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Alyce Rose Mason
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Alyce Rose Mason

Dedication

I would like to dedicate this thesis to my namzad – ***Arad Banafshi***

Azizam, you have opened up my eyes and heart to a whole new

world and with you I have found the true meaning of love, life & family.

Dooset daram Eshgham, Omram, Hamsaram, Delbaram, Jane delam…

این پایان نامه را تقدیم میکنم به نامزدم، **آراد بنفشی.** عزیزم تو چشم و قلب من رو به دنیای جدیدی باز کردی.

با تو توانستم معنی واقعی عشق، زندگی و خانواده را بفهمم.

دوستت دارم عشقم، عمرم، همسرم، دلبرم و جان دلم.

Declaration

I, Alyce Rose Mason, declare that this thesis submitted in partial fulfilment of the requirements for the conferral of the degree Doctor of Philosophy (Education), from the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

Signed:

Date: <u>01.08.2017</u>

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I wish to express my sincere appreciation to those who have contributed to this research and supported me throughout this life-changing journey. First and foremost, I would like to thank my primary supervisor: Professor Garry Hoban. Without the brilliance of your ideas, expertise and research, this study would not have been possible, and the journey would not have been as rewarding without your guidance, patience, inspiration, encouragement and support every step of the way. You have been an exemplary and visionary mentor. My experiences working as a Fellowship Facilitator for your OLT National Senior Teaching Fellowship and being part of your national road show and edited book have been central to the design and development of my PhD research and have kick-started my career. These opportunities, along with countless others, have taken me all over Australia and the world (San Francisco, Oregon, London, and now Dubai) and have led to me securing permanent work in the higher education sector in innovative fields that I love. From the days of making slowmations about moon phases and lady beetle lifecycles (and putting myself in a giant bubble in your science class), to the submission of my PhD, I can honestly say that your unwavering presence and guidance in my life has been the most influential and instrumental for my professional development and career. For this I am eternally grateful.

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Abstract

Individuals with Autism Spectrum Disorder (ASD) experience communication difficulties that impact upon their capacity to represent and interpret meaning. Research in the field of technology-based communication interventions for students with ASD aims to address these issues in the school setting. While the majority of strategies and interventions reported by the literature are teacher/expert-generated, this study focused on the use of technology to enable student-generated approaches to media-making to enhance communication.

This study involved the implementation of a Digital Media Intervention Program (DMIP) with an Autism support class at a Sydney high school that consisted of seven adolescent males (13-17 years) with ASD. The program was an adaptation of a national project designed for university science educators and their students, but was modified to involve high school students with ASD in the creation of digital media assignments. The media forms utilised for students with ASD to create included a podcast, digital story, animation and blended digital media which have increasing modal complexity. The purpose of the study, therefore, was to investigate the experiences of four high school students with ASD making various digital media forms in a DMIP.

The design of the program employed a staged approach that introduced students to the digital media forms based on an increase in modal complexity. It employed a gradual release of responsibility pedagogical model (Pearson & Gallagher, 1983) that followed a modelled, guided and independent teaching cycle so as to scaffold students towards student-generated digital media-making experiences.

The study employed a multiple case study design and gathered qualitative data concerning the digital media-making experiences of four students in the form of interviews, lesson observations and work samples. The theoretical framework of multimodality alongside a thematic approach to analysis was utilised to describe students' digital media-making experiences and address the study's three research questions concerning students': (i) media-making capacities and use of written, visual, oral and digital technology literacy skills; (ii) awareness and application of modal affordances; and (iii) communication throughout the DMIP.

Findings revealed that with appropriate support, students with ASD were able to create a suite of digital media assignments and employ a range of written, visual, oral

and digital literacy skills to communicate meaning. Students also demonstrated that they could combine media to create blended digital media assignments and justify their media use based on an awareness of modal affordances. Students were also able to communicate a range of personal interests in their digital media assignments and respond to the interests of others in a social context as a result of making and sharing their digital media with peers. Difficulties experienced by students throughout the DMIP included issues planning and structuring ideas, difficulty operating software, and social communication challenges related to working in pairs (e.g. joint decision-making and equal responsibilities). Also, students required varying degrees of teacher direction to create digital media.

This study showed that students with ASD can create various forms of digital media to communicate their experiences using a variety of modes especially when they are given opportunities to use their own content. The program could be disseminated to other schools if a specialist support website was built, accompanied by professional learning for teachers and support staff.

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List of Abbreviations

The following abbreviations are used throughout this study:

APA	American Psychiatric Association
ASD	Autism Spectrum Disorder
BDM	Blended Digital Media
DMIP	Digital Media Intervention Program
DS	Digital Story
DSM-5	Diagnostic and Statistical Manual of Mental Disorders (5th edition)
PL	Podcast Lesson
SBR	Student Behaviour Records
SL	Slowmation Lesson
VM	Video Modeling

For a detailed overview of abbreviations that constitute data reference codes see Appendix 10

Chapter 1: Introduction

Background

Contemporary advancements and innovations in technology and digital media have transformed the ways in which we think, learn and communicate. Literacy is no longer defined by reading books and putting pens to paper. Rather, learning and communicating in the 21st century requires very different skill sets and approaches than those to which we have traditionally been accustomed. Students today are presented with more possibilities for digital communication than ever before. In order for 21st century learners to be able to navigate the ever-expanding digital landscape and prepare for their future work environment, they must develop multiliteracies that enable them to make sense of information across various channels of communication (multimodal awareness), and to be able to communicate using a range of written, visual, oral and digital literacy skills.

Students who have an Autism Spectrum Disorder (ASD) experience a unique and varied range of communication abilities and challenges (American Psychiatric Association, 2013). As a result of difficulties regarding executive functions such as planning, sequencing and synthesising information, they may find it challenging to interpret and express information in traditional oral and written ways (Bergeson, Davidson, Harmon, Gill, & Colwell, 2008; Hill, 2004; McCloskey, Perkins, & VanDivner, 2009). Despite these challenges, research has indicated that digital technologies have offered much to support the learning, communication and social skills of students who have an ASD.

There has been considerable research concerned with social and communication skill interventions for students who have ASD, using teacher-generated video modeling and Social Stories™ (Bellini & Akullian, 2007; Chan & O'Reilly, 2008; Crozier & Tincani, 2007; McConnell, 2002; Mechling & Swindle, 2012; Quimbach et al., 2009; Wang & Spillane, 2009). Further, research concerning the use of expert-generated programs integrating Social Story™ and video modeling strategies, including the use of computer-based teaching aides (Sansosti & Powell-Smith, 2008), Power Point (Mancil, Haydon, & Whitby, 2009) and 2D animation software (Mandasari, Lu, & Theng, 2011), has also indicated favourable outcomes for students with ASD. The uses of dedicated applications (Aresti-Bartolome & Garcia-Zapirain, 2014) and virtual reality (Chaplin,

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Hardy & Underwood, 2013) as a means of supporting the engagement and communication of individuals with ASD have also been reported.

Each of these strategies offers students alternative and multimodal ways of communicating. In sum, research regarding interventions for students with ASD suggest that utilising strategies that integrate various modes, in particular visual technologies, can support the learning of these students (Bellini & Akullian, 2007; Bernad-Ripoll, 2007; Litras, Moore, & Anderson, 2010).

Because many students with an ASD experience difficulty expressing themselves solely through writing or speaking, investigating the extent to which digital media with its variety of communication modes (image, audio, text) may provide alternative means of communicating is a worthy project. There is little research regarding how such technologies and teaching approaches that use a computer-based format can support students' learning (Sansosti, & Powell-Smith, 2008) and development of multimodal literacies. Moreover, whilst technology offers the possibility of combining different ways for developing and utilising written, visual, oral and digital literacy skills, the vast majority of strategies and interventions reported in the literature for students with ASD are teacher/expert-generated and focussed on social behaviours. Bruce et al.'s (2013) review of multimodal composing in the field of special education reveals the need for research to further explore the potential of students with special education needs creating digital multimodal representations.

The current study sets out to explore how four high school students with ASD represent and communicate their experiences using multimodal digital representations. This study specifically examines the experiences and skills of students creating digital media assignments (in the form of podcasts, digital stories, stop-motion animations, and blended digital media) as part of a Digital Media Intervention Program (DMIP), and the impact of this on their multimodal awareness and communication.

Purpose of the Study and Research Questions

The purpose of this research was to investigate the experiences of four high school students with ASD making various digital media forms in a DMIP.

This purpose is addressed by the following questions:

1. What digital media forms did students with ASD create and what skills did they develop as part of a Digital Media Intervention Program?

2. In what ways did students with ASD demonstrate multimodal awareness in the making of blended digital media?

3. How did the Digital Media Intervention influence the communication of students with ASD?

Significance of the Study

This study draws on the research of Hoban, Nielsen and Shepherd (2013) applying the use of student-generated digital media forms to facilitate student engagement in Science Teacher Education, to the Special Education classroom context as a means for students with ASD to represent and communicate their experiences. Specifically, this study extends research that was part of an Australian Office for Learning and Teaching National Senior Teaching Fellowship (Hoban, 2013), in that the DMIP used is an adaptation of a project designed for university science educators and their students to create podcasts, digital stories, animations and blended digital media with increasing modal complexity to explain and communicate science concepts (Hoban, Nielsen, & Shepherd, 2016). Consequently, this study's modifications of the national project are significant in that they enable an investigation into the involvement of students with ASD creating digital media assignments (similarly increasing in modal complexity) to represent and communicate their experiences.

This study is timely as in light of rapid digital innovations in education. In particular, more information in needed about how digital technologies can enhance teaching and learning, specifically in the field of Special Education. This study supports emerging research in the field of multimodal learning and provides a unique insight into the ways that digital media tasks can be implemented in the classroom setting to enable students the opportunity to explore, create and express meaning using a range of modes. In particular, this study can contribute to educational theory and practice in that it is unique in its approach to involving high school students with ASD in the creation of a

suite of digital media, culminating in the composition of a blended digital media product, to support multimodal communication. Research shows that students with ASD are engaged when using digital technology (Sansosti & Powell-Smith, 2008), yet few studies have explored these students using digital technologies for educational purposes such as creating digital assignments or communicating digitally (Bruce et al., 2013).

Pandya, Hansuvadha and Pagdilao (2016) state that "there is so much we don't know – in language arts, literacy, special education and autism research" (p. 415) about the multimodal literacies of students with ASD, let alone the communicative potential of digital composition for these students in the school setting. With the exception of a few isolated studies that involve students with ASD in the creation of digital compositions (Diener et al., 2016; Holmgaard, Pedersen, & Abbott, 2013; Oakely, Howitt, Garwood & Durak, 2013; Pandya, Hansuvadha & Pagdilao, 2016; Sarachan, 2012), the vast majority of technology-based programs and interventions reported by the literature that support the communication skills of students with ASD are primarily teacher or expert generated. In addition, very little is known regarding the capacity of students with ASD to organise, reflect on, and evaluate their ideas (Hill, 2004). In fact, existing theories such as Theory of Mind Deficit, Executive Function Deficit and Central Coherence Deficit suggest that as a result of their autism, students with an ASD find it difficult to plan and organise ideas, and think about ways in which to represent and communicate their experiences (Hill, 2004). Nevertheless, research shows that students with ASD show potential and strengths in being able to visually and digitally communicate their ideas in the creation of digital stories (Oakely et al., 2013), animations (Holmgaard et al., 2013), 3D designs (Diener et al., 2016), games (Sarachan, 2012) and videos (Pandya, Hansuvadha & Pagdilao, 2016).

This study is significant in that it tracks students' experiences as they create their own digital media to represent and communicate their ideas. In doing so it explores students' skills, modal awareness, decision making and communication experiences. Further, unlike interventions that are clinically based and use a single-subject design, this study focuses on students as case studies and takes place in an authentic classroom environment to gather rich qualitative data that paints a picture of what a DMIP could look like in the context of a real classroom. It is hoped that this study will contribute to knowledge of ways to integrate digital technologies into programs to support the communication of students with ASD. This study also aims to reinforce the value of the

implementation of specific strategies, approaches and uses of student-generated digital media across multimodal representations in the school setting (Hoban & Nielsen, 2010).

The Study

Student-generated Digital Media.

This study focused on a DMIP that took place with an autism support class consisting of seven students from years 7-12 with high functioning autism (Level 1) and their classroom teacher at a local mainstream Sydney high school. The researcher developed this program through the modification of the national project (Hoban, 2013) – a project designed to support university science educators and their students in learning how to create a suite of digital media for explaining and communicating science. This study similarly adopted the original project's staged approach to introducing and teaching each digital media form, however, modifications were made to reposition the focus towards supporting students with ASD in the creation of their own digital media assignments for representing and communicating their experiences.

The program was implemented over two school terms and involved the researcher conducting various lessons that modelled how to make a range of digital media. Students were then given opportunities to jointly construct digital media under the guidance of their teacher, before being given the chance to independently construct their own digital media assignments (the outcomes of which constitute the focus of the current study). While the students were very capable with regards to using digital technologies, and had even experienced jointly constructing movies as a class prior to the study, this was the very first time that they had ever attempted to create their own digital media assignments. Each student took part in creating podcast, digital story, video, slowmation (abbreviated from slow animation), and blended digital media assignments. For the purpose of this study, data concerning the experiences of four of the seven students creating digital media assignments are presented as case studies.

Theoretical Framework.

The theoretical framework used to position this study and analyse students' experiences was that of multimodality (Kress, Jewitt, Ogborn & Tsatsarelis, 2001; Kress & van Leeuwen, 2001). This framework purports that various modes work together as resources to construct and communicate meaning. Informed by the theory of multimodality, this study examined the ways in which students utilised different modes to communicate meaning with different digital media.

Research Design.

This qualitative study employed a multiple case study design that view students as independent cases within the setting of an autism support classroom environment. Specifically, four of the seven students within the autism support class made up the four individual case studies reported in this study. Data were collected over a period of two school terms in the form of student and teacher interviews, lesson observations (recordings and field notes), student work samples, documents, reflective notes/diary entries, assessment records and student records. Data analysis was an ongoing process across data collection and was performed thematically through various phases of coding. As patterns within case study data sets emerged through familiarisation they were categorised into initial codes and mapped to research questions. Themes were then identified among and across case study data and original case study specific categories were revised to produce the most suitable themes for analysis of all data in accordance with research questions.

