comment such as they are *"always glued to those things and wasting our brains"* (FG). The tweens presented a strong argument that they *"really know a lot of things"* (FG) and that they have a lot of curiosity, they just want to be able to find things out their way. Employing the concept of *MEMO* provides a critical viewpoint for understanding the mobile tweens' social learning opportunities, noting that observation alone is insufficient for identifying all aspects of the practices and processes being employed.

5.4.7. Games & Learning

The tweens in this study who played or developed games spoke about the social aspect that appears to be ingrained in how they learn to play and/or development these games. Tweens discussed how they'll play games that they are interested in, or are based on subjects of interest such as medieval history or the creation of specific living spaces *"I'm really interested in Medieval history"* (Harry), while for others the focus is less discernable and might be *"just for fun."* (FG)

The tweens who took part in this study demonstrated application that revealed similar characteristics as the principles previously identified by Salen (2011), with the key difference being they are not situated in a purpose created learning environment (as in Salen's study), but rather within their own digital ecology. Watching the tweens create games and work within apps such as Minecraft or Roblox, provided opportunities for the observation of decision making, problem solving, complex planning and critical thinking. The participating tweens exhibited diversity, adaptability, the desire for feedback from peers and how they used the affordances of social networks available to develop, improve and implement strategies, skills and practices as an essential part of the ecology in which they operate. These practices if understood, could be leveraged by teachers to apply in other learning situations, with tweens given greater flexibility to interconnect, practice in context, interact with 'experts' from their broader collective network and apply understanding, skills and competencies to the given context.

The digital ecology of the tween has been demonstrated to an evolving system, with the dynamic development and application of digital literacies intricately interconnected within this ecology. The diversity of learning opportunities is correspondingly interconnected in the digital ecology with the interplay of these elements providing diverse opportunities for tweens to engage in learning in ways previously unimagined.

Through the narratives and data shared by the tweens in this study the findings identified connections between the literacies demonstrated, social connections and various aspects of their learning. There was a substantial overlap of learning between informal, formal, 'at school' and 'not at school' with the focus on how the tweens are using mobile devices for multifarious learning opportunities afforded by their interactions with the devices. Through continued discussions and analysis of the data, a divide was identified between the values, literacies and learning opportunities identified from the tweens' informal activities and experiences, and the predictions for similarly structured socially connected learning in more formal learning situations such as the school environment.

The connection with the tweens in this study and games was also identified on a separate level, that is, a cross-over between the virtual and physical experience in a different manner from that demonstrated in the online, social component of games. The participating tweens discussed how they used the principles of online games to create physical games that could be played when they were not connected to their mobile

devices, often at school, but sometimes also at home. This phenomenon, the mash-up of online experiences into real play activities is not new, having been identified previously in children who have been observed appropriating television dramas into their own physical games. In the findings from this study, the data extracted revealed the construction of clues and objects by the tweens to recreate online games they might otherwise play on mobile platforms when not face to face with one another.

Reflections from the children included: *"Yeah, we just started to make the game up...we kept thinking about how we could make the different parts of the game and just used whatever we could find for the different parts."* (FG)

The children had used some of the features from the online game and expanded those into the physical space, apparently using the features of the game to recreate their own games, demonstrating the readability of the online game and adaptability of the tweens' imagination. The ability of the tweens to associate their understanding of the real world and the represented world is interconnected with the dynamic literacies that result from the experiences encountered and created by the children within their mobile augmented world. As with other experiences of enhanced reality where the online or dramatised world is recreated into physical play through imaginative sequencing, the tweens are also experiencing the interplay of modality afforded by the mobile ecology in which they exist. This transfer from the virtual world to the real world is becomes integrated into the social, imaginative and cognitive experiences of the tween.

The application of the tweens' virtual experiences into the physical world is one where it proved difficult to locate directly associated literature or studies. There are studies that look at the transition of real-world activities into online games and the connection between the two, but this aspect of children's convergence of physical and virtual worlds does not appear to be significantly researched, while there are studies that have considered the connections between play skills and imaginative play with technologies from a more generalised perspective (Bird, 2019).

Examples of the 'clues' used by the children in their game can be seen in Figure 5.8.



Figure 5.8 Items used to create physical game from online game

As identified beforehand, the perception of physical space and virtual space is not ‘hard’ bound for the mobile connected tween providing greater opportunity for a blurring of experiences between the spaces, with little awareness of the crossover points. This hybrid space has been presented previously in this discussion as the third space and is seemingly the space that encompasses the parameters of the tween everyday ecology.

Studies have been previously completed exploring the importance of imaginative play for child development (Ginsburg, 2007) and the impact that media access via television or video where potentially be a source from which children might draw ideas for translation into imaginative play (Fletcher & Nielsen, 2011; Greenfield, 1990; James & McCain, 1982). Suggate and Martzog (2020). However, limited research has been presented focusing on the impact of mobile or digital technologies and inventive activities of play in children (Bird, 2019). Bird, (2019) suggested that connections exist between how children overlap the technologies in which they are immersed and aspects of imagination and play. This notion was clearly demonstrated in the examples presented by the tweens in this study, not only in the translation of ‘play’ from digital to physical, but also in the ways tweens revealed active participation inside their digital worlds of imaginative experience. When playing Minecraft, for example, the tweens exhibited personal connections with how they built their communities, socially interacting within the networked community to further develop the objects and interactions desired, using their imagination to provide the features and affordances they desired, unconstrained by the parameters of reality.

The essential focus of this discussion chapter, that is, the association of the value in implementation, engagement and practices experienced by the tweens when socially involved in playing or creating games, is to show the significance in the processes involved during these experiences. The debate focusing on using or not using games in

and for learning is not the issue being examined in this study, but rather the importance of the causal sequences that ensue from these experiences. Further research would be beneficial in the areas identified in this study, particularly the association of play, imagination, transitional concepts and social networking for older children when immersed in mobile technology experiences such as games.

5.5. Technology Management

As an active component of developing independence and the transition to adolescence, device management and control was a key finding of this study. There are two main aspects of management – personal management and external management. These aspects are impacted upon by parental decisions, knowledge of control features, developing independence and demonstration of responsibility. During the tween phase, children are becoming more aware of themselves as individuals, developing independence and the significance of relationships with adults and their peers (Steinberg & McCray, 2012). Mobile device management has become a significant point of contention and debate in recent times, particularly when associated with children of all ages and personal well-being (Heller, 2018; Kucircova et al., 2019; Livingstone, 2020). Perspectives that focus on issues relating to communication and social interactions have also been explored, with the debate hovering between positive and negative implications (Morento et al., 2019; Twenge et al., 2019). The following discussion focuses on the perspective of the tweens who participated in this study, considering their outlook on parental and school enforced mobile device management, managing screentime and strategies presented as contributory to this debate.

The debate is affected by the continual media presentation of statistics, studies and articles presenting the polarization of the argument, without apparent consideration given to understanding the experiences of the child. This study contributes to the literature by emphasising the tweens' perspective, demonstrating that the mobile enabled interface daily experience is more than a fad or 'thing' that young people have embodied, but rather is a contemporary way of being. The way tweens and other children polysynchronously engage in the ubiquitous access to mobile technologies re-mixes and reimagines the socio-cultural experiences of daily living. The dichotomy is between the *MEMO* of the child and adult, resulting in a conflict of purpose and understanding. By presenting the perspective *of* the tween, this study hopes to add balance to that presented

to the tween, engendering a debate that demonstrates an understanding of a changing ecology for younger generations, while recognising the importance of measured guardianship by older generations.

5.5.1. Perspectives On Screentime Control

The information shared by the survey respondents indicated that whilst some tweens have screentime controls, others don't – and there are mixed reviews about these controls, with most of the young people involved in this study, very open and forthcoming about their perspectives.

Overall, while many of the tweens showed some understanding of the decisions their parents were making regarding screentime, for those who had these measures enforced, the consensus was that they did not like the way the boundaries were put into place and they would like to have greater levels of negotiation regarding how this should be implemented – or if it should be at all. The negotiations with parents may have taken place to some extent (this question was not asked specifically in this study), but for most replies, this was not indicated. In a future study, it would be beneficial to survey and interview parents to develop an understanding of the other side of the tween perspective. Nevertheless, the participants demonstrated strong views, particularly those who were against screentime and other controls on their mobile devices. For some, the concept of screen controls and screentime data being visible to parents is seen as a breach of privacy, while others depict an understanding of the need for their parents to keep them safe.

Some of the tweens indicated that their parents were not aware of how to add controls to their devices – and that they were not going to inform their parents of this capability.

“My parents don't even know it exists...they don't know that you can put screen time... I'm not going to show them that they can add controls...my parents have no idea that you can do that, I don't want to tell them because then I won't be able to use my device the way I want to.” (FG)

Others had different ways of interacting with their parents over device controls: *“I wanted social media because my friends had it. So that was like the biggest factor I suppose...she said...you have to show me what's happening.” (FG)*

In many instances, as indicated in this comment from the focus group, peer pressure, 'fear of missing out '(FOMO) and a need for social belonging all play a part in the tween wanting to manage the way they access mobile technologies. The perspectives presented by the participants could be understood as normal pre-adolescent behaviours, where as the children develop towards adolescence and into the teenage years, they demonstrate perspectives and opinions reflecting the developmental transition from childhood to adolescence. Jones (2002), states that it is important for children at this stage of life as they journey from childhood towards adolescence, that they have rules they can understand, but that also they need to be given the opportunity for contributory self-expression, aided by the security of well established boundaries. Those tweens who reflected that their parents communicated with them about the boundaries of screentime and app use appeared to have less overall conflict and resistance than those who indicated the rules were enforced. For the tweens where screentime was negotiated, there appeared less resistance and acceptance of the conditions applied. Figure 5.9 (a and b) demonstrate communication between one tween and a parent, negotiating additional screentime.

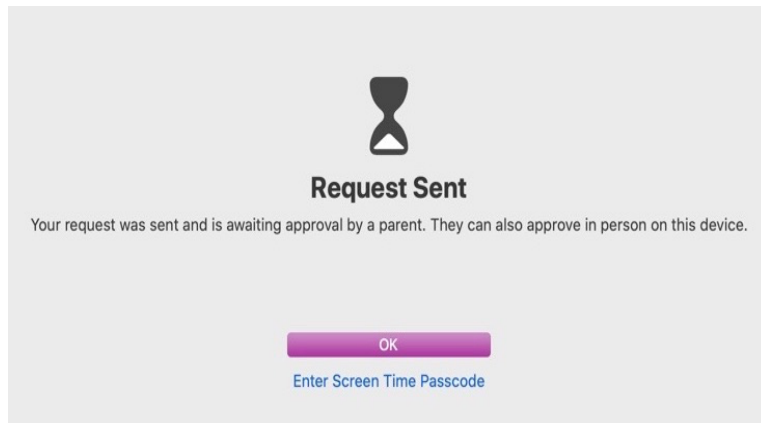


Figure 5.9 Negotiating additional screentime with parent (a)



Figure 5.10 Negotiating additional screentime (b)

The gap addressed by this study has been to present the argument about screentime and device management from the perspective of the tween. The issues presented reflected an apparent misalignment in how the tweens interact multifariously and polysynchronously with their mobile technologies and parental management of screentime and app access. The perspectives of the tweens demonstrated an understanding of the parental viewpoint, while at the same time presenting a need to be able to determine their own screentime control and unrestricted access to the devices entwined in the functions of their day. As the tween does not identify fixed times, places or spaces as they assume mobile interactions, the restrictions placed upon them appear draconian and confining. They frequently see these measures as restrictive or unfair, citing unreasonableness and lack of insight from the parent body. With greater understanding of the *MEMO* of the tween, management of screentime, well-being and concerns around the use of mobile technologies will plausibly be afforded greater equilibrium.