Participants

This study took place at Banafshi high school (pseudonym for a Sydney high school) with an autism support class dedicated to solely teaching students who have an ASD. The support class consisted of seven male adolescent students from years 7 to 11 who had an ASD. Of these seven students, data were collected for four students: Charlie, Riley, Jimmy and Damien (pseudonyms). These four students were the focus of four individual case studies in this study. One boy was 13 years old and in year 7 (Damien), two boys were 14 years old and in Year 8 (Charlie and Riley), and the other student was 15 years old and in year 9 (Jimmy). All students were diagnosed as having high functioning autism (level 1) and expressed unique autistic characteristics, abilities, and

interests (profile summaries of the four students are provided in the methodology chapter). Students were withdrawn from mainstream classes and placed into the autism support class (either part-time or full-time) because they experienced difficulties regarding social coping strategies, communication, managing anxiety, interacting with peers, and following particular school routines.

While not the focus of a stand-alone case study, the classroom teacher of the autism support class, Adrian (pseudonym), was also a central participant in the study. While the researcher initially conducted a series of introductory lessons with the class (in the presence of the teacher) to model how to construct each digital media form, it was Adrian who instructed lessons and ultimately guided students toward their creation of digital media assignments. Collaboration between Adrian and the researcher was fundamental to this study and data gathered from Adrian in the form of interviews, reflections and observations were significant for triangulation.

Limitations

There are several limitations of this research. Firstly, the study only investigated the experiences of four high school students. Due to this narrowly focussed and small group, in conjunction with the qualitative multiple case study design of this study, results cannot be generalised to the population of students who have ASD beyond the four students involved in the study.

Another limitation of the study is that the researcher was central to the design and implementation of the DMIP, and played a key role in training the classroom teacher and students in digital media construction, which provided a new and different approach for the students and the teacher involved. The divergent instructional style of the researcher (more student-centred than the teacher) and the new application of technology as a means of enabling students to produce digital assignments could have impacted on the study (novelty effect). Moreover, the DMIP relied on knowledge of digital media-making, teaching and the conceptual and theoretical contributions of the National Senior Teaching Fellowship that the program was informed by. Consequently, replication of the study would rely upon the classroom teacher gaining a degree of expert knowledge and skills through professional development and/or supervision so as to implement lessons and support students as intended.

Definition of Key Terms

Autism Spectrum Disorders (*ASD*): Autism Spectrum Australia (Aspect) describes autism as: "…a lifelong developmental condition that affects, among other things, the way an individual relates to his or her environment and their interaction with other people" (Aspect, 2015). This description is underpinned by criteria specified in the recently revised Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association, 2013) which provides standard classifications of mental disorders, and is used by mental health professionals in Australia. The DSM-5 currently identifies two primary characteristics fundamental to the diagnosis of ASD: (i) difficulties regarding social communication; and (ii) restricted, repetitive patterns of behaviour (American Psychiatric Association, 2013). There are different levels described by the DSM-5 that categorise ASD according to the severity of their impact on an individual's functioning. These levels range from 1 to 3, with Level 1 referring to individuals who are considered high functioning and have mild symptoms of autism, and Level 3 referring to students with more severely impaired functions.

Blended digital media: This digital media form comprises a narrated combination/blend of a variety of digital media forms. Hoban et al. (2013) explain that "each digital media form has its own particular affordances" (p. 33) and that integrating and 'blending' these enables "students to mix and match media for particular purposes" (p. 33).

Communication: Informed by Halliday's (1978) social semiotic theory of communication the theory of multimodality (Kress et al., 2001; Kress & van Leeuwen, 2001), 'communication' in the context of this study is defined as the process of utilising meaning-making resources (complex systems of signs that can be used as resources for communicating in verbal, non-verbal, written, auditory, visual and/or gestural ways) to serve the needs of individuals in specific contexts.

Digital media: In the context of this study digital media refers to audio, video, and photo content used to produce digital media files such as podcasts, digital stories, animations, videos and blended digital media.

Digital story: A digital story is a digital media form that consists of a narrated slide show of static images with a frame speed of approximately 10-20 seconds per slide (Lambert, 2003).

Executive Function Theory: is a theory that suggests that individuals with ASD experience significant impairment of executive functions such as organising, planning, sustaining attention, initiating tasks, flexibility of thought and action, utilising self-control, and inhibiting inappropriate responses (Hill, 2004; Ozonoff, Pennington, & Rogers, 1991).

Modes: Informed by the theory of multimodality, in the context of this study 'modes' are defined as "organised sets of semiotic resources for meaning making" (Jewitt, 2008, p. 246). Specifically, modes can include "image, writing, layout, music, gesture, speech, moving image, soundtrack and 3D objects" (Kress, 2010, p. 79).

Modal affordances: Kress (2010) defines modal affordances as the potential possibilities/impossibilities of modes to represent and communicate meaning. Modes use a range of resources to achieve semiotic effects and thus depending on purpose and context, certain aspects of modes (material, physical and environmental) may be more suitable as a means of representing and communicating meaning than others. Jewitt (2008) explains that the way in which "a mode is used, what it has been repeatedly used to mean and do, and the social conventions that inform its use in context shape its affordance" (p. 247). For example, an image in the form of a photograph offers different potential for representing and communicating meaning than the affordances of the mode of speech as a communicator of meaning through sound.

Multimodality: The theory of multimodality (Kress et al., 2001; Kress & van Leeuwen, 2001) offers a holistic means of considering literacy as comprising a range of diverse representations and practices, whereby language is but one component. Fundamental to the theory of multimodality is the notion of representational and communicational resources called 'modes' working together to achieve meaning (Jewitt, 2009; Kress, 2010).

Multimodal Learning: Multimodal learning involves the communication of ideas with and through syntheses among a range of representational modes (e.g. words, diagrams, pictures, graphs and gestures; Jewitt, 2008). Multimodal learning enables problem solving opportunities that exceed that which can be achieved utilising merely one or two means of representation (Lemke, 2003).

Podcast: According to Hoban et al. (2013), a podcast is "one of the simplest digital media forms for students to create" (p.32) in order to explain a particular concept. It usually consists of a "1-3 minute audio recording, often with no images" (p. 32).

Slowmation: (abbreviated from "Slow Animation") is a simplified way for students to design and make a narrated stop-motion animation that is played slowly at two frames per second to explain a concept or tell a story (Hoban, 2005; 2007; Hoban & Nielsen, 2010). The process of creating a slowmation involves students in designing a sequenced progression of a variety of representations (e.g. storyboard, models, photographs, narration) that break concepts down into steps and provoke students to think in unique ways and with different modalities (Hoban & Nielsen, 2010).

Social Stories™: are short stories designed for students with autism that "describe a situation, skill, or concept in terms of relevant social cues, perspectives, and common responses in a specifically defined style and format" (Gray, 2003, p. 2). They can take on various formats including video and audiotapes and booklets. In the school setting they are usually created by a teacher for sharing with students (Gray, 2010).

Theory of Mind: is a theory that suggests that not only do individuals with ASD have executive function impairments, but they also experience challenges with regards to perspective taking and differentiating their own thoughts and feelings from those of others (Baron-Cohen, Leslie, & Frith, 1985; Ozonoff et al., 1991; Pellicano, 2007).

Video modeling: is a technique that involves "demonstration of desired behaviours through video representation of the behaviour" (Bellini & Akullian, 2007, p. 266). Interventions that employ video modeling usually consist of an individual viewing a

video demonstration of a particular positive behaviour and then imitating this modelled behaviour (Bellini, Akullian, & Hopf, 2007).

Chapter Summaries

Chapter 2: Literature Review.

This chapter examines literature that frames this study from the fields of autism spectrum disorder (ASD) and interventions for targeting the social, communication and literacy skills of students with ASD. It acknowledges the ever-advancing landscape of digital technology in the 21st century and the implications and possibilities of such changes for enhancing engagement and communication for students (including those with ASD who have a predisposition to visual literacies and utilising digital technologies) in the school setting. The chapter identifies gaps in this field of literature and consequently establishes the need for an examination of student-generated approaches to communication through digital media creation, including the active involvement of students with ASD making and representing meaning through creating multimodal compositions.

Chapter 3 Methodology.

This chapter outlines the design of the study's DMIP and provides details about how the research was conducted, the case study research design that was used, and the qualitative data collection and analysis methods employed. It details the conceptual framework (modelled, guided and independent learning cycle) that guided the design of the DMIP, and explains how the theory of multimodality informed the interpretation, analysis and presentation of data. It also outlines the strategies implemented to promote data trustworthiness and ethical research practice.

Chapters 4-7 Student Case Studies: Charlie, Riley, Jimmy and Damien.

Chapters 4 to 7 present the individual student case studies of Charlie, Riley, Jimmy and Damien. Accordingly, each case study examines students' experiences and skills creating digital media (research question one), their multimodal awareness (research question two), and the impact of digital media creation on their communication (research question three).

Chapter 8 Discussion and Recommendations.

Chapter 8 discusses this study's findings and recommendations in relation to research findings and literature. An overview of theoretical and practical implications of findings is also presented. Finally, this chapter proposes recommendations for the further research and use of student-generated digital media for supporting the multimodal communication of students with ASD.

Chapter 2: Literature Review

Introduction

This review examines literature that frames the current study in the field of digital technology communication interventions for students who have an Autism Spectrum Disorder (ASD). The review is organised into three key sections. The first section defines Autism Spectrum Disorders and their impact on communication. It reports on the prevalence and general characteristics of individuals with ASD in Australia. It also focuses on the unique communication experiences and preferences of students with ASD, and how theories of autism such as Executive Function Theory and Theory of Mind, contribute to our understanding of these.

The second section examines the role that technology plays in the lives of youth with ASD and reports on the use of technology-aided interventions and strategies that have been used to support communication for students who have ASD. Specifically, this section provides an overview of the effective features of technology-aided interventions in supporting their communication skills.

The final section examines the theory of multimodality and reports on ways that the shift toward a multimodal view of literacy impacts upon communication and learning opportunities for students in the school setting, and more specifically, students with special education needs. This section reviews research concerning student-generated approaches to multimodal communication through digital media creation and explores the active involvement of students with ASD making and representing meaning through creating and/or interacting with multimodal compositions.

Autism Spectrum Disorders

Autism Spectrum Australia (Aspect) describes autism as: "…a lifelong developmental condition that affects, among other things, the way an individual relates to his or her environment and their interaction with other people" (Aspect, 2015). This description is underpinned by criteria specified in the recently revised Diagnostic and Statistical Manual of Mental Disorders *(5th ed., DSM–5; American Psychiatric Association, 2013) that provides* standard classifications of mental disorders, and is used by mental health professionals in Australia. *The DSM-5 currently identifies two primary characteristics fundamental to the diagnosis of ASD: (i) difficulties regarding s*ocial communication;

and (ii) restricted, repetitive patterns of behaviour (American Psychiatric Association, 2013). Table 2.1 presents the diagnostic criteria from the DSM-5 for each of these areas. Examples of behaviours individuals with an ASD may demonstrate as evidence of meeting each criterion (as adapted from the DSM-5) are also provided.

Table 2.1

ASD Diagnostic Criteria

Social Communication	Restricted, Repetitive Behaviours
1. Deficits in social-emotional reciprocity: • difficulties participating in social conversation • reduced sharing of interests and emotions • failure to initiate or respond to social interactions 2. Deficits in nonverbal communicative behaviours used for social interaction: • poorly integrated verbal and nonverbal communication • abnormalities in eye contact and body language • deficits in understanding/use of gestures • lack of facial expressions and nonverbal communication 3. Deficits in developing, maintaining, and understanding relationships: • difficulties adjusting behaviour to suit various social contexts • difficulties in sharing imaginative play or in making friends • absence of interest in peers	1. Stereotyped or repetitive motor movements, use of objects, or speech: • simple motor stereotypies • lining up toys or flipping objects • echolalia • idiosyncratic phrases 2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behaviour: • extreme distress at small changes • difficulties with transitions • rigid thinking pattern • greeting rituals • need to take same route or eat food every day 3. Highly restricted, fixated interests that are abnormal in intensity or focus: • strong attachment to or preoccupation with unusual objects • excessively circumscribed or perseverative interest 4. Hyper- or hypo reactivity to sensory input or unusual interests in sensory aspects of the environment: • apparent indifference to pain/temperature • adverse response to specific sounds or textures • excessive smelling or touching of objects • visual fascination with lights or movement

(Adapted from DSM-5, APA, 2013)

While an individual with an ASD will experience difficulties in both communication and behaviour, as the word "spectrum" would suggest there is significant variance among the severity and extent by which autism affects individuals. Consequently, individuals with an ASD may experience some, many, or a unique combination of the criteria highlighted by Table 2.1. Moreover, they may experience difficulties different to

those presented, especially if they have also been diagnosed with an accompanying impairment (e.g. intellectual impairment).

There are different levels described by the DSM-5 that categorise ASD according to the severity of their impact on an individual's functioning. These levels range from 1 to 3, with Level 1 referring to individuals who are considered high functioning (can access general curriculum), and Level 3 referring to students with severely impaired functions. The higher the level of severity, the greater the support individuals with an ASD need to function successfully in society. According to the DSM-5, Level 1 severity for ASD refers to noticeable impairments to communication and behaviour that "require support"; Level 2 refers to marked difficulties in social communication and fixated interests that require "substantial support"; and Level 3 ASD are characterised by severe impairments in functioning that require "very substantial support" (APA, 2013).

While ASD is officially defined by difficulties experienced in the fields of behaviour, communication and social interaction, an emerging body of research challenges this deficit model by proposing assets-based approaches to considering the unique behaviours and communication experiences of individuals with ASD (Cook, 2012; Diener et al., 2016; Mottron, 2011; Oakley et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016). For example, individuals with ASD often have unique abilities, and as a result of 'differences' that others may define as 'difficulties', they can communicate in a range of ways with strengths (e.g. visual search and attentional strengths) that individuals without ASD may not be able to (Dakin & Frith, 2005; Kaldy, Giserman, Carter & Blaser, 2016; Simmons et al., 2009).

Prevalence of autism

There has been a considerable worldwide increase in the diagnosis of ASDs (MacDermott, Williams, Ridley, Glasson, & Wray, 2007). It is estimated that approximately one in every 100 Australians have an ASD, and that of these 230,000 individuals, four times more males are affected than females (Aspect, 2015). While much debate exists about an "autism epidemic" (Simonoff et al., 2008), it can be explained that the growing number of individuals being diagnosed with an ASD in recent times is not necessarily reflective of an increase in the number of individuals with autism. Baron-Cohen, Golan and Ashwin (2009) explain that the reasons for this are

complicated. It can be argued that today we are more aware than we were in the past with regards to recognition and the diagnosis of autism (Rutter, 2005). Further, the definition of an ASD has expanded to include a wider spectrum of conditions, and there are more services and supports available today than any other time before in history (Chaplin et al., 2013). While there is no consensus about what causes an ASD, we are aware that it is a neurodevelopmental condition (resulting in differences in the neurological processes of the brain) rather than a psychological attachment disorder as was once believed to be the case. Also, despite uncertainty surrounding preventative treatment for ASD, today we are more aware than ever before about the unique experiences of individuals with autism, and strategies and interventions that can support the needs of these individuals (Chaplin et al., 2013).

Findings from a three year study commissioned by the Australian Advisory Board on Autism into the prevalence of the condition in Australia suggests that a significant number of individuals diagnosed as having an ASD are school-aged children (MacDermott et al., 2007). These figures have far reaching implications for the Australian education system. Communication differences may have the greatest capacity to hinder the socio-emotional wellbeing and quality of school and life experiences for students with ASD if not accommodated for in the school setting. The next section will explore the unique communication experiences of students with ASD.

Communication Experiences for Students with ASD

Oakely et al. (2013) urge educators to consider that "students with autism bring specific strengths and challenges to the classroom" (p. 86). Of these strengths and challenges, communication experiences have far reaching implications for the ways in which students with ASD function within the school setting. Students who have an ASD experience a unique and varied range of communication abilities and challenges. For example, it is estimated that approximately 20% of individuals who have an ASD are classified as non-verbal, meaning that they do not communicate using spoken words (Lord & Bailey, 2002). In contrast, many individuals with ASD have the spoken vocabulary to communicate verbally, but lack the skills necessary for traditional means of interacting with others (Chaplin et al., 2013), including the ability to understand social cues and expectations like their neurotypical peers. Further, research suggest that many individuals with an ASD have strengths with regards to visual learning

preferences and respond well to engagement with a range of visual cues and supports (Kaldy et al., 2016; Simpson, Myles, & Ganz, 2008). While no two individuals with an ASD possess the exact same communication style, as a result of their autism, all students will experience significant communication challenges to their neurotypical peers.

As Table 2.1 shows, individuals with an ASD may experience social communication differences in the areas of "social-emotional reciprocity", "non-verbal communicative behaviours", and "developing, maintaining, and understanding relationships" (APA, 2013). In other words, these individuals may experience differences in their capacity to interpret and express language, and utilise verbal and non-verbal communication skills in traditional ways for various purposes. Such communicative differences may manifest themselves in many ways in the school setting and have significant impacts on the ways that students with an ASD learn and function.

Situations which require an individual to expressively communicate one's own ideas and feelings, and to interpret and respond to information from various sources and others in conventional ways can pose significant challenges for students who have ASD. For example, literature reports that when assessed, many school-aged individuals with ASD have been observed to experience delayed phonological language development (Diehl, Bennetto & Young, 2006), limited vocabulary (Carnahan, Williamson, & Christman, 2011; Oakely et al., 2013), and impaired and/or literal comprehension (Gately, 2008; Oakely et al., 2013). Students with ASD have also been observed to experience difficulties communicating in traditional ways through speech (Simpson et al., 2008) and writing (Griffin, Griffin, Fitch, Albera, & Gingras, 2006; Myles et al., 2003), thus making many conventional forms of oral and written school assessments challenging (Ricketts, Jones, Happe, & Charman, 2013).

Students who have an ASD may also find it difficult to understand the purpose and audience for specific school tasks if they aren't communicated in ways that are conducive to their learning preferences and needs (Myles et al., 2003). Further, communication differences regarding social interaction can also impact upon the ways in which a student with ASD will experience school and social relationships with others. Theories about autism propose explanations of why students with ASD experience communication differences to other students.

Theories of Communication in Autism

Two prominent theories in the literature that shed light on what causes communication differences in individuals with ASD are Executive Function Theory (McCloskey et al., 2009; Ozonoff et al., 1991) and Theory of Mind (Baron-Cohen et al., 1985). Despite being framed around a deficit model, these theories have particular currency in educational settings because they identify areas of cognitive difference that affect the ways in which students with ASD can function throughout teaching and learning experiences in the classroom setting. Consequently, considering the contribution of these theories is necessary to understand the purpose and approach of common interventions used to support the needs of students with ASD, and to identify targets and approaches for asset-based interventions for the future as discussed below.

Executive functions are cognitive skills that promote self-regulation, goal-direction and problem solving (McCloskey et al., 2009; Ozonoff et al., 1991). These cognitive skills include organising, planning, sustaining attention, initiating tasks, flexibility of thought and action, utilising self-control, and inhibiting inappropriate responses (Hill, 2004; Ozonoff et al., 1991). Executive functions help the brain to fluidly perform cognitions and direct one's ability to reason and respond to specific situations (McCloskey et al., 2009; Ozonoff et al., 1991). The Executive Function Theory of autism suggests that individuals with ASD experience significant executive dysfunction and that impairment of executive functions could underpin social and communication differences (Hill, 2004; Landa & Goldberg, 2005; Lopez, Lincoln, Ozonoff, & Lai, 2005).

Theory of Mind refers to one's ability to consider and understand intentions, beliefs, interests and emotions from different perspectives (Baron-Cohen et al., 1985). It involves the application of cognitive processes such as focussed attention, flexibility of thinking, and self-control (Ozonoff et al., 1991; Pellicano, 2007). Theory of Mind as it relates to autism, suggests that not only do individuals with ASD have executive function impairments, but they also experience challenges with regards to perspective taking and differentiating their own thoughts and feelings from those of others (Baron-Cohen et al., 1985; Ozonoff et al., 1991; Pellicano, 2007). Baron-Cohen et al. (1985) refer to the Theory of Mind challenges of individuals with ASD as a case of "mind-blindness", and reasons that this contributes significantly to poor social skills and behaviours. Mind-blindness can have a particularly negative impact upon the social

functioning of students in the school setting. For example, as students with ASD may not differentiate between whether or not an individual's actions are intentional or unintentional, they may respond to situations in inappropriate ways, and thus peers may perceive them as lacking in empathy (Myles & Southwick, 2005; Pellicano, 2007).

In light of the communication differences that Executive Function Deficit Theory and Theory of Mind highlight for individuals with ASD, it is not surprising that literature reports that their engagement in and attitudes towards common literacy and communication practices at school are often problematic (Asaro-Saddler & Saddler, 2010; Oakley et al., 2013). Nevertheless, research-informed approaches suggest that adopting an assets-based perspective (as discussed below) that acknowledges the strengths of individuals with ASD and considers alternative means of facilitating communication (Oakley et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016) may support the needs of students with ASD in the school setting and challenge current theories of autism.

Asset-based Perspectives of ASD

While evidence shows that communication differences can act as barriers to learning in conventional ways, emerging research proposes that deficit views of students are problematic (Oakley et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016) and that to meet the needs of all students irrespective of ability, these views, alongside conventional literacies that are often "out of sync with the worlds that youth currently navigate" (Vasudevan, 2006), should be reimagined. Transforming practices and perspectives in this regard could enable students with ASD equitable access to optimal learning opportunities in the school setting. This is in accord with the *Disability Standards for Education* (2005), that state that it is the responsibility of educators in Australia to offer all students the same educational opportunities irrespective of ability and/or disability. Accordingly, the current Australian public education system is in support of inclusive practices that provide positive experiences and opportunities for all students, including those with special education needs such as autism. This is reflected by both the *Australian Professional Standards for Teachers* (Australian Institute for Teaching and School Leadership, 2014) and the *Australian Curriculum* (Australian Curriculum Assessment and Reporting Authority, 2017) which mandate that all teachers should differentiate instruction so as to meet the diverse needs of a range of learners,

and provide inclusive environments that nurture and support a vast range of student abilities.

A pathway to inclusivity and differentiation in the school setting is acknowledgement of students' strengths. While the majority of autism definitions, theories and research to date focus on impairments in ASD (Kaldy et al., 2016), an emerging body of research supports that individuals with ASD can possess superior visual search skills that provide an advantage regarding perceptual discrimination and a range of attentional tasks (Dakin & Frith, 2005; Kaldy et al., 2016; Simmons et al., 2009). In response to these strengths and as a means of challenging the one-sided deficit perspective, studies like that of Oakley et al. (2013) recommend the adoption of an "ICT-enabled multimodal approach" (p. 86) that acknowledges the need to communicate across a range of modes. In support of an assets-based approach to facilitating communication, the following section will consider the role of digital media in the lives of youth with ASD and the ways in which technology has been used in interventions to support the communication of students with ASD.

Technology Supporting Communication for Students with ASD
Technology-use for Students with ASD

Like most students who make up the current generation of adolescents, students with ASD engage heavily with digital technologies. Increases in students' technology-use can be explained by the increasingly digitised nature of entertainment and communication, and the fact that the current generation of adolescents are the "first to have computer and online technology as part of their lives since early childhood" (Wong et al., 2015, p. 3807).

The exploratory research of Orsmond and Kuo (2011), and Kuo, Orsmond, Coster and Cohn (2013), reveal trends regarding digital media use in the daily lives of adolescents with ASD. Orsmond and Kuo (2011) report that, as is consistent with typically developing adolescents, the adolescents with ASD involved in their study tended to watch television and use computers during the majority of their discretionary time. This was confirmed by the research of Kuo et al. (2013) who report that the adolescents with ASD in their study spent "more time engaging in television and movie viewing than any other leisure activity" (p. 915). Kuo et al. (2013) further reveal that

these individuals expressed a preference for animated television programs, especially cartoons and comedy.

The research of Orsmond and Kuo (2011) reports that the computer-use of adolescents with ASD in their research primarily consisted of browsing the internet and playing computer games. These findings were reinforced by Kuo et al. (2013) who revealed that the computer use of adolescents in their study consisted either of browsing websites for information and research purposes, or playing action, shooting, and/or simulation/role-playing computer and/or video games. It is interesting to note that while the research of Orsmond and Kuo (2011), and Kuo et al. (2013), provided detailed accounts of media use among adolescents with ASD, results did not indicate the involvement of youth with ASD creating their own digital media.

New technology offers opportunities to transform the dynamics of classrooms (Faux, 2005; Zammit, 2016). Accordingly, research has shown that the use of digital technologies in special education has supported the development of reading skills (Lange, McPhillips, Mulhern & Wylie, 2006), and increased access to, and engagement with, learning opportunities (Marino, 2009; Wong et al., 2015; Vasuvedan, 2006). Research has more specifically examined ways in which the technology can be integrated into interventions that target specific learning, social, and communication needs for students with ASD. The use of technology in interventions/instruction for adolescent students with ASD "is increasing at a striking rate" (Wong, et al., 2015, p. 3805) but is an area that is underrepresented by autism research literature. A review of research that explores the value of technology-based communication opportunities for students with ASD is presented as follows.

Technology-based Communication Possibilities

Contemporary research reveals that there has been an increase in the amount of technology-based interventions aimed at supporting the communication of individuals with an ASD, and increasing evidence for their use (Bond et al., 2016). One reason for this growth may be the capacity for technology to digitalise a wealth of visual stimuli that is conducive to the learning and communication sensitivities of individuals with ASD (Wong et al., 2015). Chaplin et al. (2013) reason that the rise in technology-based interventions aligns with a shift in the last decade from language-based instruction to visual instruction in supporting the learning of individuals with an ASD. This shift has

been motivated by research that suggests that individuals with an ASD have superior visual processing skills (Dawson, Soulieres, Gernsbacher, & Mottron, 2007; Fan, 2012; Kaldy et al., 2016; Simmons et al., 2009; Soulieres et al., 2009). In particular, studies reveal that technology enhanced visual supports such as picture prompts and videos have been fundamental to educational programs supporting the communication of students with ASD (Chaplin et al., 2013; Schlosser et al., 2013; Shane & Albert, 2008). For example, Schlosser et al.'s (2013) study of nine students (each of whom had an ASD and experienced comprehension difficulties), revealed augmented instructions that incorporate visual cues (e.g. photographs) and combine visual and auditory cues (e.g. videos) were more effective than spoken directives with regards to supporting literacy development. Consequently, the use of technology to visually represent information opens up communication opportunities that may not have been available in the past.

Research suggests that the use of different digital technologies can align with students' interests, attention and skills, thus supporting engagement and motivation regarding communication. In their review of 15 studies (involving total of 47 participants) that investigated the use of mobile technologies such as the iPod, iPhone and iPad, Kagohara et al. (2013) found that students with ASD often express a disposition and/or preference for using digital devices over low-tech options. Further, research has proven that the attention and interests of children with ASD are most often drawn to the use of computer technology (Elzouki, Fabri, & Moore, 2007; Moor, 2008). Research reveals that such a preference is often linked to their skills and capabilities using digital technology (Ganz, Hong and Goodwyn, 2013) and because of the visual and interactive ways with which it can be used to communicate meaning (Campigotto, McEwen & Demmans Epp, 2013; Chaplin et al., 2013; Dawson et al., 2007). For example, Ganz et al. (2013) investigated the efficiency of tablets as communicators and found that two of three participants expressed a preference for using visual and interactive applications on the tablet over other methods of communication. It was revealed that the student who did not express a preference for using the tablet experienced difficulty using the application. Thus, it is unknown whether skillful use of the application may have changed this student's preference. Considering the connections between technology, and students' skills and interests, it seems that that digital technologies have far-reaching potential for supporting the communication of students with an ASD. In recognition of such potential, research alludes that technology

can enhance students' learning experiences as it has been demonstrated that educational programs are most effective when they cater to students' strengths and interests (Diener et al., 2017; Lanou, Hough & Powell, 2012; Myles, Grossman, Aspy, & Henry, 2009; Willis, 2009). In reporting the effects of two classroom-based literacy interventions for students with autism, Oakely et al. (2013) affirm that communication opportunities are facilitated when learning activities and social situations lend themselves to recognition of students' achievements, capabilities and interests.