5.5.2. Technology At School – The Tween Perspective

School control of devices was another issue that divided the tweens in their responses. The tween digital ecology appears to be less organically operational within the school

environment than it might be outside the school boundaries, with participants in this study cognisant of the idea that processes and experiences at school frequently operate differently to their non-school practices. The tweens reflected frustrations with the disconnect they often experience at school, discussing their position candidly:

"I don't really like the technology we do at school, we just do it in the library...I don't like having to use the computer just because that's what we're told to do...I'd like to choose." (Tilda)

I can't do the things I want to do on my school laptop, it's set up by the school." (Jennie)

Along with the tweens' openness about how technology is used in the school environment, they continued the discussion with the same level of sincerity as they expressed how and when they use mobile technology in their lives. Choice and voice appear to be strong messages presented by the tweens. They do not necessarily expect to have everything the way it suits them, but they do want to be considered and part of the conversation.

For many of the tweens in this study, there was an element of exasperated acceptance of the disconnect between their preferred *MEMO* and school-based activities. Millie's discussion about her story writing was a clear example of the digital disconnection experienced between school and outside of school: *"We use laptops at school and write stories in class using word...when I get home, I copy the story in Book Creator...so I can publish them my own way."* When asked if she could do this at school, Millie replied that she was not able to do so, but she just shrugged her shoulders and explained that she knows this is what happens and takes the work home to finish and publish online. The compelling under-layer of this reflection, however, was not focused on the technology used, but rather on the capacity to be able to demonstrate an output that enabled the tween to do more than just complete the task. The essence of this example is the process leading to a desired output – to publish for consumption and ultimately, feedback and social acceptance. If published online in any social capacity, the tweens receive peer feedback through likes and comments that they can respond to, develop from and become socially connected.

Another student, Jimmy, who had previously been home-schooled shared the differences of being able to use mobile technology as and when he liked, learning the things he wanted, when he wanted. Most importantly, he was able to develop a deeper understanding of the concepts he was interested in and found that when he returned to a

mainstream school, he was quite bored because his knowledge of many things was much broader than his peers.

There is much discussion in recent times about how tweens and/or teens are relentlessly attached and digitally connected at all times of the day (and night) with references given to the issue of their capabilities, reflecting that they can use the technology available for social purposes such as snapchat, Instagram and tiktok but they cannot apply mobile devices for learning purposes. Previous studies examined have explored the efficacy of using mobile devices for learning and the integration of these technologies into educational practices (Christensen & Knesek, 2017; Ehret & Hollett, 2014; Kucirkova et al., 2018; Schuck, 2015; Varier et al., 2017; Weninger, 2017). This apparent disconnect between the dynamic literacies displayed by the tweens beneath the surface and their observable application in learning situations, relates to the incongruity with their cognitive development of critical literacies for implementation in complex activities. In this study, the tweens reflected that they had little opportunity to apply their literacies and skills in formal school learning situations.

The tweens who took part in this study discussed the issues they had raised regarding the misalignment between how they can use mobile technologies to learn outside of school with clarity, and although they also expressed frustration with the way they could not operate the same way at school, there was also a sense of reluctant acceptance with the status quo. They want to do things differently but seem to feel there is a level of disparity where they indicate have not been given an opportunity to demonstrate that the situation could be considered from a different viewpoint with consultation and understanding. This was particularly identified when the tweens were discussing the changing status of allowable technologies in some schools.

There was significant discussion from the tweens about the incongruence between the knowledge about mobile technologies of those with authority (teachers and parents), their understanding of how tweens operate (their *MEMO*) and the decisions made regarding restrictions of technologies. For the tweens in this study, while they demonstrate an appreciation for the need to respect decisions made by those in authority, they shared that this needs to be done with deeper understanding of the subject of the decision. These young people indicated the desire to be understood in their *MEMO* processes and for the decisions made collaboratively, reflecting a deeper awareness of their lived digital ecology and the opportunities for learning differently (to traditional approaches) afforded within the third space. The tweens reflected that they feel as though they are looked upon

as not knowing anything with regards to learning and that most mobile interactions they ‘do’ are of little or no use. They revealed that they do use technology (in school) for learning activities, but most of the time, this is for rather routine or traditional undertakings, with few opportunities to show what they are capable of doing or to operate within their *MEMO*.

Kupliainen (2013) suggested that this gap is related to the different ways children and young people interact with mobile technology and media reflecting different literacy practices between the children and teachers. The tweens in this study indicated they can operate beyond the physicality of their location enabled by mobility, reflecting the macro and micro literacies of their polymediac ecology, slip-tasking within their different mobile connections as required if and when afforded appropriate learning opportunities. The tweens reflected the desire to integrate their polychronic capabilities within the learning environment, where awareness of different operational processes – the tween *MEMO*, choice and voice are integral to the decision making process.

The willingness of the young people to take part in this study supported the notion that the formal learning environment rarely offered opportunities to apply their digital literacies, with most reflections demonstrating frustration with traditional learning environments and contemporary mobile practices. They were open and willing to share their experiences and perspectives, indicating that it would be good if “*other people understood a little bit more about how we use technology*” (FG), and that adults should be able to let them make more decisions about how they’d like to learn and when they might want to use their devices.

“I am happy to be able to help with technology studies in [young people] as I think it is an important subject to look into as it has an increasing impact on our everyday lives.”
(FG)

5.6. The Smartphone Debate – Tween Voices

One issue that became an important focus for the tweens in this study was the debate concerning banning smartphones in schools. Communicating immediately with friends has been demonstrated through the discussions and interviews as an expected norm of the tween. For most tweens, this is done via the use of their smartphone or smartwatch. The findings demonstrated a high level of awareness amongst tweens for the issues related to phone and other device ‘addictions’, and the concerns that schools and parents have for

the children in this regard. However, the emerging understanding in this study is that the children demonstrate less addiction to the devices per sé, but rather dependence associated with the affordances the devices leveraged throughout the day.

This study has much to contribute to the debate about phone addiction and the arguments for, and against, the banning of phones in schools. Of significance is the focus embedded throughout this study supporting ensuring that the voices of the tween, and other young people are enabled as contributory to this deliberation. The voice of the emerging adolescent is essential to a balanced commentary in the debate, providing a perspective that goes beyond that of the teacher and other adults. The voice of the tween is able to encapsulate the viewpoint of experience, the person first perspective. Much of the existing deliberation has been focused more heavily on “teachers’ use, [perspectives] and beliefs of mobile phones” (Ott, Magnusson, Weilenmann, & Hård, 2018. p. 518) with limited focus on the student narrative. Ott et al. also suggest that the bringing of mobile phones into the existing school infrastructure has presented a range of unexpected conflicts, but that it is essential to consider “how students reason about managing mobile phones on the boundary of the infrastructure for learning in school” (p. 518). The mobile phone has become the primary method for communication and social access for the tween through convenience, portability and for the most part, immediacy of access to their social network. As a result, this is the device they reach for to make the connections they are seeking. For those who also have a smartwatch, the device “pick-up” is interconnected, with the smartwatch usually being the first device for notifications with the completion of the transaction via the mobile phone. At the same time, when faced with screentime restrictions or banning of specific devices, the tweens know they can continue many of their social connections through messages, via laptops, so for some, the associated issues have been minimised. Discussing this ‘loophole’ between teacher knowledge of connectivity and desired functionality the tweens commented: *“If I need to then I can just access most of my things on the laptop, because it doesn’t have the same restrictions and they [the teachers] don’t know this can be done.”* (FG)

In the findings from the survey, the tweens demonstrated overall, an interesting perspective on the potential banning of mobile devices at school. The indication from the students was that students should have access to laptops, but not phones, with only 30 percent of responses in favour of the phone at school. Tablets were not seen as desirable

overall, but smartwatches received almost 60 percent approval for use during the school day.

The comment from students in the survey about the use of mobile phones in school indicated concerns about the behavioural actions of students and the way the mobile phone enables these issues. Similar to studies done previously by Thomas and Muñoz, (2016) the responses in this study demonstrate the tweens' awareness and concerns for cheating, cyberbullying and social distractions when using mobile devices (refer to section 4.10). Interestingly, in the survey, a large number of the responses indicated that mobile phones should not be allowed in schools, while the tweens in the interviews and focus groups indicated significantly different perspectives. The tweens in these discussions did identify issues with teachers not knowing that students can hide inappropriate activities easily, cannot recognise body language that indicates off-task behaviours and that cheating or bullying is easily enabled through a hidden smartphone device. At the same time, they wanted to be able to use their devices as they identified them as integral to how they find information and communicate for either social or personal reasons.

In their responses, the participants were identifying behaviours with the mobile devices, rather than issues of the device itself. Whilst in some ways, this may seem synonymous, additional perspectives looking at the devices as a means to manage “downtime” in class or other aspects of learning. The respondents showed a mature approach to their understanding of how and when it would be appropriate to use their mobile phones. This aligns to studies done elsewhere, such as that described by Olin-Scheller and Tanner (2015), where findings indicated, “students are rather aware of when to use and when not to use their mobile phones. Often the mobile phones are used in between assignments” (Olin-Scheller & Tanner 2015, as cited in Ott et al, 2018, p. 520).

In the findings, tweens referred to the use of contacting people as for ‘educational purposes’: *I think that students should be allowed to access their devices in class but only for educational purposes, such as contacting people, searching the internet... (FG)* sharing also they are not allowed to use their devices to connect with others during class time. This aligns to the issue presented by Ott et al. (2018) where consideration needs to be given to the “mundane school practices” (p. 519) identifying powerful applications for learning through the use of mobile devices, and that students have a good-understanding of regulating acceptable use of these technologies.

It seems that the concerns raised by the tweens in their comments about the use of mobile devices in the classroom are not specifically about the mobile phone, as social media can be accessed through a range of devices, but rather the ethical and social implications enabled through the interaction with the phone as an immediate and accessible source of connection.

When faced with imminent banning of phones on one of the schools where this study was undertaken, the focus group participants had alternative perspectives on other aspects of social interaction. Some of the children shared that even when devices are not allowed at school, they will still bring them but (mostly) comply with the school decision not to use in the classroom or on the playground. Where this could be seen as defiance of a school policy, the children indicated quite clearly that they understood the boundaries, but in doing so, they would still make sure they had their devices for entertainment during their travel to and from school.

Other tweens discussed how they would be troubled by having to hand in their phone each day as it is “theirs”. The concept of ownership has emerged in other aspects of this study where the tweens felt that even parents controlling their screentime or wanting to see what they were doing on their devices as a breach of privacy.

Many of the students were quite pragmatic about the management of mobile devices in school, seemingly having the opinion that it is something they just have to do. To some extent, there was an element of mystery about the issues being raised at the adult level, with feelings that adults have overcomplicated the issue and it needs to be addressed from a different perspective.

Of interest, were the perspectives of a group of tweens in a school where currently the students are allowed to use mobile devices including laptops and phones, but in 2020, the plan in to implement a ban on phones during the school day. The group was very open and considered about their responses, explaining that while the school had a right to do this if they wished, they were not sure how they would function throughout the day.

In the focus groups, the tweens explained that the teachers in their schools relied heavily on communication throughout the day for change of rooms and other notifications that came through via email. The students discussed the complications of their daily functioning at school, not so much about having the device restricted, but focusing on operational efficacy. The disruption to their *MEMO* was a major focus with requests for greater levels of contribution to the debate regarding the use of mobile devices. The

tweens presented a clear desire for agency and for those making decisions *about* them to include them in the decision-making process.

The social component of mobile connection was also identified by the tweens in this study, who shared the difficulties presented in social connections if mobile devices were to be excluded from school. The social connections and functionality of the tweens as they interact with their mobile devices, particularly phones are deeply ingrained in the ways in which these young people operate. The interoperability and fusion of mobile interactions with everyday behaviours is a key theme that has emerged from this study and is evidenced in the comments contributed in both phases of data collection. The focus was more on the functionality of the device than on what type of device was being used, that is, whether the tween in using a smartphone, laptop, smartwatch or tablet, lending voice to the argument that the device is not the focal point, but rather how it becomes the conduit for the microtransitions that the tweens experience – and expect to experience. The concept of being digital and the blurring of time, place and space is reinforced time and again through the discussions and comments made by the participants in the study. The tweens contributed further insight into the issue of banning phones in the school environment through voicing the need for immediate communication in the event of personal issues or a need to contact a parent for care or advice. The findings indicate that the tween defaults to what they know – to contact someone who is their primary carer immediately there is a problem. They are used to having this micro and immediate level of connection, and voiced concerns about the pending impact of this connection if mobile devices were banned from the school environment.

The tweens in this study demonstrated a depth of awareness about the potential for distraction, social discourse and use and misuse of devices across the different activities of the school day. It is important for those making decisions about the inclusion of mobile technologies in the classroom and school environment to consider the changing infrastructure of learning and to allow scope for the students to adapt their use of devices within this environment.

This study shows that mobile devices have become integral to the micro-fibre of student's everyday lives and are central to their social and emotional fabric. This understanding is essential to evaluating the potential impact of technology on learning practices. To re-iterate the purpose of this study was not to attempt debate the case for or against the management of mobile devices in schools, but rather that within these decisions, the voice of the pre-adolescent tween is afforded the opportunity to be heard, and that consideration

be given to the perspectives they bring to the discussion. It is essential that when making these decisions, there is an understanding and observation of the ways in which young people are being digital and in having an awareness of their mobile, connected ecology. For the tween, there is a blending of time, place and space requiring an appreciation of how they access the existing learning infrastructure within autonomous, interconnected zones of social and learning activity (Jones, 2015). The expectation is that, by including the voice of the child across all stages of development, that the focus in mobile inclusion/exclusion policy development, will be a balance of minimising risk and facilitating the integration of digital opportunities.

5.7. Tweens & Distraction

The concept of distraction was raised during the interviews and focus group sessions and sits in parallel with the discussion about the management of mobile phones in schools. The tweens demonstrated some strong insights in this issue and were quite forthright about how they can be distracted and how they manage – or at times, have problems managing their concentration. The notion of distraction and smartphones in particular, has been the basis for much of the debate and significant research in recent years focusing on the banning of mobile phones for children in schools. As previously noted, this study does not enter the debate regarding the banning of mobile devices as a consequence of distraction, however, acknowledges that distraction is an issue that the tweens also recognised during the course of the research undertaken.

Overall, while the tweens indicate they can be distracted by their devices, they also feel that banning phones is an over-adjustment of the situation and that the development of personal management would be a better approach to take. They also note that adults aren't very good role models with the issue of distraction, acknowledging the statistics that relate to car accidents, pedestrian problems, parenting research and similar reports from the media. Nevertheless, the tweens acknowledge the issue of distraction, noting that they can sometimes be distracted even when they are a disciplined student. Interestingly, most discussion about distraction related to schoolwork, with limited alignment to other aspects of everyday life.

One of the tweens, when discussing the issue of distraction and the responses from schools about banning smartphones, provided some insight into the problem – explaining how for the most part, if teachers were aware of the difference in tweens' body language,

they could easily identify if they were using their devices for on-task or off-task being distracted. Cassidy (participant) reflected that if teachers were aware of the differences, she could use her mobile device to get the information required during class and not be in trouble for using her smartphone at that time.

Distraction is a topic that appeared to have limited outcome, with the tweens acknowledging this as an issue, making some suggestions for management, but not really providing any real insight into this issue. It would appear that the set-up of the device makes some difference, with tweens noting that by turning off notifications, putting their phones onto airplane mode or using the do not disturb functionality of the device can make a difference. They also acknowledge, however, that the issue is about maturity and behavioural and not really anything to do with the device itself. Comments about parents and teachers “*not helping the situation, because they do it all the time,*” (Kristina) reflected the argument the tweens have about perceived double standards from authority figures.

The issue of distraction, school decisions to ban mobile devices (more specifically smartphones) and technology management are interconnected, with many overlapping issues, comments and perspectives. In section 5.7, the reflections of the tweens focusing on management issues is explored in detail, noting that this matter does not sit in isolation but rather as an interplay with the aforementioned themes.

This study has also taken into account contemporary media articles and reports that focus on the distractibility and impact of mobile devices on the emerging tweens’ well-being, mental health and general development (Donald et al., 2020). This study is cognisant of the perpetuation of publications cogitating the negative aspects of mobile access and interactions in children, often without the necessary contribution of additional, contributing perspectives from the subject of this study that would demonstrate a balanced viewpoint; thereby presenting the significance of the findings from this research project. Furthermore, studies focusing on the debate about whether children should or should not use mobile devices during school time continue to be presented (Busch & Watson, 2019; Lepkowska, 2019), with additional research studies focusing on broader issues relating to excessive exposure to screen-time, over-use of mobile technologies and addiction to social media (Babic et al., 2017; Kaufman et al., 2017; Kucirkova et al., 2018). Whilst these reports and studies are significant and the issues are important to examine, they do not always represent a comprehensive examination of the entire mobile ecology of the young person who is the subject of the investigation and may polarise the

debate without intent. Presenting a comprehensive perspective of the young person's digital ecology is imperative and addressing this gap has remained the predominant focus in this study.

This study also recognises the importance of the recommendations and advice of the Australian eSafety Commissioner (2019) encouraging parents, educators and tweens to review the information provided regarding time spent online, cyberbullying, online gaming, social media and other related issues, observing the value in being informed so as to make well considered decisions when using mobile technology. This study has, with this in mind presented the tween perspective, proposing that any issues relating the use of mobile technologies across all timeframes in childhood and adolescence, provide a balanced platform when scrutinised. It is essential that parental and educator concerns, potential impact and associated issues be examined and analysed to safe guard the well-being and potential impact of inappropriate or excessive mobile use by children. However, this study would present the notion that it is correspondingly essential that the perspective of the tween or child on whom this study focuses be included, and that the layers hidden beneath the evident behaviours be exposed and evaluated.

5.8. Capturing Mobile Data

As presented in the literature review (Chapter 2), there has been a call over the past decade for new methods to research the use of emerging technologies, particularly in response to the increasing mobility of these technologies and associated experiences (Falloon, 2018; Gower & Mareno, 2018; Prieto, 2013; Potter, 2017; Tie et al., 2019; Toninelli & de Pedraza, 2015; Toh et al., 2017; Wingvist & Ericsson 2011). The principles of contemporary and novel uses of mobile interactions have been considered, with this study prioritising the experiences of the tweens involved, maintaining a high level of authenticity of data collected.

This study has explored and experimented with some alternative ways to capture data on mobile devices and as young people interact with the mobility of the technologies available to them in current times. As discussed in chapter 2, there have been many considerations given to the ways in which data might be collected for research studies, as technologies and users have mobilised. The approaches used in this study have extended the boundaries of more traditional methods such as collection of consent, communication with participants, interviews and focus groups, utilising a range of resources available to

develop novel ways of completing aspects of this study. The methodologies applied and developed in this study recognise the need for changing methods of data collection to reflect and align with the speed of development in available and emerging technologies. The pace of technology development means that “a generation of mobile devices is short lived” (Wingvist & Ericsson, p. 10) resulting in research methodologies being quickly outdated.

5.8.1. Collecting And Sharing Data

All parts of this study were embedded digitally including supporting resources, enabling the entire study to be done within the tweens’ mobile ecosystem. The tweens were able to scan codes for access, link directly to survey instruments and consent forms, receive auto-generated unique identifiers and contribute to interviews directly through the mobile technologies used. Although the focus groups could be held using online webinar resources, aside from those where the children were remotely located, these sessions were held face to face. However, even in the face-to-face discussions, the tweens were quick to upload their data directly to the collection points online, scanning a QR code made available for that purpose.

The availability of screentime data on smartphones and tablets revolutionised the ways in which data was able to be collected throughout this study. Using the in-built screen-time data functionality of mobile devices, the participant no longer had to stop and think about what they are doing (when using their device), or record how often they logged in or out, when they needed to take screenshots of what they are doing, or interrupt the flow of their experiences when taking part in this study. This builds on the data gathering that has been done in previous studies where tracking apps have been used or screenshots have been taken resulting in the participant having to be cognisant throughout the study period of their digital interactions. By utilising the auto-generated data in the mobile device operating system, the tweens were not impacted in the flow of daily experiences as they contributed to the study data.

The survey participants were required to upload a screenshot of their screentime data and the “most used” apps data that is automatically collated on their devices, twice within the four-week period of this study. The data is auto-generated daily and collated within the device system over a week, with both sets of information available on demand. The participating tweens were able to either directly upload if using a smartphone or tablet to complete the survey, or they sent the image to themselves if using a laptop and then

uploaded. This information provided a snapshot of participant data, although not supported by explanatory notes as was available during interviews. Nevertheless, the data proved useful as a glimpse of tweens' mobile interactions at the time of the survey. Twice during the study period, the tweens who participated in the interviews were required to take a screenshot of this screentime data and additional data showing their most used apps for the past 7 days uploading those images to a prepared online form using the resource Jotform (see Appendix H). To ensure tweens and their parents understood the full extent of this component of the data collection and the processes involved, a short, explanatory video was created and added to the form where the data was to be uploaded, mitigating issues that might impact on the process (Figure 5.12).



Figure 5.11 Video for how to share your data - resource for study participants: Access video via the QR code for full video review.

By integrating the unique ID auto-produced for each tween, it was possible to leverage the data already on the tweens' devices reflecting their mobile practices and experiences directly into this study. Barzilay (2019) presents the notion that the functionality of mobile devices and resources available for collecting data has enabled changes in how data is collected. However, in Barzilay's study, the data referred to was collected from apps and other resources used *through* the device, not data recoverable *in* the device system. Barzilay refers to potential benefits focused on real time access to surveys, convenience of access, replication and distribution affordances, customisation, flexibility and consistency of data collected. This study has demonstrated many of these concepts, particularly consistency in data collection and participant flexibility.

Whilst also utilising several mobile enabled apps such as Zoom, Jotform and Survey Monkey for survey responses and other data collection as described by Barzilay, this study's real difference is that it has used the functionality within the mobile device to enable authentic user participation, in line with the new methodologies previously discussed that have been called for and for collecting data within the active and authentic use of mobile technologies (Falloon, 2018; Potter, 2017, 2019).

The data submitted by the tweens in the survey and Jotform was focused primarily on their use of tablets, smartphones and laptops. Screentime data was used for the "smart" devices and browser history for laptops. The participants were also able to give a short explanation of how they had used their devices to support the user data, adding this information by either audio recording (directly in the online form) or by typing their response, with one third of the respondents using the audio record function and the remainder adding text responses. When asked to discuss the choice made, the following responses from Jimmy, Hamish and Katie, summed up the general consensus from the interviewees.

...I liked being able to just talk, it's better for me than having to write, I can think more easily (Hamish)

"it was nice being able to just sit back and not have to worry about how to spell what I was trying to say...it made my thinking a lot better." (Jimmy)

The tweens discussed how the functionality of being able to record their responses, reflecting that this enabled them to think more clearly and not worry about the mechanics of writing as they shared their thoughts. This addressed potential issues relating to literacy and inclusivity, enabling all tweens who self-selected to participate. This is indicated in the following comment:

"I have dyslexia...it's quite hard for me to write things down...so being able to record myself made it much easier...it meant I could tell you what I was thinking without having to worry about writing." (Jimmy)

The children who responded with text indicated that they did that because typing answers was just what they were used to doing when responding to questions and that they did not really think about doing the audio. The majority of audio responses were more detailed

than those provided by text demonstrating greater descriptive narrative and authenticity (see Appendix I for examples of responses).