Technology also has the capacity to provide structure and create controlled environments that restrict sensory stimulus and minimise specific cues, thus supporting the gradual and systematic development of specific skills, including communication. In particular, the predictability and minimal variance of such environments are conducive to the attention skills and communication preferences of students with ASD (Baron-Cohen, 2006), as according to research literature (e.g. Lovaas Koegel, 1979; Rincover & Ducharme, 1987) they often thus find it challenging to focus on and process specific information. Similarly, students with an ASD may experience difficulties avoiding distractions so as to navigate and strategically engage with a range of sensory stimulus (Grynszpan, Martin, & Nadel, 2008; Hill, 2004). Nevertheless, controlled digital environments can prompt and motivate student responses, while simultaneously minimising anxiety that may occur from sensory overload or challenges associated with disruptive transition behaviours (Chaplin et al., 2013; Faux, 2005).

Another advantage of technology-based communication is that it can be used to facilitate interaction in non-judgemental and safe digital environments (Hall, 2010) that do not require high levels of social skills (Chaplin et al., 2013). Research indicates that individuals with ASD find it distressing to participate in social situations that lack control and predictability (Charlop-Christy, Le & Freeman, 2000). Consequently, technology-based communication can offer a less intimidating alternative to face-to-face interaction (LeBlanc & Volkers, 2007). Further, such an environment can support autonomy and self-regulated learning (Hall, 2010; Rao, Dowrick, Yuen, & Boisvert, 2009). While some have expressed concern that technology-based communication may isolate students from interpersonal interaction with peers (Goldsmith & LeBlanc, 2004), teaching guides continue to promote the use of digital technologies with students with ASD in the classroom as a catalyst for social interaction (Hardy, Ogden, Newman, & Cooper, 2002; Hall, 2010).

The unprecedented advancement in mobile technologies (e.g. smartphones and tablets) is also changing the ways in which learning and communication takes place in the school setting (Zammit, 2016), thus impacting on the education of students with ASD. Johnson et al. (2015) highlight that we are in the midst of a complete transformation of the technologies that we use. This shift in the context of special education can be explained by the fact that mobile technologies are becoming increasingly intuitive, capable, compact and lightweight. Further, Hoban et al. (2016) reason that in many instances mobile technologies are more accessible than laptops and desktop computers as they cost less money to buy and are not place-bound. In support of the use of such devices, the research of Campigotto et al. (2013) suggests that the portability and touch screen nature of interaction that mobile technologies afford can support the engagement and interaction preferences of individuals with ASD. An added benefit of using mobile technologies is the access of devices to a myriad of apps (Zammit, 2016), many of which are free and may have educational value for students with ASD and/or may be used as a means of augmentative and alternative communication. Hoban et al. (2016) argue that the advent of mobile devices has had a significant impact on the ways in which students create, interact with, and share content, and that as more basic computing tasks can be achieved using mobile devices, it appears that only specialised tasks require the use of a keyboard, mouse and large monitor. These observations are similarly noted by Keppell, Souter and Riddle (2012) who suggest that mobile technologies have redefined what is meant by the term "learning space" (Keppell et al., 2012).

Literature suggests that students' use of technology in the school setting can support inclusion (Bolte, Golan, Goodwin, & Zwaigenbaum, 2010; Oakley et al., 2013) thus aligning with *Australian Curriculum* principles (Australian Curriculum Assessment and Reporting Authority, 2017). Take for example students' use of mobile technologies such as the iPad. The use of iPads is becoming increasingly common in special education settings as an emerging body of published research supports the educational use of iPads for students with special needs (Aresti-Bartolome & Garcia-Zapirain, 2014; Oakley et al., 2013). The popularity of iPads is reflected by the wealth of apps that have been specifically developed to target the needs of these individuals (Venkatesh, Thong, & Xu, 2012). As iPads are devices that can be used by all students and have not been specifically designed for individuals with an ASD, their educational use in the school

setting can be seen as supporting inclusion (Cumming, Strnadová, Knox & Parmenter, 2014; Kagohara et al., 2012; Shane et al., 2012). This is especially the case if students use iPad functions and apps that have relevance to all individuals irrespective of special needs. In contrast, apps that are specifically designed for individuals with an ASD are often expensive, and as they are not relevant for other individuals, their use in the school setting may in fact contradict the notion of what constitutes inclusive practice (Oakley et al., 2013).

Technology has become a fundamental component of many students' day-to-day communication practices, thus creating possibilities to improve their social communication and identity (Gee, 2013) as well as transforming the contexts and ways in which they communicate. As part of this transformation, research reveals a growing trend in students using a range of digital media to create content for various social and educational purposes (Johnson, Adams Becker, Estrada & Freeman, 2015), thus suggesting the communicative potential of technology to position students with ASD as creators of content rather than as consumers. Hoban et al. (2016) reason that opportunities for students to create digital media to communicate meaning are growing as a result of the convergence of technologies into hand held devices that increasingly have the capacity to capture multiple media forms including image, video and audio. Nevertheless, it can be deduced from the review of Kagohara et al. (2013) that much research in the field of technology for special education focuses on how technology can be used to deliver instruction, access stimuli, or supplement communication (e.g. AAC speech-generating devices). Despite an increase in research that examines technology-based communication interventions, there are only a few studies that have set out to explore the potential of students with ASD using a range of digital media to communicate. Before examining emerging research studies that investigate student-generated and technology-based approaches to communication for students with ASD, the following section reviews research regarding more prominent, widely reported and/or evidence-based technology interventions for communication in the field of ASD. While these studies primarily favour an expert, professional and/or teacher-directed approach, they reveal insights regarding potentials for technology to support the communication experiences of students with ASD. Moreover, they provide theoretical and contextual foundations for consideration of emerging student-centred approaches that are subsequently reported in the final section of this literature review.

Technology-based Communication Interventions for ASD.

There has been an abundance of research concerning technology-based interventions and strategies for supporting the communication needs of students who have an ASD (Ayres & Langone, 2005; Bellini & Akullian, 2007; Delano, 2007; Gray, 2003; Grynszpan, Weiss, Perez-Diaz, & Gal, 2014; McConnell, 2002; Reynhout & Carter, 2011; Vaughn et al., 2003; Wang & Spillane, 2009). Contemporary studies reveal that among such research, favourable communicative outcomes have resulted from the use of digital Social Stories™, video modeling, dedicated applications for computers and tablets, and virtual reality. This section will examine each of these approaches in detail. Specifically, it will look at the reported outcomes and successes of each approach as well as limitations and areas for further research. It will also situate the current study as part of an emerging body of research that aims to facilitate equitable access for students with ASD to the curriculum and provide opportunities for them to communicate as 21st century learners.

Social Stories™

Social Stories™ are short narratives that "describe a situation, skill, or concept in terms of relevant social cues, perspectives, and common responses in a specifically defined style and format" (Gray, 2003, p. 2) that is meaningful for teaching social and communication skills to students with an ASD. Social Stories™ are traditionally and most commonly designed and constructed by a teacher or therapist for a student in a booklet format (Gray, 2010). Reynhout and Carter (2007) caution that while Social Stories™ are widely accepted as an intervention strategy, there is little empirical evidence to support their effectiveness in enhancing communication skills. Nevertheless, Wang and Spillane (2009) conclude that Social Stories™ meet evidence-based practice criteria for use with students who have autism. This is supported by the extensive reviews of Ali and Frederickson (2006), Karkhaneh et al. (2010), and Reynhout and Carter (2011), which reveal the value of using Social Stories™ in the field of Special Education. Contemporary studies suggest that such benefits include enhanced favourable social communication (Chan & O'Reilly, 2008; Crozier & Tincani, 2007; Quirmbach, Lincoln, Feinberg-Gizzo, Ingersoll, & Andrews, 2009) and reduced disruptive behaviours (Crozier & Tincani, 2007; Ozdemir, 2008; Quilty, 2007; Reynhout & Carter, 2007).

Contemporary research has seen technology used to digitalise Social Stories[TM] (Moor, 2008; Sani-Bozkurt, Vuran, & Akbultut, 2017) as a means of supporting the social communication skills of students as Gray (2010) explains that it is also acceptable for Social Stories[TM] to take on the form of audio or video. The digitalisation of Social Stories[TM] has been found by research to be just as effective and in some cases more effective than traditional paper-text Social Stories[TM] (Hagiwara & Myles, 1999; Mancil et al., 2009; More, 2008; Sansosti & Powell-Smith, 2008). One of the earliest studies to explore the use of digital Social Stories[TM] was the research of Hagiwara and Myles (1999). This study revealed that after engaging computer-based Social Stories[TM], all three participants (7-9 year-old boys with ASD) demonstrated enhanced skills regarding hand washing, completion of tasks and time-on task. While primarily focussing on improving the life skills of children with ASD, this study suggests potential for enhancing a broader range of social, communication and behavioural skills through use of a multimedia Social Story[TM] intervention. Following the research of Hagiwara and Myles (1999), a study that pioneered the field of digital Social Stories[TM], but diverted toward supporting student communication, was the research of Thiemann and Goldstein (2001). This study explored the effects of Social Stories[TM] with supplementary video feedback on the social communication of five students (6-12 years old) with ASD in the school setting. Findings revealed that since participating in the Social Story[TM] intervention, students demonstrated improved communication outcomes relating to the initiation of positive interactions and appropriate responses.

Since the research of Hagiwara and Myles (1999) and Thiemann and Goldstein (2001), as advancements in technology have transformed the ways in which communication and learning takes place in the school setting, there has been an increase in research exploring innovative digital Social Story[TM] interventions. For example, recent studies suggest that video-based Social Stories[TM] (Bernad-Ripoll, 2007; Litras et al., 2010; Scattone, 2008), and digital Social Stories[TM] in the form of animations (Mandasari et al., 2011; Shepherd et al., 2014) and computer-based formats (Mancil et al., 2009; Moor, 2008; More, 2008; Ploog, Scharf, Nelson, & Brooks, 2013; Sani-Bozkurt et al., 2017; Sansosti & Powell-Smith, 2008) can have a positive effect on the social communication of students. Nevertheless, Schneider and Goldstein (2010) warn that while such studies show promise for innovative ways to support students' communication, it is inconclusive whether to attribute positive effects to the Social

Story^{TM} strategy itself or the combination of Social Stories^{TM} with other intervention and technological features. Further, Prelock (2006) warns that there is inconsistency in research literature concerning the maintenance of communication skills acquired through Social Story^{TM} interventions, thus warranting further investigation into generalisation effects.

Despite technology transforming the ways that Social Stories^{TM} can be designed and presented, Sani-Bozkurt et al. (2017) explain that their creation and use have continued to largely remain the responsibility of a teacher or an expert. Moreover, it appears that the majority of Social Story^{TM} computer programs and apps are designed for teachers, therapists and parents to create Social Stories^{TM}, rather than students. Similarly, it would seem that the majority of research conducted in this field primarily explores the use of stories to communicate information to students from teachers or experts. Mandasari (2012) reasons that a more appropriate approach is needed in the school setting that involves students being more active in the participation Social Story^{TM} interventions, as the process of designing and reading Social Stories^{TM} to individual students proves to be a time-consuming task for teachers who manage large classes (Crozier & Tincani, 2007).

While research reveals that students with ASD engage with and respond well to using digital technologies (Campigotto et al., 2013; Elzouki et al., 2007; Ganz et al., 2013; Kagohara et al., 2013; Moor, 2008), there appears to be an absence of research that documents the extent to which they are able to create their own Social Stories^{TM}. With the exception of small scale studies such as that of Shepherd et al. (2014) that suggest it may be valuable for primary-school students with mild intellectual impairments to co-construct animated Social Stories^{TM}, and the research of Sani-Bozkurt et al. (2017) that explored the design and use of interactive Social Stories^{TM} for Children with ASD, there appears to be limited research that investigates the potential of students' active interaction with or participation in Social Story^{TM} creation. Perhaps this is a result of the fact that the definition of and criteria for designing Social Stories^{TM} proposed by Gray (2010) positions students as recipients of such an intervention.

Research has shown that students with ASD can create their own digital narratives for various purposes (Holmgaard et al., 2013; Oakely et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016). Hence, there may be value in examining whether or not students can similarly create their own Social Stories^{TM}. Alternatively, perhaps general

digital storytelling offers a more feasible approach that isn't limited by the theoretical confines and processes of implementing an official Social Story^{TM} intervention.

Video Modeling

Video modeling is a "technologically advanced" (Chaplin et al., 2013) communication development strategy that has been reported favourably in the literature (Ayres & Langone, 2005; Bellini & Akullian, 2007; Delano, 2007; Hitchcock, Dowrick, & Prater, 2003; McCoy, Holloway, Healy, Rispoli, & Neely, 2016; Mechling & Swindle, 2012; Nikopolous & Keenan, 2004). By definition, video modeling involves the use of video representations to demonstrate desired behaviours and skills (Bellini & Akullian, 2007). Typically a school-based video modeling intervention consists of a student viewing a video of an individual (either themselves or another person) performing a targeted behaviour. The purpose of a student viewing such a video is to facilitate their imitation of the modelled behaviour. In their extensive analysis of interventions for students with autism, Wang and Spillane (2009) concluded that like Social Stories^{TM}, video modeling also meets the criteria for evidence-based practice. Moreover, Wang and Spillane (2009) reveal that video modeling is the only evidence-based social and communication skills intervention that has proved to be highly effective. Aligned with Bandura's social learning theory (Bandura, 1977), such interventions are described as enhancing positive behaviours and efficacy through visually cued instruction and modeling strategies (Bellini & Akullian, 2007). Research has demonstrated that viewing a video demonstration of positive behaviour, either modelled by the student viewer (video self-modeling) or another individual (video modeling), facilitates a student viewer's imitation of this modelled behaviour (Delano, 2007).