The data sets and responses from the tweens were used to identify themes and patterns of use. Significantly, the patterns identified no obvious patterns of use as being evident, other than the tweens use their devices across the days ubiquitously and multifariously. This supports the emerging view that the tweens are polymediac and that they operate polysynchronously across the full range of the day and week. For most tweens there were peaks and troughs of use that they could explain: *"I was on a camping trip"* (FG) and *"We can't use our devices at school"* (FG), but the numbers of notifications and pickups varied across all participants and from the same tween, from one data scree-shot to another.

5.9. Mobile enabled data sharing - *MEDS*

The participants in the interview phase of this study were asked to share their screens during the interview and discuss their mobile experiences. This method provided rich explanations of the information collected in the device system as the tweens could refer to different aspects of the data or respond to questions from the interviewer. The advantage was that the interviews became an assembly of different strategies used for data gathering and sharing, different to a traditional interview or observation process.

During the interview, the participant was encouraged to first share their screen with the auto-generated data (see figure 5.12)



Figure 5.12 Screen sharing at the beginning of an interview

The tween could then discuss any aspect of this screen that they felt was important – unstructured questions were asked such as ‘*tell me about the apps you’ve used*’ or ‘*talk to me about how you’ve used your device today*’ (interviewer). This approach provided opportunities for the tween to exert agency over the process, required limited direction for the remainder of the interview. The tweens were generally descriptive about the data presented, willing to discuss how they had been using various apps, explaining the purpose of the app and the intention of the activity (see Figure 5.13).



Figure 5.13 Exploring apps and activities over the past 24 hours

The approaches used in this study have presented the potential for greater authenticity when studying the use of mobile technologies in action, demonstrating reliable data gathering strategies, drawing on traditional approaches and enabling the evolution of those practices to occur in response to the affordances of the operational systems available. Reliability has improved as neither the participant or the researcher is responsible for actually collecting the data necessary for this study. Issues relating to misinterpretation of activities or experiences, or for the data gathering points to be forgotten or contaminated are mitigated as the participant does not have to remember to stop and consider if any particular event is related to the study. Consequently, by drawing on the operating system's data, the participant became free to function in an authentic manner, uninhibited by the constraints of being a contributor or study subject. As a reflection of the approaches employed, this approach is described as Mobile Enabled Data Sharing (*MEDS*). The significance focuses on leveraging the affordances of mobile technologies to *enable* data sharing – the emphasis remains on the subject of this study (in this case, the tween) and their experiences, not on the technology, safeguarding that similar studies remain focused on the experiences of the user and are not techno-centred. Using a *MEDS* approach, the technology is seen as the functional vehicle to assist this

study in realising greater authenticity of the data being examined and is not in itself causative towards the study outcome.

The *MEDS* concept of data gathering may also contribute to mitigating ethical issues that relate to children's mobile practices being recorded for research studies, and for the information generation to be authentically a representation of the actual experiences of the subject. The data can also be used to ascertain the types of resources, apps and usage patterns that users are involved in during all aspects of the day, regardless of location or time. This information may be beneficial in assisting educators to determine how they might leverage informal practices and social capital to better plan and develop contemporary learning opportunities.

The *MEDS* method contributes to the call for the refinement of remote or non face-to face research methods as a response to the COVID-19 global context (Upadhyay & Lipkovich, 2020). This approach takes the data generation capacity beyond the parameters of self-tracking apps and other peripherals previously used in studies investigating mobile discourses and practices. It is additionally relevant to note that whilst the *MEDS* approach had already been established through the implementation of this study and was enacted pre COVID-19, the contribution to considering research from a remote perspective has been significant and timely. *MEDS* as a significant aspect of the interview process can be reviewed in Appendix J.

5.9.1. Mobile Enabled Self-Directed Think Aloud - MESTA

Further to acknowledging the value of employing *MEDS* as a key approach for the gathering and sharing of data, additional novel approaches were integrated in other aspects of this study, presenting a fusion of traditional field study, observation and think-aloud processes, developing into a hybrid process that was not exactly the same as each of these approaches, but demonstrated elements that were recognisable in the individual research instruments. The process has been identified as Mobile Enabled Self-directed Think Aloud (*MESTA*).

The development of *MESTA* has delivered an innovative approach that addresses some of the issues commonly experienced when using the think aloud process and field observations in research studies (Bryman, 2008; Güss, 2018). Think aloud, reflecting the 19th century “technique of selbstbeobachtung or self-observation, also called introspection” (Güss, 2018, p. 1), provides the opportunity for the study participant to speak aloud their thoughts concurrently when completing a task. As noted in Chapter 3, section 3.8.6, the

verbalisation of experiences enables insight into the thinking and reasoning processes of the participant, adding to the observations of the researcher (Eccles & Aarsal, 2017). Think aloud and field study can be challenging for maintaining authenticity as the researcher needs to be positioned so as not to disturb or interrupt the subject, while at the same time being able to observe and record cognitive processes spoken aloud or actions undertaken. The subject might also be involved in retrospective or stimulated retrospective or stimulated think aloud, where experiences are remembered or stimulated through a video of the activity during which they articulate their thoughts from the experience (Ji & Rau, 2018), impacted by the nuances of memory and reimagining the feelings from the activity at the time.

When the subject is mobile, recording the responses from think aloud activities and observations become more problematic as the activity is no longer fixed. This issue was also raised by Falloon (2018) when exploring the notion of capturing data on the go, where the mobility of the participant was seen as an impediment to gathering appropriate data and reflection. Alternative methods such as cameras positioned in various locations, small microphones or video cameras attached to participants or their devices and strategies such as having students take screenshots of activities for later recall have been employed in other studies (see Chapter 3).

In this study, the evolution of *MESTA* provided an instrument for gathering the cognitive articulations of the participants, delivering authentic opportunities for the tweens to be directly involved in a self-directed activity, uninterrupted by the research process and unencumbered by spatial constraints.

Demonstrating *MESTA* in action, in figure 5.12, the tween in this online interview chose to demonstrate how they use a particular application, CoSpaces (www.CoSpaces.io/edu). During the session, the participant clearly became immersed in the process of developing a three-dimensional scene, selecting different items, changing the environment, adding storyline narrative in addition to thinking aloud as they problem solved and demonstrated emotive success when overcoming a problem. For video demonstration of the process captured, scan the QR code below figure 5.14.

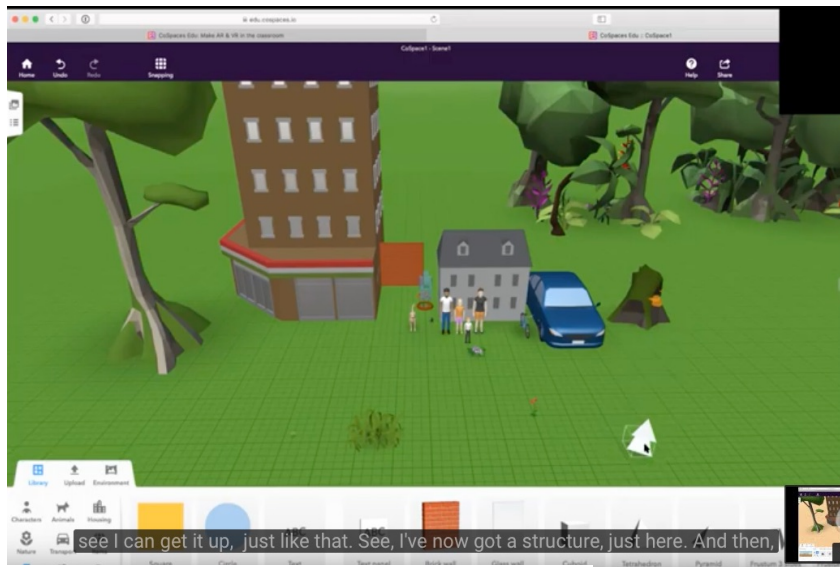


Figure 5.14 Think aloud in action during online discussion interview...scan QR code for footage relating to this example. All video footage is used with permission



The thought processes of the tween when working through this selected activity are demonstrated clearly, with the dialogue focused on the creative and mechanical processes *in action*. Similar *MESTA* results were repeated throughout this study, with the tweens responsively demonstrating the apps and resources used narrating *in time* mobile experiences.

MESTA facilitates the participant in demonstrating their thinking and creative applications within the third space, crossing between physical and virtual environments, overcoming the limitations of orchestration of the shared experience. The tweens were able to contribute their activities, reasoning and narrative inside a natural environment, uninhibited by the research process and without becoming techno-centred, maintaining authentic pedagogical and autonomous processes. Implementing the *MESTA* approach, learning space of the tween was sustained, providing opportunities for the tween to slip between the different spaces used, with a focus on context-awareness and the architecture of the activity. The tweens' agency and flexibility became integral to the methodology employed, supported by processes that leveraged the technologies available.

The defining difference with *MESTA* and other think-aloud methods of data generation as a research tool is the extrication of the binaries that may constrain previous approaches.

Moving away from more traditional approaches that are researcher defined (Charters, 2003; Güss, 2018), the tweens in this study were able to select an activity they wished to contribute. Through the adaptation of think aloud using the *MESTA* approach, reliability and validity have been safeguarded, minimising the ambiguities of the process, enabling automaticity of verbalisation, with the tween directing the activity and narrative uninterrupted. *MESTA* has integrated elements of field study, observation and think-aloud, offering exclusive insights into the authentic experiences of the tween, leveraging the affordances of the mobile environment of their digital ecology. For more examples of the *MESTA* process in action, see Appendix K.

5.10. Implications

This study has sought to understand the experiences of pre-adolescent tweens, as they interact with mobile technologies across all aspects of their everyday lives. The findings present implications for a wide range of stakeholders including researchers, policy-makers, parents, teachers, teacher educators and the tweens themselves. Using a grounded theory approach, the study has identified the situated nature of the practices of tweens with mobile technologies. Grounded theory has enabled the study to be undertaken from the perspective of the tween, with the emphasis on being positioned in the specific context of the participant. With the intent of enabling the emergence of findings and theory, this approach has provided the scope to analyse the data as it was generated rather than interrogating data to prove or disprove an existing theory or hypothesis.

For the tweens who participated in the research project, the grounded theory approach has given them a voice in the sea of studies that investigate and discuss issues and concerns relating to their use of mobile technologies. Their perspective can now be integrated into the debates that are being held regarding these issues. This study has presented a forum for the tweens to demonstrate the layers of their mobile ecology and associated digital literacies that are often not observed by others. This study has provided an authentic person centred perspective, with the tweens contributing to a deeper understanding of their own *MEMO*. This understanding enables tweens agency and supporting evidence when discussing their mobile socio-cultural interactions, enabling greater opportunity for them to collaborate with higher levels of decision making and learning design.

The research should be of interest to all educators, particularly those who teach children in years (grades) 5-8, encouraging insight into the tween *MEMO*, identifying concepts

such as polysynchronous and polyspatial interactions as tweens use mobile technologies across their day, in both formal school settings and beyond the school environment. The notion of third space has been illustrated in action, providing nuanced insights into the tween mobile culture, delivering a more perceptible view of the interplay between tweens' use of time, place and space in their mobile ecology. Understanding the tween *MEMO* and the tween polychronic, multifarious interactions with mobile technologies, provides an avenue for teachers and learning designers for the 'middle school' sector to reconsider the traditional understanding of how learning takes place when binaries of formal and informal learning are facilitated to coalesce.

Appreciating the tween *MEMO* would benefit teachers when considering the design of learning opportunities, incorporating the digital literacies and operational practices presented in this study, illustrated in the diagram 'What Lies Beneath' including the perspective of these young people in the design and construction of learning activities (see Appendix M). Through understanding the multiplicity of literacies and processes through which tweens connect, communicate, learn and function, the teacher can draw on operational diversity, engaging the students in the orchestration of new learning opportunities. *With* the tweens, the teachers can design and implement learning situations, adapting and modifying in response to their appreciation of the tween *MEMO* enabling greater individual agency and personalisation within learning activities.

This research has demonstrated a clear need for school leaders and policy makers to familiarise themselves with an understanding of the tween *MEMO*, as they consider the shape of curriculum experiences and policies associated with the use of mobile devices in schools. This study has also indicated the need for the perspective of tweens (and other groups of children where applicable) to be included in the development and implementation of policies relating to the use of mobile devices in schools. This perspective is additionally important for all studies completed about tweens or other children, as the emphasis should be on examining the situation and experiences *with* the young people not *about* them. As policies that impact on the inclusion and exclusion of mobile devices continue to drive debates about technology in education, in the future, school leaders and policy makers should proceed in response to the perspectives of the tweens presented in this study, reflecting the need for a greater participatory culture in the decision making process.

There are also implications for teacher education in that there may be value for pre-service teachers (PSTs) to be given assignments that involve interviewing tweens about

their digital culture to elicit their 'voice'. The PSTs could then use the key findings to design and develop learning activities, reflecting the person centred perspectives and ideas of the interviewed tweens. Additional ways of using this study in initial teacher education could be to encourage PSTs to work collaboratively alongside tweens, developing mobile enabled learning activities in collaboration, acknowledging the flexibility, social construction and adaptable polysynchronicity of the students, providing opportunities for an innovative interplay of agency in teaching and learning. The PSTs could use the collaborative learning situations to further examine classroom engagement and the impact on student learning.

For parents, this study holds further insights into the perspectives of their children, identifying their digital culture and socio-spatial connectivity. The study has provided insights for parents into the perspectives of tweens regarding management and screentime control, clarifying the way these young people understand the need for guidance that reflects their transition to adolescence. Further insights about the tween *MEMO* provide opportunities for parents to consider how tweens might be integrating mobile use across their day in ways they had not considered or observed – and that observed behaviours are not always as they appear. The need for the tween to have a voice in decisions being made should reflect the findings presented, understanding that these young people operate differently as they exist in a world where *being digital* is their norm.

This study has implications for tweens and other children who experience disruption to their learning through health, cognitive issues, isolation or other factors that impact on their learning opportunities. The findings from this study present alternative strategies for educators and carers of children for whom adjustments to everyday living are required. The tween *MEMO* removes many of the barriers and hurdles experienced in a more traditional learning and social setting. Through a deeper understanding of the tween *MEMO*, socio-digital connectivity and the notion of polyspatial interconnectivity, children who may otherwise experience partial inclusion can contribute more comprehensively within a greater range of activities and collaborations.

The implications for all stakeholders have also been exemplified in the current global situation as the world grapples with the impact of the COVID-19 pandemic. The findings in this study contribute to a deeper understanding of the tween mobile digital ecology providing insight into alternative approaches to online and remote learning possibilities. Educators need to consider how they might re-shape learning to respond to emerging remote teaching structures that occur during school and community lock-down situations

in response to the global pandemic. Traditional classroom practices and notions of curriculum have been precipitously disrupted, with children and teachers separated from the recognised learning environment. Conventional patterns of learning have been challenged and students may need to learn under altered cultural conditions with little warning or preparation. This study provides evidence-based illustration of mobile practices, dynamic literacies and social connectivity that can be leveraged to address these issues, providing greater opportunity for autonomy and agency for learners.

5.11. Limitations

Exploring the experiences of tweens offers an important perspective on the mobile exchanges being examined and this person centred perspective in this study was essential. Nevertheless, a limitation of the study is not having the additional perspectives of parents, teachers and policy makers. While these groups were not the focus of this study, their perspectives would be beneficial as they are also identified as key stakeholders for implications from the study. Their voice would add further balance to the perspectives of the tweens, enabling a well-informed deliberation across all related issues.

Additional limitations could arise from the self-selection strategy used for participant recruitment across the various data collection instruments in this study. While this was determined to be a strength of the approaches implemented, in that promoting the agency of the tweens was paramount, it may also limit the participants to those who feel they have something positive to contribute, not necessarily the perspective of all tweens, thereby impacting the breadth and depth of the responses

Further studies would benefit from a deeper examination of each of the dimensions presented, considering the broader application of the study parameters to investigate the tween digital culture from all stakeholders' perspectives. This study included a broad socio-demographic representation, nevertheless, it is recognised that participating tweens were primarily students from New South Wales in Australia, with the majority of participants from suburban locations. As this study can be completed entirely online, enabling replication across other states of Australia and internationally (observing the procurement of appropriate ethical consent from the various jurisdictions), this limitation could be mitigated through the inclusion of tweens from different socio-economic, cultural backgrounds and geo-locations. The nature of this study and data collection

instruments is repeatable, thereby enabling additional studies to be completed, leveraging the affordances of the mobile devices used by tweens across the globe.

This study is a snapshot of a specific digital culture now – a culture that is continuously emerging, responding to the changing mobile environment contemporaneously with tweens transitioning towards adolescence. It is critical to recognise that ongoing exploration of digital cultures is essential as the ‘snapshot’ provides a glimpse of the experiences of a specified group at a precise time. As technologies develop and individuals respond to extraneous factors such as the global pandemic, digital cultures will similarly change and must therefore, be unremittingly re-examined.

5.12. Future Research Directions

Throughout this study, issues were investigated that either raised additional questions or provided interesting information that would be worthy of further investigation. These ideas emerged during analysis of data and memoing, as key themes emerged, and during the discussion stage of the research process. This study has demonstrated the importance of including the voice of the young person where debates exist focusing on the restriction of mobile devices in formal learning. The field would benefit from studies where the voice of the child, tween or teen is included in negotiated resolutions to the issue.

This research has raised the dichotomy that endures between young people’s embedded mobile enabled operational practices across their everyday experiences, and the opportunities for authentic integration of these practices in formal learning situations. Future studies could include exploration into the polyspatial notion of the mobile child’s use of time, place and space how the *MEMO* of the mobile child might be leveraged by teachers and the impact this might have on shifting pedagogical practices to become more inclusive of the young person’s digital ecology.

For researchers, in addition to having a deeper understanding of the tween *MEMO* the methodologies implemented in this study provide a basis from which to further explore the affordances of emerging technologies to enhance the research process. The concepts presented, *MEDS* and *MESTA*, provide novel approaches that can be applied across other related studies to enable authentic research investigating aspects of mobile technology use and application.

A longitudinal study of children as they transition from childhood to tweens, then to teens and finally to young adulthood would also be beneficial. It would be noteworthy to gather

data reflecting the potential changes in the patterns and perspectives presented in this study as the children move through childhood into adolescence and towards adulthood. The tween *MEMO* could be scrutinised as young people physically, intellectually and emotionally mature, observing changes that occur and the factors that influence these changes. This may provide greater insight into the evolving digital ecology of the all children and provide a deeper understanding of their mobile experiences that may influence long-term practices in research, policy making and education.

Additional research, identified through this study that would be beneficial is the association of play, imagination, transitional concepts and social networking for older children when immersed in mobile technology experiences such as games. The cross fertilisation of interactive experiences, creativity and play acting through the immersion of virtual and physical games played by children in response to their mobile and online activities, may be of value to understanding the changing nature of imagination and play. Further investigations into the methodologies implemented could continue to refine and improve approaches and instruments used for authentically gathering data in similar studies. As enhancements to the affordances of mobile technologies continue to emerge, the approaches embedded in this study could be further developed, providing greater opportunities to extensively examine different mobile practices and experiences of individuals.

5.13. Conclusion

The discussion in Chapter 5 has focused on the relevance and significance of the findings, considering how these have addressed the research question:

How are tweens experiencing and constructing meaning as they interact with mobile technologies in their everyday lives?

This question has provided the platform to consider the experiences, social capital, techno-social interactions and connectivity of the pre-adolescent tween as they exist in their mobile, digital ecology. The perspective of the tween has been the key focus of the discussion, eliciting their narrative from the data shared across all study instruments in the research project. Untethered by time, place and space, the methods employed have reflected the changing research environment, authentically examining the tweens' social connectedness, polysynchronicity and multifarious interactions as they operate within their contemporary mobile ecology.

The discussion has also presented the contribution of methodological adaptations that have addressed the evolving challenges of studying the mobile digital experiences of children. The approaches used in this study have implemented various strategies, resources and applications to authentically capture data in movement and during everyday experiences, with limited impact on the participant. Novel approaches have been devised to leverage the affordances of the mobile technologies being explored to generate and collect relevant data and to provide avenues for reconsideration of traditional data collection methods such as think-aloud. The methods presented contribute to the need for approaches that can authentically shadow the participant in situ, without the need for additional tools or recording devices that intrude on the integrity of the research. This study has answered the call to 'gather high quality, real-time data' (Falloon, 2028, p. 66), to investigate the spectrum of activities mediated by mobile technologies (Toh et al., 2017) to understand the nature of mobile learners (Burden & Kearney, 2016) and to address the evolving behaviours and processes associated with mobile activities (Potter, 2017, 2019; Williamson et al., 2019).

In Chapter 6, the significance of this study will be presented, with a focus on how this study has addressed the research question and the contribution of the methodologies employed throughout the study to the field of contemporary research.

6. Conclusion

In this chapter, the significance and contributions of this study are presented, exploring the impact of the approaches used in the process of the investigation and how the research question has been addressed, presenting the significance and implications of the study for all stakeholders. Throughout this study, the focus has been on ‘tweens, that is, children who are pre-adolescent, aged 9-13 years, and their everyday experiences with the mobile technologies to which they have ever-increasing access. This study has investigated the *notion* of *being* digital, exploring the development and evolution of digital literacies and operational processes of mobile interaction as the tweens navigate their day within new paradigms of time, place and space. This study presents an authentic perspective of the inside and outside of tweens’ mobile interactions, social connectivity, digital presence and spatial identities, investigating the dynamic mobile mediated polychronic ecology of the pre-adolescent.

6.1. Significance Of The Findings

In this study, the mobile experiences of tweens have been examined, exploring the notion that when tweens interact with mobile technologies, they exploit unique interfaces that impact on socialisation, connections and interactions in their everyday lives. The emphasis underlying this study has been to appreciate these experiences from tweens’ perspective enabling a person centred approach to present the voice and stories of the young people themselves. Key to this study has been a non-judgmental paradigm, where specific activities and behaviours in themselves were not the subject of the investigation, but rather the emphasis was on the emergence of a deeper understanding of the experiences, digital literacies and capabilities revealed. The audience for this study includes a range of stakeholders including tweens, parents, practitioners, the individual education sectors and policy makers in education. The findings for the stakeholders provide a broad perspective of the *MEMO* of the tween, encouraging a deeper understanding of the implications of multivariate practices and associated literacies that are concomitant with the mobile experiences of the pre-adolescent child.

This study has provided an opportunity to develop a deep understanding and nuanced insights of the everyday practices and experiences of tweens when using mobile

technologies, providing a contemporary snapshot into tween digital culture. The inside and outside of the tween mobile experience has been explored, demonstrating the polysynchronous and multifarious interactions revealed across the breadth of routine tween activities throughout the day. The tween is a polymediac user of mobile technologies where in addition to the observed actions and behaviours that may be interpreted (or misinterpreted), a range of dynamic literacies is also demonstrated within the events and activities of multiconnected experiences.