The literature reveals that video-modeling interventions can enhance a range of communication skills for individuals who have an ASD (McCoy et al., 2016). The research of Charlop-Christy et al. (2000) and Sherer et al. (2001) report that after children viewed videos demonstrating how to engage in socially appropriate dialogue, they were able to model communicative cues and thus demonstrated improved conversation skills. Research has also demonstrated success in video modeling interventions being used to increase appropriate social communicative interactions. For example, the research of Apple, Billingsley and Schwartz (2005) reported that video modeling led to enhanced social reciprocity and compliment-giving communication

skills for children with ASD. Similarly, Maione and Mirenda (2006) found that video modeling was effective in supporting a young students' use of social language in peer-communication situations. Charlop, Dennis, Carpenter and Greenberg (2010) also revealed improvements to students' expressive social language skills as a result of participating in a video modeling intervention that targeted verbal comments, gestures and facial expressions fundamental to positive social interaction. Similarly, the findings of Baharav and Darling (2008) demonstrated that video modeling enhanced word production and socialisation for a minimally verbal child with ASD. The research of Charlop-Christy and Daneshvar (2003) and LeBlanc et al. (2003) found that video modeling was effective in teaching perspective taking skills to students with ASD. Nevertheless, as was the case with the study of LeBlanc et al. (2003), findings indicated limited generalisation, thus LeBlanc et al. (2003) advise that further research is needed to develop strategies to support the long-term generalisation of perspective-taking skills.

Research suggests that there is promise for the implementation of communication development strategies that integrate video modeling features with Social Stories[TM], thus capitalising on the strengths of both strategies (Litras et al., 2010). Recent studies have reported positive effects of such strategies on the understandings and skills of students who have ASD (Bernad-Ripoll, 2007; Litras et al., 2010; Sansosti & Powell-Smith, 2008; Scattone, 2008). Bernad-Ripoll's (2007) study reported that combining video self-modeling with Social Stories[TM] led to the enhanced recognition and understanding of emotions for a child with Asperger Syndrome. Similarly, Scattone's (2008) study provides support for combining features of video modeling with Social Stories[TM] as the results of their intervention also indicated enhanced conversational skills for a boy with Asperger Syndrome. Further, the research of Litras et al. (2010) argues that the use of a video self-modelled Social Story[TM] intervention with a child with ASD resulted in increased communicative behaviour and social engagement. Investigations concerning the use of computer-based formats to present interventions that integrate Social Story[TM] and video modeling strategies, including the use of computer-based teaching aides (Ploog et al., 2013; Sansosti & Powell-Smith, 2008), Power Point (Mancil et al., 2009) and 2D animation software (Mandasari et al., 2011), have also indicated favourable communicative outcomes for students with ASD. A recent study by Chen, Lee and Lin (2016) also indicates that the use of augmented reality-based video modeling storybooks may support the

development of nonverbal social cues (including facial expressions and emotions) for students with ASD.

Despite being an effective evidence-based intervention for individuals with ASD that prompts favourable outcomes from the majority of participants (Wang & Spillane, 2009), research indicates that not all students who engage with video modeling demonstrate enhanced communication skills (Maione & Mirenda; McCoy et al., 2016; Scattone, 2008) or generalise behaviours (Luiselli, Russo, Christian, & Wilcyznski, 2008). This suggests that certain skills may not be as suited to video modeling interventions as others, and perhaps such an intervention is not conducive to the needs and learning preferences of all individuals with an ASD. Further, because a large proportion of research has investigated the use of video modeling in combination with other strategies (Ganz, Earles-Vollrath & Cook, 2011), it is difficult to ascertain if reported enhancements in participants' communication are a result of a combination of strategies, or video modeling alone. Goldsmith and Le Blanc (2004) urge that further research is needed to compare the features of interventions so as to investigate "which design features are critical for producing therapeutic effects and how those design features create their impact" (p.173).

The use of student-composed videos has gained traction in the school setting in recent years (Jewitt, 2008; Pandya, Hansuvadha & Pagdilao, 2016; Ranker, 2008), but Bruce et al. (2013) report that few studies have explored students with special education needs making their own digital video compositions, or creating their own video models. One exception is the research of Cumming (2010) which suggests that student-generated role play videos have the potential to enhance the motivation of students with emotional and behavioural disabilities to participate in social skills training. It has been noted that for video modeling interventions to be successful, they must be delivered in accord with direct instruction and provide authentic opportunities for individuals to practise skills (Ganz et al., 2011; Schreibman & Ingersoll, 2005). It is perhaps for this reason that there is an absence of research that explores students designing their own video models as part of communication interventions. Nevertheless, as there is a growing consensus in the classroom that many students with ASD are skilled at using technology and could thus capture and create their own videos (Eliasz, 2009), there is a need for research to explore students' active involvement in digital video composing and video modeling interventions. There is also a need for research to investigate the

decision-making processes that students engage with as they create their own digital media (e.g. videos). Such an examination would shed light on the multimodal literacies that students with ASD possess and may develop as they utilise a range of modes to communicate meaning. This awareness is fundamental to enabling strategies and environments in the school setting that are most conducive to meeting the communication needs of students with ASD.

Dedicated Applications

In their review of technologies as support tools for individuals with an ASD, Aresti-Bartolome and Garcia-Zapirain (2014) define dedicated applications as "technological tools targeting people with autism" that are "designed to be used on computers, tablets or mobile phones" (p. 7772). Such tools include computer games, software, and smart device applications such as iPad apps that have been specifically designed for use with individuals who have an ASD. In their review of research in the field of dedicated applications, Aresti-Bartolome and Garcia-Zapirain (2014) argue that the majority of computer-based interventions explored by research studies focus on improving the communication of individuals with an ASD. In particular, these studies explore the use of dedicated applications supporting the communication of individuals with an ASD through use of images and sounds (Aresti-Bartolome & Garcia-Zapirain, 2014). Leighton and Bentley (2012) reason that technology-based communication supports such as dedicated applications are designed to serve one of two purposes: 1) to substitute or supplement communication; or 2) to teach communicative skills and facilitate independence in social communication. This section of the chapter considers how dedicated applications have been used to target the communication skills of students with ASD. In particular it will review research that has investigated the value of dedicated applications supporting the communication development through, animation and interactive games. Limitations of such applications and approaches will also be considered.

Storytelling Applications. Oakely et al. (2013) explain that students with ASD are often excluded from storytelling because of literacy difficulties. Nevertheless, there are a range of dedicated storytelling applications that aim to engage these individuals in storytelling (e.g. StoryBuilder [Rodriguez & Cumming, 2012]) in order to support their communication development. A recent study that reports on the effects of such a

storytelling application on the communication of children with ASD includes the study of Murdock, Ganz and Crittendon (2013). This study explored the impact of an iPad application that told stories on the interactive dialogues of three preschool students with ASD. Murdock et al. (2013) found that during playing with the iPad application with their peers, all three students demonstrated an increase in communicative dialogue.

While it appears that the majority of dedicated storytelling applications position students with ASD as story viewers, a few studies have explored the value of dedicated applications that enable children with ASD to create their own stories. One of these studies is the research of Dillon and Underwood (2012). This study indicates that students with ASD can use a dedicated application to create their own real and fantasy stories. Nevertheless, unlike a control group of children without ASD, the children in study with ASD made communicative errors and used different components of the application when creating their story. In an attempt to explain these differences, Dillon and Underwood (2012) reasoned that these findings provided evidence that ASD affects a child's imagination (Dillon & Underwood, 2012).

Internet and App Store searches using the terms "Social Story" and "autism" reveal that there are a range of Social Story^{TM} applications on the market for supporting the communication of individuals (particularly young children) with ASD. Results similarly reveal a range of story-themed applications for video-modeling interventions. Nevertheless, a closer look at these apps shows that they either consist of premade general Social Stories^{TM} or video models for showing individuals with ASD, or they have been designed for teachers or professionals to create Social Stories^{TM} or video models on behalf of individuals with ASD. Just as there is an absence of research exploring the active role of students with ASD creating their own stories in the form of Social Stories^{TM} or video models, there similarly appears to be an absence of dedicated applications available to support students with ASD in creating their own stories for these purposes (Shepherd et al., 2014).

Programs that encourage storytelling that have not been created specifically for students with an ASD, may have relevance for supporting the communication of these individuals (Sarachan, 2012; Shepherd et al., 2014). Oakley et al. (2013) explain that general technology-based applications are sometimes more accessible as applications designed specifically for students with ASD can be expensive. Also, as the spectrum of autism is so broad and diverse, dedicated applications may not have relevance for all

students with ASD. Moreover, programs that can be used by all students in the classroom setting irrespective of ability/disability may have relevance for students with an ASD and may similarly have the capacity to facilitate inclusion (Bolte et al., 2010; Oakley et al., 2013; Shane et al., 2012). More research is needed to explore the value of general storytelling applications that may enhance the communication of students with autism. Research is also needed to compare the effectiveness of dedicated storytelling applications for students with ASD and applications that can be used by all students in a classroom setting.

One study that explored the value of general storytelling applications (as opposed to dedicated applications) in supporting the communication of students with an ASD is that of Sarachan (2012). Unlike the majority of research that explores how stories can be used as a means of delivering information to students, Sarachan (2012) investigated how students with ASD communicate as content-creators in the design of their own stories and games using a program called *Scratch*. Sarachan (2012) reported enhanced problem solving and creativity from children who were able to use the *Scratch* application to create their stories and games. *Scratch*, unlike dedicated applications is not specifically designed for students who have an ASD, but as a result of the visually engaging way with which it enables users to interact with code so as to create games and stories, it has been deemed as useful for supporting the learning of students with an ASD (Sarachan, 2012). Such research reveals that similarly other applications on the market may have relevance for supporting the communication needs of students with an ASD.

There are a range of low cost and free general applications that may support the communication of students with ASD through enabling storytelling in the form of podcasts, digital stories, animations and videos. For example, *Audacity* is freely and widely available for recording and editing sound. This can be used to create podcasts and record audio for animations and videos. *Windows Movie Maker* (for a PC) and *iMovie* (for a Mac) are also examples of free computer software that enable options for students creating digital media such as digital stories, animations and videos. There are also various applications for tablets that enable users to create their own animated stories such as *PuppetPals* (enables children to create their own stories by animating and adding voices for digital puppets) and *MyCreate* (enables users to take multiple photographs of models/figurines and record a narration to make stop-motion

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animations). The iPad application called *Explain Everything* can also be used to create animated slideshows and to combine multiple digital media (e.g. images, video) with the added feature of screencast annotation tools (e.g. arrows and screen drawing/manipulations tools). While these applications have not been specifically created for students with an ASD there may be potential for students to use the features of these applications to create their own digital media stories. Nevertheless, research is needed to explore this further.

Animation Applications. Dedicated applications for enhancing communication skills can also take on the form of animations that, similar to storytelling applications, aim to serve as a medium for projecting information and breaking down complex ideas. Interventions that have utilised animation to communicate meaning have demonstrated success in enhancing social problem-solving and communication skills for a range of individuals with special education needs (Bosseler & Massaro, 2003), and have thus been widely supported by the literature (Baron-Cohen et al., 2009; Bernard-Opitz, Sriram & Nakhoda-Sapuan, 2001; Herskowitz, 2009; Myles, Trautman, & Schelvan 2004). Animation has also been central to various gaming applications as a means of sustaining attention, and reinforcing or prompting specific responses for individuals with an ASD (Herskowitz, 2009; Mandasari et al., 2011). Research attributes the success of interventions that use animation to the visual style that information is presented, and the way that animation can transform an abstract concept into a tangible concept (Hoban & Nielsen, 2010; Myles et al., 2004). Hoban (2005; 2007) explains that animation can be used to breakdown concepts into segments that support thinking with a range of modalities. Such a process is believed to be conducive to the attention and learning preferences of individuals with ASD (Baron-Cohen, 2006; Elzouki et al., 2007; Moor, 2008).

Mandasari et al. (2011) warn that while animation is widely used in a range of fields and reportedly enjoyed by individuals with ASD, there is limited substantial research that specifically explores the effects of animation on school-aged children with ASD. For example, while the study of Boraston, Blakemore, Chilvers, and Skuse (2007) investigated the impact of abstract 2D animation on the emotion recognition of individuals with ASD, such a study involved adults with ASD rather than school-aged students and similarly did not focus on improving communication. Further, there

appears to be an absence of research regarding the use of animation applications that measure the generalisability of targeted communicative behaviours to real-life environments.

Despite the wealth of dedicated applications that use animation to deliver information to individuals with ASD, research suggests that students may be able to create their animations. For example, Holmgaard et al. (2013) report that the two students with ASD in their study (12 and 13 year olds) were successful (with minimal support from a professional animator and teacher) in creating short animations. They explained that the students "used the animation medium to capture and express their ideas in new ways" (Holmgaard et al., 2013, p. 61). The authors (2013) reason that "the animation medium enlivens the social histories, and also gives children opportunities to create these stories" (p. 58). Consequently, it is possible that animation applications could be "applied to a range of powerful and expressive possibilities" (Holmgaard et al., 2013, p. 58) that enable students with ASD to tell their own stories. Further research is needed to better understand the ways in which students with ASD can use animation as a means of communicating meaning, and whether or not there is a need for dedicated applications in this field.

Hoban (2005; 2007) suggests that the process of mainstream students creating their own animations can improve their learning and communication of ideas. In describing the capacity of a form of stop-motion animation called *Slowmation* to support student learning, Hoban and Nielsen (2010) explain that the design of a sequence of representations (storyboard, models, photographs and narration) can engage students and supports them in understanding and explaining complex ideas. While research concerning the use of *Slowmation* has primarily focused on supporting the engagement and understanding of pre-service science teachers and students (Hoban, 2005; 2007; Hoban, Loughran & Nielsen, 2011; Hoban & Nielsen, 2010), Shepherd et al. (2014) suggest that there is value for the application of students creating their slowmation in the field of Special Education. Specifically, there is a need for research to explore how students with ASD can communicate meaning through the creation of their own simple animations so as to draw on their disposition for using technology, and to contribute value to research literature concerning the use of animation in communication development.

Interactive Game Applications. Various dedicated applications that aim to teach communication skills to students with an ASD are designed in the form of interactive games. Sharmin et al., 2011 reason that interactive game software offers an innovative alternative to traditional means of teaching students with ASD that are often monotonous and ineffective. For example, Hulusic and Pistoljevic (2012) developed a framework that utilised games to teach social communication skills to a small group of children with ASD. Such a framework appeared to be successful as students were reported to achieve positive results within the games and were able to transfer skills to other situations. Similarly, the research of Hetzroni and Tannous (2004) indicates that the use of interactive computer software led to enhanced communication skills for children with ASD, including the generalisation of skills to the classroom setting such as the appropriate use and clear initiation and delivery of speech. Grynszpan et al. (2008) also developed interactive software to support the communication of adolescents with ASD. Each game prompted interaction and responses to a range of communicative scenarios. Unlike the research of Hulusic and Pistoljevic (2012) and Hetzroni and Tannous (2004), the study of Grynszpan et al. (2008) found that the participants who played the games struggled when presented with rich multimedia interfaces as a result of experiencing difficulties organising information in a multimodal way. It would seem that the findings of such a study are consistent with Executive Function theory that purports that students experience difficulties regarding the planning and organisation of information (Hill, 2004). Nevertheless, more research is needed to substantiate such claims.

Chaplin et al. (2013) explain that interactive applications are most effective when they meet specific requirements, including the provision of modeling, multisensory interactions, immediate and consistent feedback, and opportunities to build on learning experiences in a step-like progression and rate that is individually suited to student needs. In light of these affordances, Mandasari (2012) identifies a range of interactive software packages that literature indicates may have relevance for supporting the communication of students with ASD including: *Mouse Trial* (designed to improve vocabulary [Hall, 2010; Moor, 2008]); *Gaining Face* (interactive activities for recognition of facial expressions [Hall, 2010]); *MySchoolDay* (software that enables students to explore appropriate interactions and behaviours at school [Prelock, 2006]) *Affective Social Quest* (interactive software that explores the expression of emotions in

various situations [Blocher & Picard, 2005; Bryant, 2004; Poon, 2006]) and *Emotion Expressor* (program supporting the expression of opinions on various topics [Poon, 2006]). While such programs are designed to enhance the communication skills through participation in interactive games, further research is needed to review, validate and justify their use with students who have ASD. Moreover, Bernad-Opitz, Sriram and Nakhoda-Sapuan (2001) reason that there is a need for research that measures the generalisation of skills that students gain through computer-assisted instruction to real life settings. There is also a need for research to explore the potential of students with ASD creating their own interactive applications, as the research of Sarachan (2012) reported enhanced problem solving and creativity from children who were able to create their own games and stories using an interactive program call *Scratch.*

While dedicated applications are accepted for use in the school setting by many teachers, because of their usability, Aresti-Bartolome and Garcia-Zapirain (2014) warn that the foundation of much research in this field is made up of pilot studies that have yet to substantiate whether or not such applications facilitate the transfer and generalisation of communication skills beyond the applications into the everyday lives of individuals with an ASD. Aresti-Bartolome and Garcia-Zapirain (2014) consequently urge that further research and development of dedicated applications is necessary to address communication difficulties. Further, despite mounting evidence that computer-based interventions are effective in supporting the communication skills of individuals with ASD, Goldsmith and LeBlanc (2004) reason that "the critical question is whether computer-based instruction is more beneficial than its low-tech counterpart" (p.170). While comparative studies have indicated positive effects of using computer-based instruction (Moore & Calvert, 2000; Williams, Write, Callaghan, & Coughlan, 2002) and research like that of Ganz et al. (2013) have proved that tablets can be more effective than traditional communicators, additional research is needed to strengthen claims of efficacy.

Virtual Reality

While "still in its infancy" (Chaplin et al., 2013, p.161), the use of virtual reality environments for supporting the communication of individuals with ASD is an area that is gaining traction in research literature. Similar to dedicated applications that utilise interactive activities, virtual reality relies on individuals exploring digital environments

and engaging with tasks that involve responding to prompts and making decisions (Cumming, 2007; Cumming & Higgins, 2005). Consequently, when compared to the student experience of traditional Social Story™ and video modeling interventions, virtual reality appears to enable a more student-centred approach to communication for students with ASD in the school setting through the provision of student choice, interaction opportunities and decision-making demands.

As a result of advances in computer science, virtual reality technology has been developed that "allows the opportunity to experience a three-dimensional, computer-generated world in which people can behave and encounter responses to their behaviour" (Goldsmith & LeBlanc, 2004, p. 171). The literature describes two types of virtual reality environments including: 1) *Immersive Virtual Reality* (IVR) which involves users wearing and manipulating special equipment to experience visual immersion; and 2) *Non-Immersive Virtual Reality* also known as *Desktop Virtual Reality* (DVR) which engages users in 3D environments that allow for manipulation using a monitor, mouse and keyboard (Mandasari, 2012). While studies such as the research of Strickland, Marcus, Mesibov, and Hogan (1996) have shown that students with ASD can tolerate and interact with *Immersive Virtual Reality* (IVR) environments, Parsons, Mitchell and Leonard (2004) warn that in light of the weight and cost of IVR devices and reported symptoms of cyber-sickness, other technology-based approaches may be better suited for use with children who have ASD. It is perhaps for these reasons that DVR is more commonly used in the school setting and as a focus of research and interventions that target the needs of individuals with ASD.

Even though virtual reality can reduce the need for social interaction with peers, research indicates that virtual environments have the potential to support the communication and interactions of individuals with ASD in various innovative ways (Parsons & Mitchell, 2002). For example, research literature supports that virtual environments can serve as effective places for individuals with ASD to interact with others through use of avatars (Weiss & Klinger, 2009). The research of Ke and Im (2013) contributes value to this claim. In their research, Ke an Im (2013) investigated how children engaged with and responded to using a program that required them to communicate with avatars at a virtual cafeteria and birthday party. Findings demonstrated that children experienced increased interaction and communication performance during and after the intervention. Similarly, the research of Mitchell,

Parsons and Leonard (2007) which involved the immersion of six adolescent individuals with ASD in a virtual coffee shop revealed improvements in communication and interaction. Like, the studies of Ke and Im (2013) and Mitchell et al. (2007), the research of Strickland, Coles, and Southern (2013) also explored the value of virtual reality supporting the communication of individuals with ASD. Strickland et al. (2013) developed a program called JobTIPS that offered young people with ASD a virtual world to practice communication skills for job interviews. Such a study yielded positive results as it was revealed that all 11 participants who engaged with JobTIPS experienced enhanced verbal skills in an interview. Further, results indicate that the communication skills demonstrated by the participants in the interview were superior to the control group of young people who did not use the virtual environment of JobTIPS to practice interview skills.

Another virtual reality environment that has attracted attention as a result of the communicative potential that it affords to individuals with ASD is Brigadoon City within the popular virtual reality application *Second Life*. The virtual space of Brigadoon City is a virtual world reserved for individuals with ASD to interact with each other in a safe and supportive environment that encourages socialisation and the sharing of experiences (Lester, 2005). Weiss and Klinger (2009) reason that while research indicates that the controlled nature of interaction within Brigadoon City creates a safe environment for interaction, the capacity of Brigadoon City to develop communication skills that are transferrable to a real world setting for individuals with ASD is yet to be realised.

Goldsmith and LeBlanc (2004) explain that perhaps one of the most notable benefits of virtual reality is that it affords control over an environment, thus enabling a teacher or clinician to organise environments in ways that are most conducive to promoting acquisition, practice and generalisation of communication behaviours and skills. In support of this benefit Chaplin et al. (2013) reason that capacity of virtual environments to create controlled environments can make users feel safe as a virtual environment is "less hazardous and more forgiving than a real environment, when a mistake is made by the user" (p. 162). Further, because engagement with virtual reality does not require advanced social skills, users of virtual environments are presented with the opportunity to explore and practice communication skills in a less intimidating way then afforded by unpredictable face-to-face interactions.

There is a concern that while technology may support students' communication, digital environments (such as those created through the provision of virtual reality) may hinder communication development as they can strengthen the divide between digital and real worlds and thus isolate students from interpersonal interaction with peers (Goldsmith & LeBlanc, 2004). Further, Howl (1998) warns that an over-reliance on interaction with computers may detrimentally impact upon an individual's communicative potential and may lead to increased isolation and obsessive behaviours. While Chaplin et al. (2013) similarly acknowledge that computer-assisted instruction may lead to isolation; they suggest that such isolation can support individuals with ASD when focusing on a specific skill or situation.

While virtual environments can be realistic, as a result of poor theory of mind individuals with ASD may interpret information literally (APA, 2013) and thus similarly interpret virtual environments literally (Parsons, Leonard, & Mitchell, 2006). Literal interpretations restrict the generalisability of skills to real life settings and hence more research is needed to address this challenge associated with virtual reality environments for students with ASD. In particular, more research is required to explore the value of technology being used to bridge the gap between real life and digital/abstract spaces, and to track the transferability of skills explored in virtual worlds to the real world (Bernad-Opitz, Sriram & Nakhoda-Sapuan, 2001).

In a systematic review of technologies for supporting individuals with ASD, Aresti-Bartolome and Garcia-Zapirain (2014) identify that while research regarding the use of virtual reality in special education dates back to 1996, there has been a significant increase in studies concerning the subject since 2004. Nevertheless, in comparison to studies that explore its application in a range of disciplines, the volume of research concerning virtual reality interventions for school-aged students with ASD has been considerably limited (Goldsmith & LeBlanc, 2004). Consequently, while the benefits of virtual reality "may be quite substantial" (Goldsmith & LeBlanc, 2004, p. 171) for students with ASD, further research is needed to empirically affirm such a claim.

In summary, the technology-based communication interventions and strategies discussed thus far share common traits in that they have all used digital media in various ways to support the communication needs of students with ASD. Nevertheless, the majority of these are teacher or expert-generated, and primarily use technology as a means of substituting and/or complementing direct teacher instruction. Similarly, as

research emerges regarding computer applications that aim to teach communication skills schools to students with an ASD, they tend to focus on how students engage with the applications and the effects of viewing digital content (Aresti-Bartolome & Garcia-Zapirain, 2014).

Even though applications may provide an interactive element that is more student-active than being read a story or viewing a video, they tend not to engage students in the design of content thus mostly positioning students as passive recipients of content to absorb or model. For example, as can be seen in the review of Kagohara et al. (2013), the majority of studies focus on how technology can be used to present instruction, access stimuli or serve as an augmentative and alternative communication device (e.g. speech-generating device). In contrast, burgeoning research in the field of virtual reality reveals that making connections to students' life-worlds is invaluable (Aresti-Bartolome & Garcia-Zapirain, 2014; Chaplin et al., 2013; Strickland et al., 2013) and supports that students with an ASD are engaged and empowered as explorers and creators of content rather than passive recipients or controlled responders. Nevertheless, as research expands to explore the value of virtual reality, studies also need to consider the role of the student and teacher in navigating and driving communication through multimodal composition and representation. The following section considers the impact of changing multimodal literacy practices on the role of students as content-creators as opposed to consumers and recipients of content presented through a knowledge-transmission model of teaching and learning. Specifically, it identifies the relation of this trend to special education contexts and reviews research that positions students with ASD as creators of multimodal, digital compositions.

Student-generated and Multimodal Approaches to Communication

As technology becomes more accessible and user friendly, it is capable of supporting the communication skills of students by providing access to a variety of multimodal digital resources for meaning making decisions. Multimodal theory offers a theoretical framework for students' media use for communication. This framework and its application in the school setting is presented as follows in order to provide context for the ensuing review of literature concerning student-generated multimodal communication in special education, and then more specifically the multimodal digital compositions of students with ASD.

Multimodality

The ways in which we communicate are transforming in parallel with advances in digital technologies. Consequently, the ways that we engage with and use various media to make meaning are also changing. Specifically, Kress (2003) explains that writing used to be the dominant communicative literacy practice, but has now been extended by image. Similarly, Kress (2003) explains that the "medium of the screen" now overshadows the use of the once dominant medium of the print-based book (p. 1). A range of terminology has been used to identify this transformation of communication in recent times including *digital literacies* (Carrington, 2005), *multiliteracies* (The New London Group, 1996; Unsworth, 2001), *new literacies* (Coiro, Knobel, Lankshear & Leu, 2003) and *multimodal literacies* (Kress et al., 2001; Kress & van Leeuwen, 2001). Each of these contemporary frameworks for considering the changing nature of literacy in the 21st century acknowledges the need to clarify the relationship between communication and technology. While most of these frameworks conceptualise literacy through a lens that favours language in its written and spoken form, the theory of multimodality (Kress et al., 2001; Kress & van Leeuwen, 2001) offers a holistic means of considering literacy as comprising a range of diverse representations and practices, whereby language is but one component. Such a concept challenges traditional understandings about the role of language (Kress, 2010) as the theory of multimodality suggests that language is but one of many meaning making resources and that rather being dominant, other means of representing and communicating meaning may be equally as valid and work in partnership (Kress, 2010).

Fundamental to the theory of multimodality is the notion of representational and communicational resources called *modes* working together to achieve meaning (Jewitt, 2009; Kress, 2010). Specifically, modes can be defined as "organised sets of semiotic resources for meaning making" (Jewitt, 2008, p. 246) and may include "image, writing, layout, music, gesture, speech, moving image, soundtrack and 3D objects" (Kress, 2010, p. 79). Informed by Halliday's (1978) social semiotic theory, multimodality posits that communication is a process of utilising meaning-making resources to serve the social needs of individuals in specific contexts. Nevertheless, unlike Halliday's linguistic theory that acknowledges "language as communication" (Halliday & Matthiessen, 2013), multimodality recognises that modes other than and including

language constitute complex systems of signs that can be used as resources for communicating in verbal, non-verbal, written, auditory, visual and/or gestural ways.

Central to the multimodal perspective is the notion that modes use a range of resources to achieve semiotic effects and that depending on purpose and context, certain aspects of modes may be more suitable as a means of representing and communicating meaning than others. Such resources are also known as *affordances*, and can be material, physical and environmental (Jewitt, 2008). Specifically, Jewitt (2008) defines a *modal affordance* as "what it is possible to express and represent easily" (p. 247), and explains that the way in which "a mode is used, what it has been repeatedly used to mean and do, and the social conventions that inform its use in context shape its affordance" (p. 247). For example, an image in the form of a photograph offers different potential for representing and communicating meaning from the affordances of the mode of speech. The following table illustrates aspects of the potential affordances of different meaning making resources. While the contents of the table is not exhaustive, it provides a snapshot of some of the ways that different modes use resources to achieve semiotic effects, and how the use of such resources constitute modal affordances that influence representational and communicational capacity.