In this study, the notion of third space has been examined through the lens of the tween, presenting an authentic perspective of the multifaceted construct of their experience of time, space and place in a mobile connected world. The study presents a theoretical contribution to the notion of third space, drawing on the culture of the mobile tween, demonstrating their everyday experience as socially connected and interstitially networked, functioning within the range of physical, virtual and spatial affordances of their digital ecology. The binaries of formal and informal learning, and physical and virtual spaces were evidently collapsing and merging as demonstrated through the lens of tweens' voices. Inside their digital ecology, the tween interconnectedness has redefined and reshaped boundaries of time, place and space, imperceptibly interacting with mobile technologies in response to their demand for social connection and information access. The exhibited organic shapeshifting of the tween ecology renegotiates the linear and perceptible notions of time and space, interstitially threaded with multifarious applications of social connectivity, information gathering and polysynchronicity – the tween *MEMO*. The resulting reconsideration of traditionally accepted binaries reveals the significance of the tween mobile experience, where *being digital* is reflexive, responding to the affordances of their digital ecosystem, demonstrating third space in action.

The emphasis in this study has not been to determine if using mobile technology is “good” for the tweens or for education, or if they might learn more effectively with or without mobile devices. This study has expanded the theoretical understanding of digital literacies, building on the concepts presented in earlier studies to further identify and establish the dynamic transitional considerations of the construct of technology facilitated literacies. The findings from this study indicate that there are channels of dynamic digital literacies connecting and interconnecting, bridging capabilities and skills. The tweens are immersed in a range of social, creative and linked exchanges as they navigate their day, interspersing technological activities with personal intentions. Their digital ecology is

incalculable, as the movements and networks within this ecology are not defined by time place or space. Yet, within this ecology are barriers that are implemented, impeding the desired outcomes of the tween, enforced by external authorities.

This study establishes a deeper understanding of how pre-adolescents incorporate mobile technologies polysynchronously into their lives, developing a range of adaptable micro and macro digital literacies interconnecting across contemporaneous experiences. The manifestation of these literacies and skills are responsive to the interchange of multiple channels of communication and technologies available with the social and cultural exchanges of the tween. The dynamic nature of digital literacies reflects a decontextualisation of the multi-faceted mechanics and proficiencies associated with communication, meaning making and social connectivity through the subjective and interpretive application of mobile technologies across a range of opportunities. Dynamic literacies are interchangeable, implemented within a polyspatial ecosystem of mobile connectivity and application, empowering the agency and social capital of the user, unbounded by physical or time constraints.

This study has focused on the exploration of 'what lies beneath 'the experiences of tweens (ages 9-13) as they interact with mobile technologies in their everyday lives, considering how they construct meaning within these experiences (see Figure 5.4 and Appendix M). A person centred approach was embedded throughout ensuring the perspective of the tween participant during the generation of data, analysis of the findings and dissemination of emergent theory was the primary focus of the investigation. This study has recognised the importance of using a person centred approach to facilitate recognition of the individual differences of the participants depending on their maturation and providing an opportunity for the children to feel they are constructively contributing to the study. This approach was seen as essential in the study, providing a platform to reflect the voice of the tweens who repeatedly disclosed feeling disenfranchised from studies and decisions made about their use of mobile devices. Jennie's comments encapsulated the consensus of these viewpoints: *"I just wish they'd sometimes ask us...we understand this differently"*.

6.2. Methodological Contributions

The methods engaged in this study have combined multiple technologies and resources to enable diversity of participants and authenticity within the data collection processes

integrated throughout the project. Employing online video webinar-style interviews and leveraging the automated data generation of the participants' mobile devices and screen-sharing functions has enabled a redesign of approaches and strategies used throughout. The methods implemented have focused on maximising participation authenticity and integrity of data. As is fitting with a grounded theory approach, the lens through which this study was investigated focused and re-focused throughout, responding to emerging themes, enabled by the novel approaches implemented within the study instruments. Through the application of in-built statistical collection within the operating system of the devices used by the tweens, an innovative method of dependable data generation, particularly focusing on the study of mobile technologies in action - mobile enabled data sharing (*MEDS*) has been realised. The *MEDS* method of data generation enables the researcher to authentically 'capture data on the go', optimising the relevant aspects of mobile socio-technical interactions and seamlessly connecting the different components of the autonomous experiences of the user.

The practices and methods employed and developed during this study's process provided opportunities to also reshape the interview practices, presenting the unprecedented development of a methodology aptly referred to as mobile enabled self-directed think aloud (*MESTA*). The evolution of the *MESTA* method of data generation has drawn on elements of existing interview and think aloud methods, further developing the process and interoperability through the affordances of the technologies applied. *MESTA* enables more diversity in participant authenticity, narrative and perspective as the subject has greater ownership over the think aloud activity, significantly less constrained by external elements.

The *MEDS* and *MESTA* approaches developed in this study have contributed to addressing gaps identified previously in the literature review, where contemporary researchers in this field have acknowledged the need for novel approaches to studying authentic experiences with mobile technologies. The *MESTA* approach can also provide opportunities for authentic assessment of, in and when learning, delivering a diverse platform through which students can demonstrate deeper understanding than might be accessible through traditional assessment strategies. *MEDS* provides a unique platform for educators to collate and analyse data auto-generated, to consider the assortment of mobile applications being accessed and utilised for specific learning endeavours, enabling

the redesign of learning activities to enable higher levels of student choice and autonomy. This may promote the transition from techno-centric learning design, to designing learning opportunities focused on projected enduring understanding, recognising the diversity and polymediac operations of the students, thereby providing latitude for greater agency of the learner.

6.3. Conclusion

This study has revealed that tweens operate within a multi-faceted digital ecology, demonstrating a level of bricolage through the affordances of the mobile technologies available within their everyday experience. Tweens' digital operational practices are evidently restructuring the traditional linear paradigm of time, place and space with the third space morphing across known binaries and boundaries to create the contemporary, emergent tween experience of *being digital*. In this way, this study has revealed the complex literacies that are woven imperceptibly within the tweens' digital interactions and social connections, where autopoietic and polycontextural practices reconceptualise the mobile narrative of each young person.

This study has produced compelling evidence presenting a unique awareness of the nuanced insights into digital culture through the perspective of the tween. The contemporary mobile tweens' ecology is socially interrelated, exploiting digital interconnectivity to extend real world connections and experiences, blurring the edges of conventional *modus operandi*. The tween *MEMO* has been elucidated, identifying previously uncharted mobile facilitated interoperability as these young people transition between childhood and adolescence – their everyday mobile experiences interstitially synapsing within the polyspatial world they inhabit.

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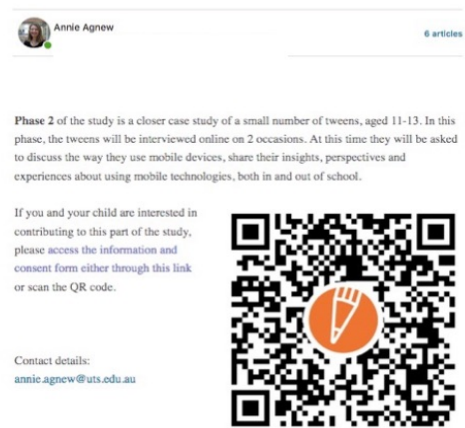
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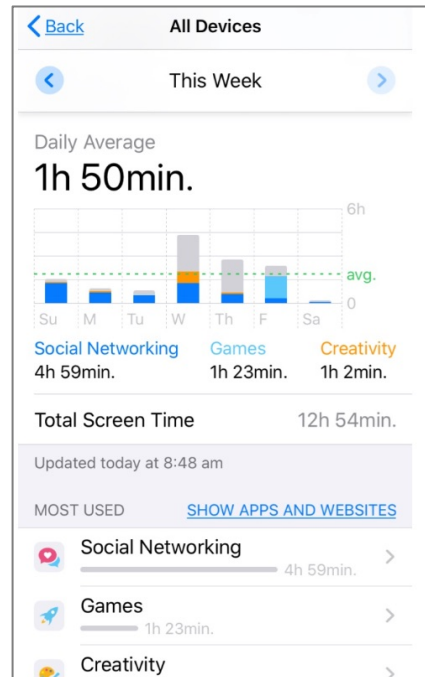
Appendix A

Using social media to generate interest and participation in Mobile & Wired research study

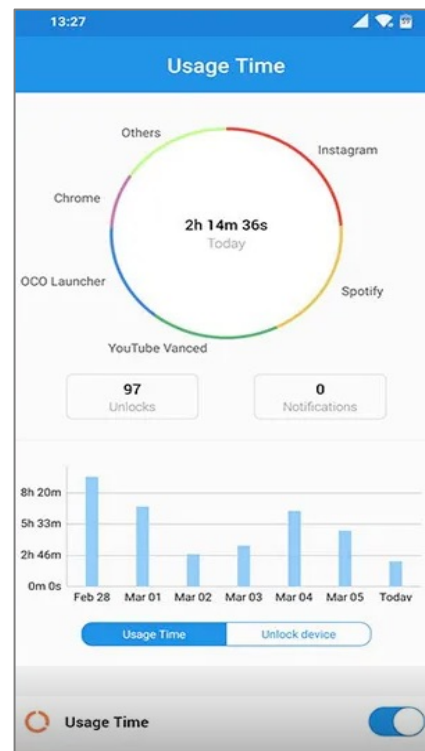


Appendix B

Screen time data collection on iOS and Android mobile devices



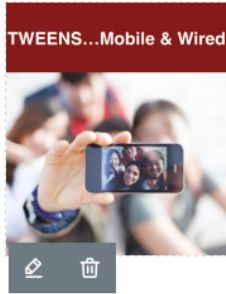
Screentime data generation on iOS devices – showing total screentime across all iOS devices for the user.



Screentime data generation on Android devices – showing total screentime for this device only

Appendix C

Survey Questions



Mobile & Wired: Mobile Technologies & Tweens

⊕ PAGE TITLE

This survey is to explore how "tweens" (ages 9-13) are using mobile technologies in their daily lives.



Access a preview of the [full set of survey questions here](#) or by scanning this QR Code :

Appendix D

PDF with unique ID auto-generated and auto-emailed to parent

The images below demonstrate sections of the email sent through Jotform when parents and child submit consent form to participate in online interviews. ID was used by tween when participating in the study.

My child and I agree to the above statements	<input type="checkbox"/> Yes
My child and I agree that the research data gathered from this project may be published in a way that	<input type="checkbox"/> Does not identify me or my child in any way
	<input type="checkbox"/> May be used for future research purposes
Parent/carer name	
Parent/carer email	
Parent/carer signature	
Date	
Child/participant name	
Child/participant signature	
11/11/2019	
Please select the region where you are located	Australia

Online interviews

Below, please select 4 dates and time frame/s that work best for you and your child in the next 4 weeks

Create your own automated PDFs with [JotForm PDF Editor](#)

for a 20-30 minute online interview.

Your child will only be asked to do the interview on 2 of these occasions.

The researcher will contact you regarding the exact date and time a minimum of **ONE week** prior to the online interview.

Date Reservation

<input type="checkbox"/>	1-16
<input type="checkbox"/>	1-17
<input type="checkbox"/>	1-23
<input type="checkbox"/>	1-24

Time frame: FROM

6:00 p.m.

Time frame: TO

6:30 p.m.