Table 2.2

Modal Semiotic Logic and Resources

Mode	Semiotic Logic	Resources
Written language	Space Time	• Syntax (sentence, paragraph, genre) • Grammar • Lexis • Graphicical: font, size, colour, bolding, frames, spacing • Sequence/directionality
Image (still)	Space	• Positioning of elements in space • Depictions • Frame • Graphical: Size colour, line and shape
Speech	Sequence in time	• Sequence • Lexis • Syntax • Grammar • Variation in energy, rhythm, accent, pitch, intonation, length • Silence
Gesture and moving image	Time Space	• Succession of frames of image and sequence of movements • Spatial organisation • Lexis

(Information gathered from Jewitt, 2008; Kress, 2010; Walsh, 2010)

As shown by Table 2.2, modes generate specific semiotic logic. For example, it can be said that written language utilises spatial logic as it relies on graphic resources such as font, size, colour, spacing and bold typeface which it can manipulate to achieve specific communicative results. Further, written language leans on the semiotic logic of time as the sequence of elements can be used to infer meaning. Similarly, verbal speech shares syntactical resources with written language, yet as speech is produced using sound, the graphical affordances of written text and images do not apply. Rather, unlike written language, speech can utilise resources such as intonation, pitch and accent to manipulate sound and meaning. Speech also draws on the semiotic logic of time, unlike the spatial and graphic representations that can be achieved with the modes of written language and image. As shown in Table 2.2 modes such as gesture and moving image similarly use spatial semiotic logic, however, like written language they also rely on the logic of sequence in time. The resources that the modes of gesture and moving image afford include the succession and organisation of frames and movements. Similarly, the potential for a still image relies on the manipulation of graphic resources such as size, colour and shape, as well as the positioning of various elements within a specific space and frame.

Multimodality has far reaching implications for the process of creating multimodal texts. In particular, awareness of modal affordances can support creators of multimodal texts in the representation and communication of meaning (O'Halloran, 2004). As technology has an influential role for not only constructing modes, but also integrating a range of modes, awareness of modal affordances can support users of technology in representing and communicating ideas. The following section will address how the theoretical framework of multimodality can be applied to a classroom context as a means of conceptualising literacies fundamental to multimodal text construction. In particular it will look at existing literature in the field of multimodality that has relevance to teaching, learning and assessment in the school setting.

Multimodality in the School Setting

The "digital turn" of the 21st century (Mills, 2010, p. 246) has seen the transformation of communication practices take place alongside advancements in digital technologies (Mills, 2010; Walsh, 2008; 2009; 2010). Consequently, there is a need for pedagogies and school literacy practices to similarly transform (Cercone, 2017; Miller & Bruce,

2017). Schools have long been criticised for their tendency to focus on language and print-based notions of literacy (Gee, 2004). Nevertheless, the need for a shift towards a multimodal approach to literacy (Jewitt, 2008) has been acknowledged by the Australian Curriculum (Australian Curriculum Assessment and Reporting Authority, 2017). Walsh (2010) reasons that because the nature of communication is evolving, teachers need to explore ways that they can incorporate digital technologies into their lessons to meet the multimodal literacies of students. While assessment is yet to adapt to the changes that are occurring to curriculum, in that the majority of assessments still remain in the traditional written form (e.g. NAPLAN), it is clear that use of digital technologies in the personal lives of students is increasing.

In response to increased use of digital technologies outside of school, and in an attempt to bridge the gap between home and school worlds while simultaneously developing 21st century literacy skills, the Australian Curriculum for English K-12 indicates a need to foster and support multimodal communication. The Australian education system demands that teachers help students demonstrate what they know and provide students with a variety of ways to communicate understandings (Kluth, 2010). This educational responsibility is promoted by the Board of Studies NSW (2012), as syllabus documents urge literacy educators to provide diverse opportunities for students to engage with the meaning of texts, and demonstrate their understandings using various modes of communication. It is a requirement of the NSW 7-10 English Syllabus for all students (including those with special education needs) to develop skills composing and responding to multimodal texts created in and through different information and communication technologies, and to understand the effects of technology and the use of different modes on meaning (Board of Studies NSW, 2012). Multimodal literacy is a significant component of the English syllabus, indicating the importance of students' developing awareness of the affordances of various modes and how different modes can be combined to communicate meaning. In response to the shift away from written and spoken language as the primary means of communication in the school setting, Walsh (2010) defines multimodal literacy as meaning-making that takes place "through the reading, viewing, understanding, responding to and producing and interacting with multimedia and digital texts" (p. 213).

The theory of multimodality (Kress & van Leeuwen, 2001; Kress, 2010) suggests that the simultaneous processing of various modes within a digital text differs

to the processing required to engage with the linear structure of print-based texts. Bearne et al. (2007) confirms this, revealing that students (3-16 years old) who engaged with screen-based texts relied upon decoding skills that are similarly used to retrieve meaning with print-based texts. However, unlike processes involved in reading print-based text, students who engaged with screen-based texts demonstrated skills in non-linear navigating through a range of visual, written and auditory modes to make meaning. While digital means of communication present diverse means of communication, little is known about the ways in which such differences in processing impact upon the ways in which students learn and communicate. Walsh (2010) reasons that it may be possible that digital communication relies on different set of skills than those fundamental to traditional literacy practices of reading and writing print-based texts. In light of the different skills involved in viewing and creating multimodal texts, Walsh (2010) explains that "students need to understand the meaning making potential of different modes, particularly the relationship between words and images, in reading, writing and producing multimodal texts" (p 215). Further Walsh (2010) urges that students need to develop multimodal awareness and "use and manipulate new technologies, but to be able to consider the best way to use these for their purpose and audience" (p.216).

The implications of multimodality in 21st century classrooms have been the focus of many recent studies reported by literacy literature, as researchers explore the value of general education students making meaning through creating multimodal representations (Cercone, 2017; Miller & Bruce, 2017; Mills, 2010; Zammit, 2016). Research has similarly attributed favourable literacy outcomes of student-created multimodal compositions for students from low socioeconomic backgrounds (Hull & Katz, 2006) and low-achieving students (Bruce, 2008). Nevertheless, as stated by Bruce et al. (2013) in response to reviewing a limited body of literature concerning students with special education needs creating multimodal compositions: "its effects on students with special needs is yet to be fully explored" (p. 38). More specifically, Pandya, Hansuvadha and Pagdilao (2016) reason that research has yet to clarify "the challenges of layering meanings in different modes" (p. 417) for students with ASD.

Just as literature has shown value in adopting a multimodal approach to literacy in the general education setting (Cercone, 2017; Miller & Bruce, 2017; Mills, 2010), research suggests that adopting a similar approach in special education settings may

support the communication of students with special education needs (Bruce et al., 2013; Zammit, 2016).

Multimodal Composing in Special Education

Bruce et al.'s (2013) review of research literature concerning multimodal composing in special education classrooms yields a number of valuable insights into the potential of students with special education needs creating their own digital media. The review found that research in this field is limited and thus highlights the need for additional studies to strengthen and extend existing/emerging studies in this field. Bruce et al. (2013) reported 11 instances of research that explored students with special education needs composing multimodal texts and showed that extant research predominately explores students' use of multimodal tools to produce print-based texts. For example, of the 11 studies reported, only four within the last 20 years explored students' composition of multimodal digital media in the form of blogs (McGrail & Davis, 2011), digital labs (O'Brien, 1998) and multimedia stories (Faux 2005; Rao et al., 2009). The remaining nine studies reviewed by Bruce et al. (2013) concerned students' use of multimodal tools/technologies to create print-based texts, thus showing a need for research to further explore the potential of students with special education needs creating digital multimodal representations.

Bruce et al.'s (2013) review also reveals an absence of research concerning the potential of high school students with special education needs composing multimodal digital texts, or students with a range of disabilities such as ASD. Rather, of the limited number of studies in this field, the majority were conducted with elementary students who have learning difficulties or mild intellectual impairments. Further, the majority of these studies focussed on the affordances of specific technologies to support the writing of students with SEN. There also appears to be an absence of research that explores the modal affordances of digital media and how this could have potential for enhancing meaning-making for students with SEN. Bruce et al. (2013) reasons that a shift away from a specific focus on a technology of software is necessary as "a specific technological device runs the risk of becoming obsolete as technology changes and evolves" (p. 39). Bruce et al. (2013) thus recommend that there is a need for future research in this field to focus on "the features and functions of technologies" (p.39) and how these can support students with special education needs in composing meaning.

While there is an absence of empirical research exploring the potential of students with ASD creating multimodal texts, a handful of studies that have reported the experiences of students with ASD creating digital media shed light on this field. These are presented as follows.

The Multimodal Compositions of Students with ASD

A few studies have responded to gaps in special education research literature by exploring the impacts of students with special education needs, and more specifically students with ASD creating multimodal representations in the form of digital stories, animations, 3D designs, games and videos. Key studies in each of these fields are reviewed as follows.

Digital Stories. There have been a handful of small scale studies over the last 12 years that have explored the involvement of students with ASD creating multimodal digital stories. The research of Oakely et al. (2013) describes two case studies of teaching interventions that supported the literacy of two students with ASD (5 and 8 years old) through multimodal text construction. In particular, this study adopted a multisensory student-centred approach facilitated by preservice teachers to position students with ASD as multimodal authors of digital books. Students demonstrated an ability to select their own images, research ideas, write sentences, and use software to create and edit comic pictures. Findings revealed that each intervention enhanced students' literacy achievements and engagement, and may have also empowered students by enabling a sense of achievement and pride. This was evidenced by a students' confident expression after having created his own book: "I am a comic maker, look at my comics" (Oakely et al., 2013, p. 91).

The research of Faux (2005) and Rao et al. (2009), supports the findings of Oakely et al's study (2013). While not specifically focussed on the needs of students with ASD, these studies may have relevance to ASD research as they report on the experiences of students with special education needs using ICT to create multimedia stories. Faux (2005) reports that students within a special education unit at a secondary school were able to use multimedia software to produce their own stories and that as a result they could offload cognitive tasks such as spelling, and were able to work with greater independence and at a higher standard. Further, the research of Rao et al. (2009)

similarly reports that students from grades 9-12 in a special education language arts class were able to produce their own multimodal digital stories consisting of pictures, audio and text. Findings from this study indicate that students' creation of digital stories supported their writing behaviours, engagement and motivation. Rao et al. (2009) reason that a multimodal means of representing information "reengages students in the learning process and improves academics" (p. 28) while facilitating differentiation in special education contexts through appealing to "a variety of learning styles and preferences" (p. 27).

Animations. Research suggest that there may be value in students with special education needs, and more specifically students with ASD creating animations to communicate meaning, The research of Holmgaard et al. (2013) reveals that two children (12 and 13 year olds) with ASD were able to work as a pair to produce their own short animated films with minimal support from a professional animator and teacher. The purpose of students creating animations was to support their understanding of personality traits, emotions and social interaction. Results show that both students successfully "used the animation medium to capture and express their ideas in new ways" (Holmgaard et al., 2013, p. 61). Moreover, the process of creating animations enabled unique social communication opportunities for the two students. They were observed to work harmoniously together sharing the roles of animating and filming, and cooperating and interacting with one another throughout the design and production of their animations. In commenting on the potential of animation and its affordances for enabling multimodal and alternative means of communication for students with ASD, Holmgaard et al. (2013) argue:

> Not only does animation hold great potential in education practice, it also gives teachers a new perspective on autism and an alternative tool to understand and appreciate the skills and potentials of children with autism, which are easily overlooked in teaching methods based on written text.

The research of Shepherd et al. (2014) while not specifically involving students with ASD may similarly support the research of Holmgaard et al. (2013) in that it demonstrates that primary school students with special education needs (mild intellectual disabilities) were able to participate in the creation of animations. However, the research of Shepherd et al. (2014) differs in that it explored the use of stop-motion

animation called "slowmation" (abbreviated from "slow animation"), took place with elementary school students, and examined the use of animation as a means of students creating Social Stories™ as part of a social skills intervention. It may be possible that such an approach could have value as part of a communications intervention for students with ASD, but further research would be required to investigate this.

3D Designs. A recent study conducted by Diener et al. (2016) suggests that there may be value in students with ASD communicating meaning through the creation of their own 3D designs. The researchers implemented a program for seven students with ASD (ages 8-17), training them how to use SketchUp™ software (a creative 3D freeware programme used by engineers, architects and game designers) to create their own designs. The study reports that after six months participation in a series of workshops run by technology mentors, students were able to create their own designs and present these to their peers. Results show that students' 3D design experiences appealed to their visual spatial strengths and enhanced their social engagement and interactions with peers. In response to these findings Diener et al. (2016) claim that building on students' interests and dispositions for using digital technology can "facilitate personal, social and vocational readiness in students with ASD" (p. 195). Results also indicate that while the role of technology mentors in implementing the program was central to supporting students' development of skills for using the design software, the facilitative nature of their role was especially important. Specifically, the student-driven approach of the program facilitated peer collaboration and teaching which Diener et al. (2016) explain enabled students to "assert ownership, creativity and authentic self-directed learning" (p. 188).

Games. Like the study of Diener et al. (2016), the research of Sarachan (2012) similarly proposes that there may be value in students with ASD taking an active role in design processes. Sarachan (2012) explored the potential of students with ASD using coding and programming skills to design their own games. As was the case with Diener et al.'s (2016) study, Sarachan (2012) similarly explored the use of software *(Scratch)* that was not specifically designed for students with ASD but that had real life application to design in a range of contexts and for a range of purposes. Results showed that students could design and create their own games using *Scratch* software and that

this developed and strengthened creativity and problem-solving capacities, thus positioning games as a "valuable developmental tool rather than a distractor for children on the spectrum" (p. 3). Sarachan (2012) reasons that just as "mastery over digital technologies at a young age has been used to empower children worldwide with varying resources" (p. 3), similarly game creation may enable "success in a learning environment that provides the children with agency over their decision-making and allows them to engage with personal interests" (p. 3).

Videos. Perhaps the greatest insights provided by research thus far about the value of multimodal, digital compositions for students with ASD could be gathered from the recent research of Pandya, Hansuvadha and Pagdilao (2016). This research implemented a teaching program in an elementary school that involved children with ASD using iMovie on an iPad to create their own multimodal digital autobiographies in the form of videos. Results show that there were aspects of video design and production that they could achieve independently (benchmarks) such as capturing their own photographs and videos on the iPad for use in their digital autobiography video. Nevertheless, evidence revealed that students required the support of researchers, teachers and peers to organise visual media, adjust image frame speeds, add titles and music to slides, and record voiceover narrations to support images.