This is your unique ID number confirming consent for your child to participate in phase 2 of this research Mobile & Wired Case Study(MWCS). Please make sure they use this ID information for each interview and form submission

MWCS11

This is your unique ID number confirming consent for your child to participate in phase 2 of this research Mobile & Wired Case Study(MWCS). Please make sure they use this ID information for each interview and form submission

MWCS11

! This field is hidden and will not be seen on the form.

During construction of the form this component that auto-generates the unique ID in the emailed response to the parent after submitting the consent form.

The screenshot displays the 'FORM SETTINGS' interface. On the left sidebar, the 'EMAILS' option is highlighted with a red box. The main panel shows the 'EMAIL' tab selected, with a red box highlighting the 'Notification 1' section at the top. Below this, the 'Email Subject' field contains 'Re: {form_title}'. The 'Email Content' section contains a rich text editor with a red box highlighting a specific paragraph of text that includes a unique ID placeholder.

FORM SETTINGS
Form status and properties.

CONDITIONS
Create conditional logic.

EMAILS
Send emails after submissions.

MOBILE NOTIFICATIONS
Customize your app notifications.

INTEGRATIONS
3rd party features.

THANK YOU PAGE
Shown after form submit.

Notification 1 /
Receive an email when someone fills your form.

EMAIL | **RECIPIENTS** | **ADVANCED**

Email Subject
Change the subject title of your email content.
Re: {form_title}

Email Content
Edit the content of the email body.

Rich Text Editor:
F T B I A [Icons] Form Fields
{please select}
Date Reservation {typeA}
{timeFrame}
Time frame: TO {timeFrame25}
This is your unique ID number confirming consent for your child to participate in phase 2 of this research Mobile & Wired Case Study(MWCS). Please make sure they use this ID information for each interview and form submission {thisIs}

Setting up automatic email and generation of auto-ID information for parents after consent form submitted.

Appendix E

Distribution of information for participant recruitment through survey question and school newsletters.



Your school has been invited to take part in a research study being undertaken, investigating how pre-adolescents or "Tweens" (ages 9-13) are using mobile technologies/devices. The study is exploring the behaviours, practices and digital literacies that are integral to tweens' use of mobile technologies in their everyday lives.

Phase 1 of the study is being done at school during class time. Information about this part of the study has been printed in the school newsletter or other communication means.

Phase 2 of the study

1: Individual case study: In this section, (not done through the school), the tweens will be interviewed online on 2 occasions. At this time they will be asked to discuss the way they use their mobile devices, sharing their insights, perspectives and experiences about using mobile technologies, both in and out of school.

If you and your child are interested in being part of phase 2 (individual case studies), please access the information and consent form: <https://form.jotform.co/annielal/MobileWiredCaseStudy> or scan the QR code.



2: Focus groups: In this section of the study, your child may choose to volunteer for one focus group that take around 30 minutes and be held during a morning tea or lunch break – refreshments provided. The focus group is voluntary and anonymous. No personal information will be recorded that could identify your child in any way.



If you and your child are interested in being part of phase 2 (FOCUS GROUPS), please access the consent form using this link: <https://form.jotform.co/annielal/focusgroup>

Or by scanning the QR code

Final question in the online survey – interested tweens were taken to online information about the next phase of the study (on Jotform). This included the written information and video explaining the study, and consent form if the tween and parent wished to proceed.

Are you interested in being a part of phase 2 of this research study?

In this next part of the study, we want to **talk to you** more about the way in which you use mobile devices both in and out of school.

During this time you will be asked to participate in **TWO online interviews** where you will be asked to talk more in-depth about

- how **you use your mobile technologies** (laptops, tablets, smart phones and other mobile devices)
- general discussions around what you like to do; how you would like to use technology etc

****Access the consent form for participation in phase 2 of this study - this needs to be signed by you and your parent/carer.**

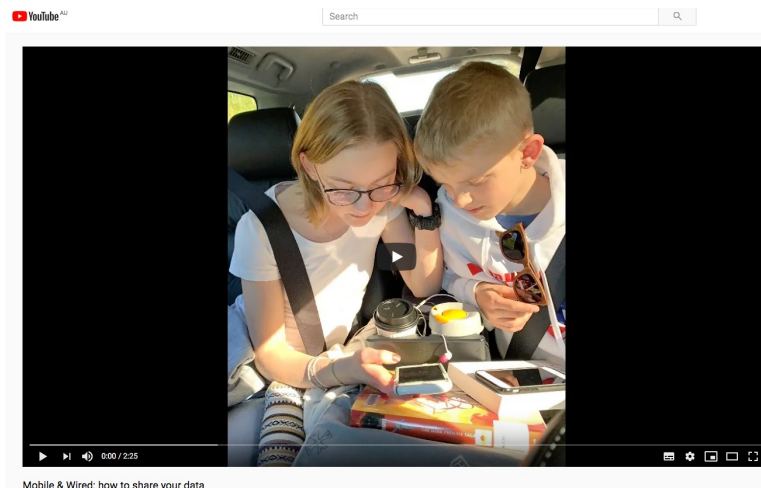
<https://form.jotform.co/anniela1/MobileWiredCaseStudy>

or scan the QR code.

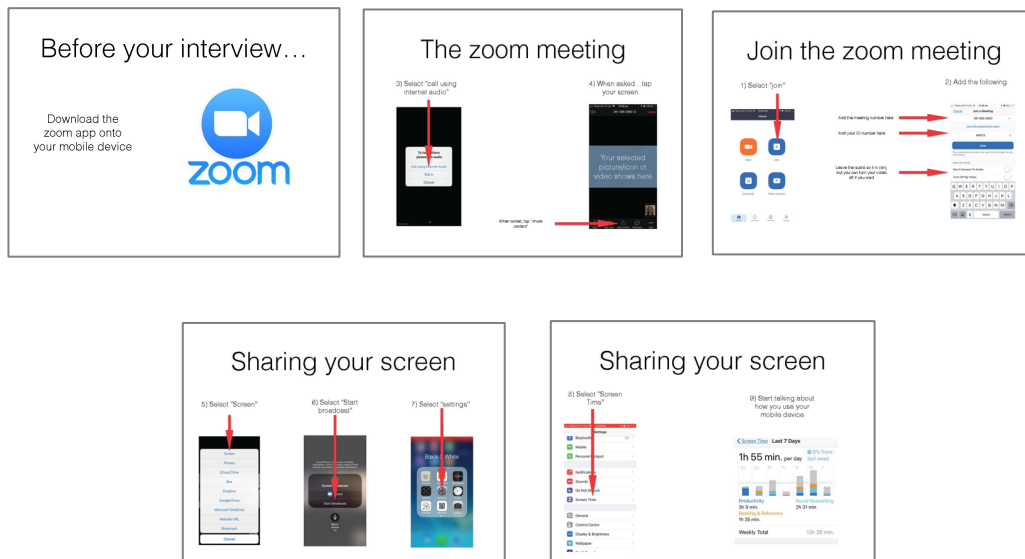


Appendix F

Supporting resources created to assist participants in taking part in the study.



Video provided to assist participant with data sharing. Scan the QR code to review the resource developed.



Images from PDF "how to" sent to all participants before online zoom session for interviews.

Appendix G

Tween perspectives on screentime management


Management focus	Tween perspectives
Communication about screentime management	<p><i>It doesn't really affect me too much because I was kind of like that [not spending too much time on my phone] before the restrictions came in. I have a thing on my phone. Where after an hour and a half all the apps stop working.</i></p> <p><i>I'm not really that good at it so I am not allowed to use my phone or my iPad if I have to do an assignment.</i></p> <p><i>I would mention that we haven't had any restrictions at all since the screen time software came out. We do talk about it a lot though.</i></p>
Explain why you feel you can manage your own screentime	<p><i>So I feel like if you're kind of if you're responsible and you can actually think about getting stuff done you shouldn't need restrictions. I can manage myself.</i></p> <p><i>If I do the wrong thing then they should put controls on – if not, they should trust me</i></p> <p><i>My parents put time restriction limits but I do it myself, I know it's not good to be on your device all the time</i></p> <p><i>I think my parents shouldn't use parent controls because they can trust my use and they can give me an app that helps monitor how much time I am using.</i></p>
Positive perspective about parental management	<p><i>I think parents should control some devices, so then they can make sure that their kids are being responsible</i></p> <p><i>It is good to have restrictions to let your kids have more interaction time with the 3D people in their life</i></p> <p><i>I think that Parent Controls are useful because it can restrict the amount of time we use our devices.</i></p> <p><i>It is important that parents have control over how much time kids spend on</i></p>

Management focus	Tween perspectives
	<p><i>devices to ensure that they have a healthy life</i></p> <p><i>It is good to trust your parents in everything by telling them everything</i></p> <p><i>I think it's pretty good overall for your parents to limit what you can see, but I also don't think they should be able to track everything you do as I personally think I deserve to have privacy.</i></p> <p><i>I think this about parent controls because if I was a parent, I would want my children to be safe online and I am already restricting things that my 6 year old sister does on devices.</i></p> <p><i>It's important to have limits with addicting technology so you don't always feel the need to get back on it. It's important for everyone to have a break</i></p> <p><i>It allows me to restrict myself from spending too much time on social media and watching videos, it also allows me to sleep and get work done</i></p> <p><i>Because it can give me time to do more important things eg. school work, exercise and other things.</i></p> <p><i>So parents can monitor children's usage of devices and help keep them safe</i></p>
Disagreement with management by parents	<p><i>I think that one day we will need to use devices a lot now that technology is improving. It does not help us get used to it by giving us time restrictions</i></p> <p><i>It is our device and we should be able to do whatever we want to on it!!!</i></p> <p><i>It's kind of ... annoying? And it sort of invades privacy</i></p> <p><i>I...don't think they should be able to track everything you do as I personally think I deserve to have privacy.</i></p> <p><i>Because I can control my own time and they [screen time controls] are a hassle</i></p> <p><i>Parents shouldn't do this because I don't use any apps that I'm not supposed to use.</i></p>

Management focus	Tween perspectives
	<i>I think parent controls are good for younger kids, but not really for older kids, because we like having more freedom</i>
	<i>If I have screen controls and my time has run out, sometimes I might not be able to get to something when I need it</i>
	<i>I don't think I need it, and sometimes it can get in the way.</i>
	<i>It gets annoying with the parent controls and when you need a bit of privacy, they won't give it to you.</i>
	<i>I don't want my parents to have control over my devices, but it might be good if they do</i>
	<i>I think my parents should be able to trust what I do as we have spoken about it before.</i>
	<i>I think this, because parents shouldn't restrict all devices, so then kids can have a little freedom</i>

Appendix H

Uploading data for participating in phase 2 of the study



How you use your mobile phone

In this section, you will be asked to upload images of the screentime data collected by your mobile phone – or "battery use" if screentime data is not available. In each section there is a sample image of what you should upload.

Do you use a mobile phone?

☐ Yes

☐ No

Take a screenshot of the "PICKUPS" apps from the last 7 days – include the "first used" details (no equivalent if screentime not available)

Upload your image of PICKUPS here

[Browse Files](#)

If available, take a screenshot of the "NOTIFICATIONS" from the last 7 days

Upload your image of NOTIFICATIONS here

[Browse Files](#)

Briefly describe how you have used your mobile phone in the past week

If you would rather record your response to the question about how you use your mobile phone, do that here. Press STOP when you have said all you want to share.

[Record](#)

Appendix I

Examples of differences between verbal and written responses from online questionnaire

Written response #1 ...*Today I used my laptop to check my emails. I used Google Chrome and photos on my laptop. Over the past few days I have also been checking my emails* (Tessa).

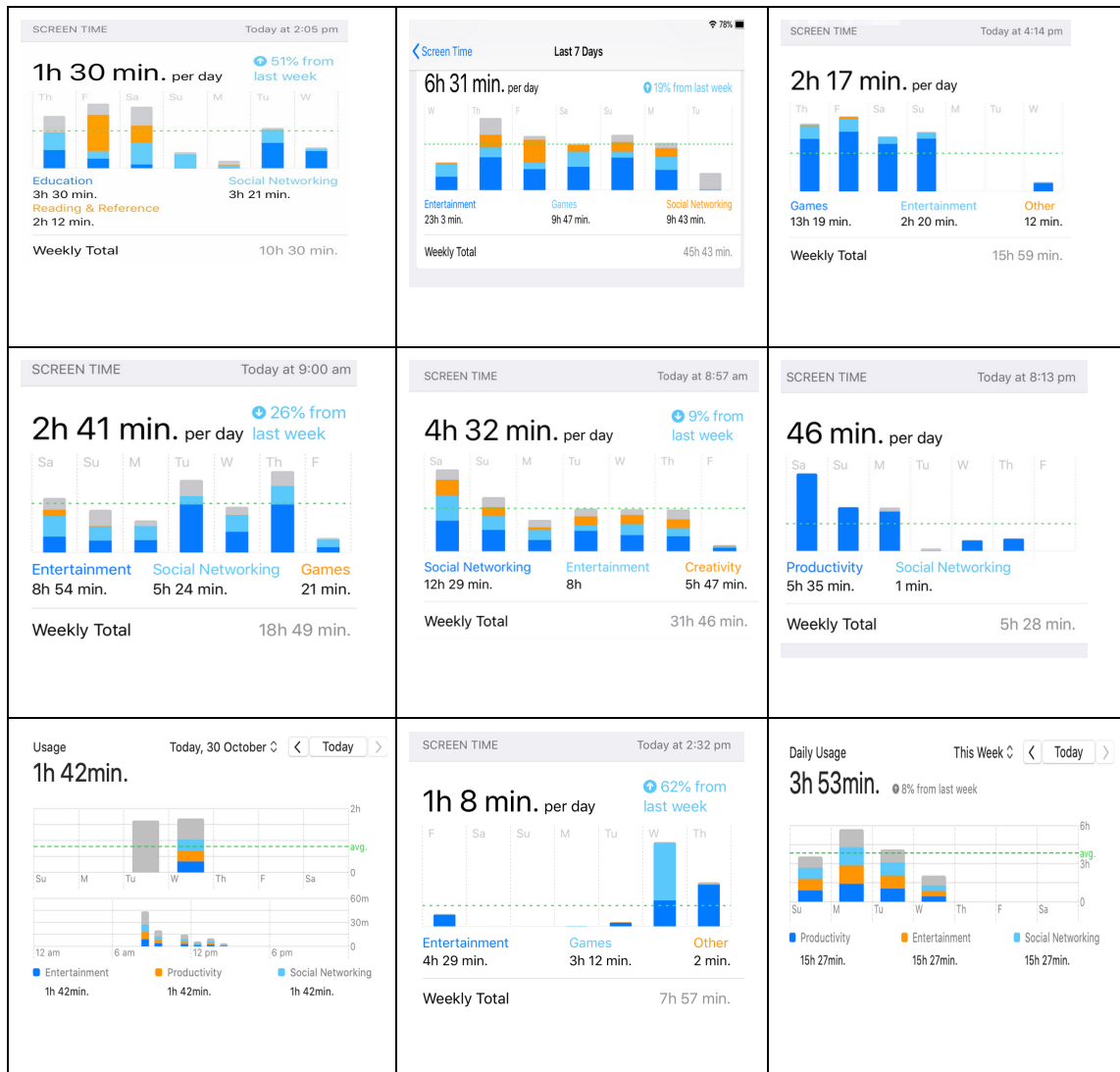
Written response #2 *I sent lots of telegram messages [on my phone] including a photo. I also got notifications from telegram. I used Tripview* (Alice).

Audio response #1 ...*I've done mathletics for homework and I've played a motorbike game and a cricket game on my laptop. Then I went onto the [school] spaces to see what I had to do for homework and looked for sources...I didn't do much else, because I'd been sick* (Hamish).

Audio response #2 ...*I've used my phone for mainly watching YouTube and also for like talking and messaging my family so I know where they are, and I also play some games on it. The games are called Fishing Clash and a surfing game. I like the way I can just pull my phone out wherever I am* (George).

Appendix J

MEDS – sharing data during interviews



Scan the QR code for explanation of
MEDS in action during interviews

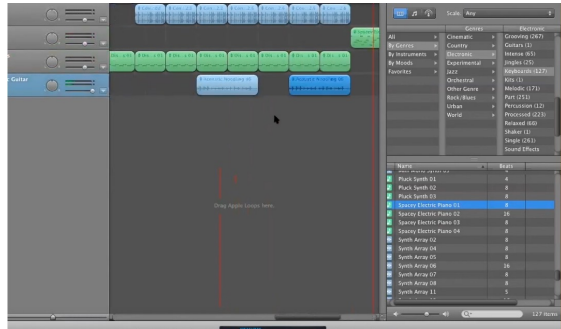
Appendix K

MESTA in action during interviews

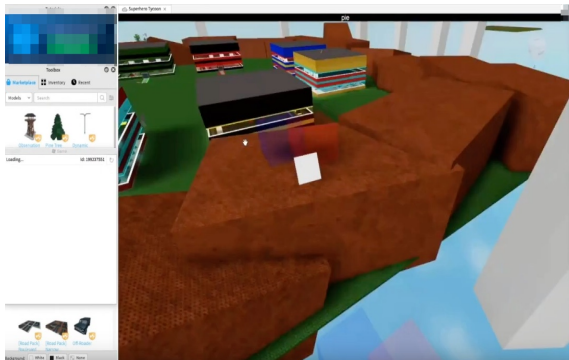
For each example of *MESTA* in action, scan the QR code beneath the image



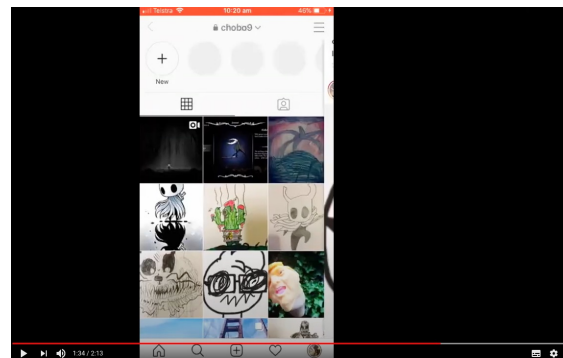
MESTA #1



MESTA #2



MESTA #3



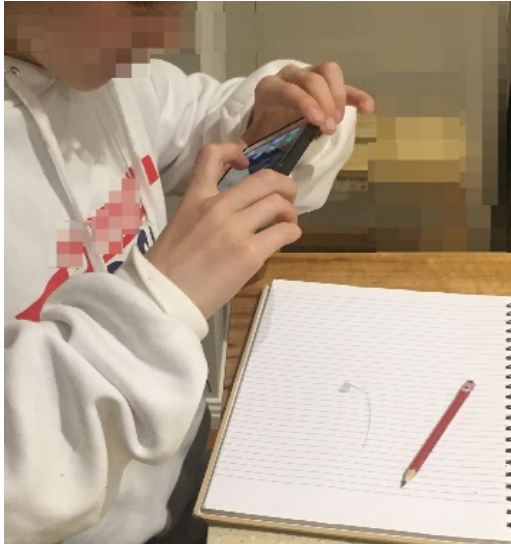
MESTA #4



(All videos shared with permission)

Appendix L

Tween MEMO examples



Photographing drawings to send to friend for feedback



Reading weekly published chapters online by well-known author



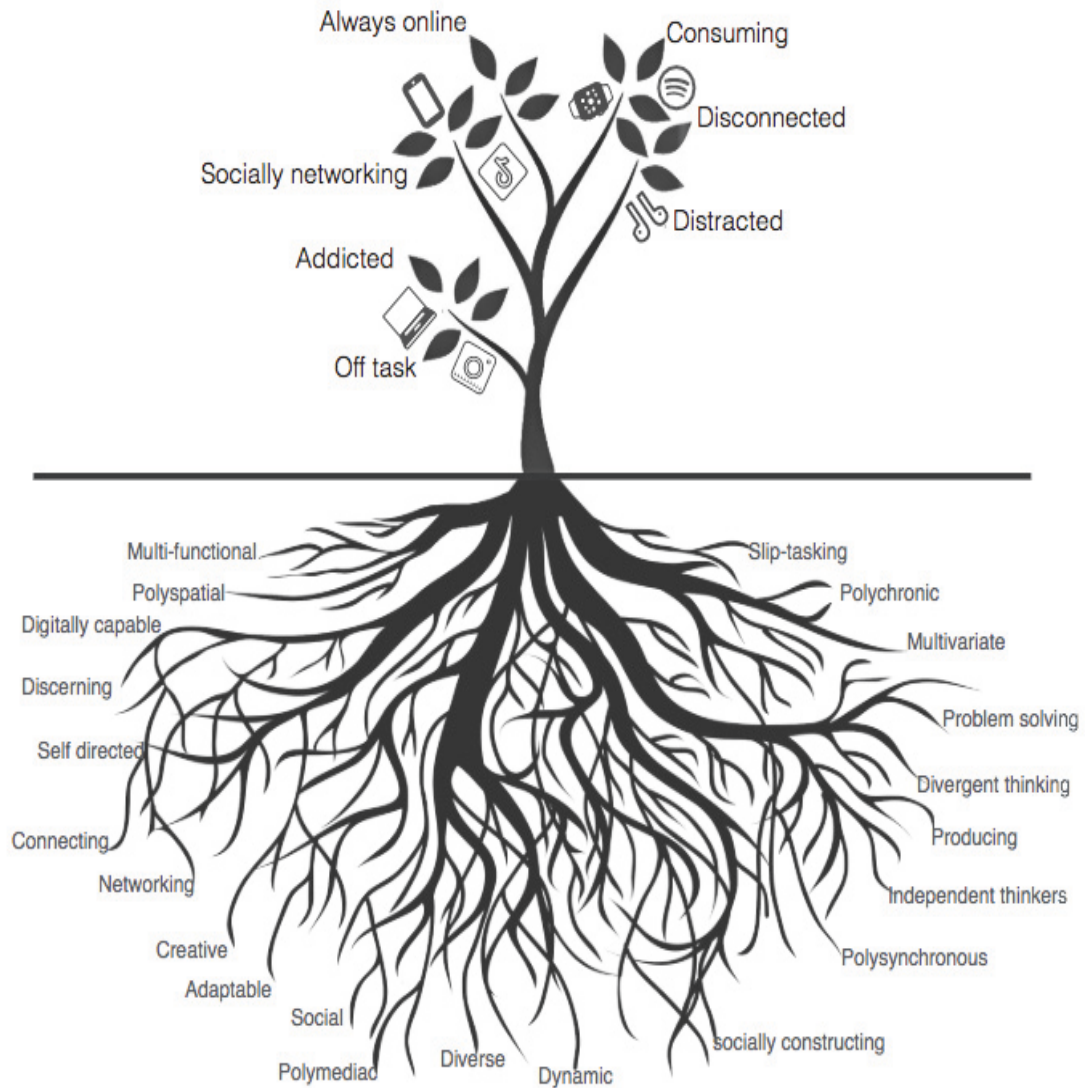
Using mobile phone and smartwatches to determine elevation, mapping references and time to destination



Finding connectivity to sync smartwatch

Appendix M

What lies beneath – the tween MEMO



Scan the QR code to review tweens' *MEMO* perspectives presented in an interactive display in Thinglink.