To provide a snapshot of the detailed accounts of student experiences in the study, Pandya, Hansuvadha and Pagdilao (2016) describe the processes of video creation for a student called Cindy. Pandya, Hansuvadha and Pagdilao (2016) report that Cindy dictated a script of what she wanted to say in her video to her teacher. The teacher wrote this script verbatim on a storyboard template as Cindy dictated it, and then Cindy drew pictures on the template to accompany the written narration. Cindy then took photos of her storyboard drawings and other photos and short videos of herself dancing for inclusion in her video. With the one-on-one support of the teacher, Cindy then made decisions about how to organise her images and videos in iMovie on the iPad, and recorded her voice as a narration using her written script as a guide.

The research of Pandya, Hansuvadha and Pagdilao (2016) suggests that with support, young students with ASD can participate in the making of their own digital media compositions and can leverage the affordances of multimodal composing to communicate meaning in new ways. Aligning with a multimodal approach Pandya,

Hansuvadha and Pagdilao's (2016) study challenges traditional literacy practices in the school setting and encourages teachers and researchers to move away from teacher-centred, knowledge transmission models toward student-centred and assets-based approaches. Pandya, Hansuvadha and Pagdilao (2016) reason that adopting such an approach challenges teachers and researchers to "find ways to create differentiated assignments that offer students multiple potential entries into creative, productive, multimodal text making" (p. 427), and provokes them to "think about how to meaningfully include students with disabilities in their multimodal, digital composition work" (p. 49).

Pandya, Hansuvadha and Pagdilao (2016) reason that two aspects of multimodal composition offer "creative and academic affordances for children with autism: engagement with multiple modes and the sensory aspects of composition" (p. 417). Drawing on these affordances they highlight the importance of further research in this field identifying intellectual processes of multimodal orchestration, and in particular shedding light on the experience of students with ASD "layering meanings in different modes" (p. 415) as information about this "unknown" (p. 415). Perhaps if replicated in a high school setting with older students, many of the tasks that students in this study were unable to achieve on their own could be achieved independent of direct teacher or research support. Nevertheless, this is also unknown, and hence further research in this field is needed to further examine the multimodal literacies and capacities of students with ASD communicating through digital media composing.

A Need for Further Research

"There is very little extant research" (Pandya, Hansuvadha & Pagdilao, 2016, p. 415) that explores the ways in which students with ASD specifically engage with multimodal representations through the creation of digital media. Consequently, while this literature review has thus far reported on small-scale and often isolated research in this area, in spite of the contributions of these studies, overall "there is so much we don't know – in language arts, literacy, special education and autism research" (Pandya, Hansuvadha & Pagdilao, 2016, p. 415) about the multimodal literacies of students with ASD, let alone the communicative potential of digital composition for these students in the school setting.

More research is needed that adopts the theoretical framework of multimodality (Jewitt, 2008) to understand the processes by which students with ASD engage in designing their own digital content and making decisions about using modes to communicate meaning. Intervention research indicates that as a result of impaired executive functions (Hill, 2004; McCloskey et al., 2009; Ozonoff et al., 1991) and poor theory of mind (Baron-Cohen et al., 1985; Ozonoff et al., 1991; Pellicano, 2007) associated with ASD, students may experience difficulty multitasking and planning and organising traditional written information. Nevertheless, emerging research suggests that students with ASD may not experience these challenges and/or use different skills when engaging with and creating digital content that challenge assumptions and deficit theories regarding cognitive processing and executive functions (Pandya, Hansuvadha & Pagdilao, 2016; Walsh, 2010). For example, research indicates that individuals use different skills to interpret information on screen than they do to read print-based texts (Bearne et al., 2007). Further, research shows that students with ASD show potential and strengths in being able to visually and digitally communicate their ideas in the creation of digital stories (Oakely et al., 2013), animations (Holmgaard et al., 2013), 3D designs (Diener et al., 2016), games (Sarachan, 2012) and videos (Pandya, Hansuvadha & Pagdilao, 2016). Consequently, more research is needed to understand how students' experiences interacting with and creating multimodal digital media might compare with more commonly documented accounts of their experiences and/or difficulties engaging with traditional literacy practices in the school setting.

There is also a need for research to explore the effects of positioning students as content-creators rather than passive consumers or recipients of pre-made computer or expert-generated content/digital media. An absence of research that positions students with ASD as creators and designers of digital media seems to contradict contributions from technology-based intervention research about potential affordances and favorable features of technology in supporting the learning and engagement of students with ASD. For example, it has been known since the early investigation of Lahm (1996) that individuals with ASD prefer computer-based programs that enable a high degree of interaction, and integrate features of animation, audio and voice. Further, Chaplin et al. (2013) explain that computer-based programs and applications that foster "individual use and independence" are fundamental to facilitating the learning of students with ASD. In light of the fact that the affordances of digital media offer students more

control of the learning experience and simultaneously enhances motivation (Yildirim, Ozden, & Aksu, 2001), research is warranted to explore to possibilities of student-directed applications and student-generated digital media for communication as alterative literacy practices and vehicles for differentiation (Rao et al., 2009) The multimodal and hands-on nature of such an approach lends itself to integration into school curriculum (Crozier & Tincani, 2007; Hall, 2010; Sharmin et al., 2011) and may also promote inclusion (Pandya, Hansuvadha & Pagdilao, 2016).

Summary

This literature review has revealed that further research in the field of multimodal communication for students with ASD is needed to shed light on and provide a more balanced and asset-based account of the potential of intervention programs to support students' interpretation and representation of meaning through digital media creation. The literature reveals that students with ASD have a disposition for using technology as it appeals to their visual processing skills and is conducive to their attention needs and interests (Dakin & Frith, 2005; Kaldy et al., 2016; Simmons et al., 2009). Over the years technology-based interventions and strategies to support the communication skills of students with ASD have included the use of Social Stories[TM], video modeling, dedicated applications for computers and mobile devices, and virtual reality environments. Many of these interventions have reported favourable outcomes including enhanced communication skills and opportunities for interaction and socialisation, thus supporting the application of technology-based approaches in the school setting (Ayres & Langone, 2005; Bellini & Akullian, 2007; Delano, 2007; Hitchcock et al., 2003; McCoy et al., 2016; Mechling & Swindle, 2012; Nikopolous & Keenan, 2004). Nevertheless, while interventions such as Social Stories[TM] and video modeling have been deemed evidence-based practices, more research is needed to explore the value of emerging trends regarding the use of dedicated applications and virtual reality for supporting students' communication.

With the exception of a few isolated studies that involve students with ASD in the creation of digital compositions (Diener et al., 2016; Holmgaard et al., 2013; Oakely et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016; Sarachan, 2012), the majority of technology-based programs and interventions reported by the literature that support the communication skills of students with ASD are primarily teacher or expert generated.

While there is currently a trend towards utilising interactive applications (Hulusic & Pistoljevic, 2012; Sani-Bozkurt et al., 2017; Sharmin et al., 2011) and virtual reality (Chaplin et al., 2013) to engage individuals in learning specific skills, it appears that the majority of such approaches similarly demonstrate ways that technology can support teacher-instruction while simultaneously positioning students as recipients of information. Few studies in the field of ASD research focus on students as creators of content using simple media-making processes. Nevertheless, insights from a few small-scale research studies suggest that there may be value in students creating digital media as a way of enhancing different ways to communicate (Diener et al., 2016; Holmgaard et al., 2013; Oakely et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016; Sarachan, 2012).

To further research possibilities of student-generated media for students with ASD, the purpose of the current study is investigate the experiences of four high school students with ASD making their own digital media in a DMIP. The next chapter will provide information about the program and outline the ways in which the study was designed and the methods implemented to gather and analyse data that address the study's research questions.

Chapter 3: Methodology

Introduction

This chapter details the methodology employed to address the study's research questions. It provides a justification of the case study research design and details the qualitative data collection and analysis methods employed. It describes the conceptual framework (modelled, guided and independent learning cycle) underpinning the design and the implementation of the DMIP, and concludes by outlining the steps taken to ensure trustworthiness of data and ethical considerations.

Research Design

The purpose of this study was to investigate the experiences of four high school students with ASD making their own digital media to communicate meaning in a DMIP. This study employed a multiple case study design as a qualitative strategy of inquiry to track the experiences of four high school students with ASD over two school terms as they experienced different ways of communicating meaning through digital media-making. The four students made up four individual case studies who each participated in a series of lessons (during regular class) delivered by the researcher and classroom teacher to create a podcast, digital story, animation and blended digital media.

Mertens (2010) explains that research that proposes to investigate the "how" aspects of a particular phenomenon are most suited to a case study design. Consequently, multiple case studies were employed in this study with the aim of providing a "detailed investigation" (Kervin, Vialle, Herrington, & Okely, 2006, p. 199) into the complexity and individuality (Stake, 2006) of how each of the four student participants engaged with the process of creating digital media to represent and communicate meaning.

By examining the individual experiences in each case study, the researcher was able to "include as many different perspectives on an issue or topic as feasible" (Corbin & Strauss, 2008, p. 273) and thus illuminate the complexity of students' experiences (Stake, 2006; Creswell, 2009). This decision reflects the constructivist ideal that meanings are subjective and varied in nature (Simpson, 2001; Creswell, 2009) and cannot therefore be confined or generalised to mere categories or ideas (Sogunro, 2002). Further, complementing a relativist ontology, in response to the nature of the problem setting, this study's employment of a descriptive case study design enabled data

collection to facilitate a rich description of a phenomenon in its context (Yin 2003; Kervin et al., 2006), with the capacity to generate theory and "discover variables rather than control them" (Corbin & Strauss, 2008, p. 318).

Context

Banafshi High School is a pseudonym for the secondary school involved in the study. This school had an autism support class dedicated to teaching students who have ASD. This class consisted of seven adolescent boys who had ASD. These boys were withdrawn from mainstream classes and placed in the support class because they lacked social coping strategies and experienced challenges in relation to managing anxiety, interacting with peers, and following particular school routines. The role of the autism support class was to equip students with the necessary skills to function efficiently in the school classroom environment. The overarching goal of the class was to provide appropriate academic and social supports that assisted students with coping strategies that could be applied in both the autism unit and in mainstream classes in which they had been integrated.

The autism support unit was managed by a classroom teacher who taught the subjects of English, Mathematics, and Human Society and its Environment (HSIE). Students spent 80-100% of each day in this class. When not in the support unit, students attended regular mainstream classes. Students were integrated into mainstream classes for Science, PDHPE, Creative Arts and elective subjects.

School and class selection was based on the expressed interest of the school's Head of Special Education Support unit teacher during a meeting with the researcher regarding the potential of implementing a DMIP with the autism support class to enable students hands on experiences using digital media to communicate meaning.

Participants

This study took place at Banafshi High School (pseudonym for a Sydney high school) with an autism support class dedicated to solely teaching students from years 7 to 12 who had an ASD. The support class consisted of seven male adolescent students between the ages of 13 and 17. The DMIP was implemented with the whole class thus enabling all students the opportunity to create a range of digital media to communicate meaning for school tasks. Nevertheless, of these seven students, data were only gathered

and analysed for four students (who make up four individual case studies) and their classroom teacher.

Students.

Students from the autism support class at Banafshi High School were targeted by the Head Teacher of the Special Education unit for inclusion in the study because of their communication difficulties, which impacted upon the ways in which they expressed ideas and interacted with others. Of the seven students enrolled in the autism support class data were collected for four students: Charlie, Riley, Jimmy and Damien (pseudonyms). These four students constitute the four case studies of this study. At the time of the study Damien was 13 years old and in Year 7, Charlie and Riley were 14 years old and in Year 8, and Jimmy was 15 years old and in Year 9.

The decision to collect data for four of the seven students in the class was made by the researcher in consultation with the teacher based on students' level of autism, interest in the study, and availability during class. For example, two of the students in the class (from years 7 and 11) were often out of class for grade-based programs and thus had less time than the students in years 8 and 9 to create various digital texts as part of the DMIP. Further, unlike his peers, one of the Year 9 students had an intellectual impairment in addition to his autism, which affected his capacity to independently work on assignments. For these reasons the students in years 7, 9 and 11 were able to participate in the DMIP when in class but were not considered for inclusion in the study as case studies.

The four student case studies were selected for participation in the study by their classroom teacher in accordance with student and parental consent (see Appendix 7). All students were diagnosed as having high functioning autism (level 1), and expressed unique autistic characterises, abilities, and interests (profile summaries of the three students follow). Students were withdrawn from mainstream classes and placed into the autism support class (either part-time or full-time) because they experienced difficulties regarding social coping strategies, communication, managing anxiety, interacting with peers, and following particular school routines. Students had varying abilities regarding the use of digital technologies prior to the study but had never created digital media as a means of representing and communicating meaning for a school task. Data collected from these students included observations, interviews, work samples and behaviour records. Focussing on only four students by means of multiple case studies was

reflective of the constructivist ideal that knowledge is socially constructed and complex (Creswell, 2007; 2009; Mertens, 2010). The use of a multiple case study approach also enabled the researcher to probe students for answers to questions and attain personalised and detailed information relating to their knowledge, skills and experiences.

Table 3.1

Overview of Student Participants

Student	Age	Year	Diagnosis	Communication difficulties	Digital interests
Damien	13	7	Autism (Level 1)	• English is second language (weak receptive skills) • Shy and reluctant to contribute to class discussions • Exhibits attention seeking behaviours • Difficulty maintaining attention and focus • Ongoing conflict with peer (Riley) • Requires teacher support for written tasks	• Video games • Watching television and movies • Computer games (combat games) • Google Earth
Charlie	14	8	Autism (Level 1)	• Social skill challenges (lacks interest in others and struggles to interact with peers) • Bullied by students in mainstream classes	• Lego • Computer games • Viewing iPad media/apps • Using internet for school research and entertainment
Riley	14	8	Autism (Level 1)	• Suffers from anxiety (has panic attacks, hyperventilates and hides under table) • Easily frustrated and loses temper when angry (yells, growls and throws objects across the room) • Argues with peers and calls people names	• Watching YouTube videos about comics and trains • Playing Batman video games • Playing Minecraft on computer and iPad • Collecting model trains • Capturing images and videos on iPod
Jimmy	15	9	Autism (Level 1)	• Withdrawn and avoids participation in class discussions and activities • Lacks motivation to complete school tasks and applies minimal effort • Often appears lethargic and disinterested • Dislikes written tasks and on occasion refuses to complete work • Distracts other students by playing computer games during class	• Skilled user of computers (for entertainment purposes e.g. games and movies) • Prefers creating PowerPoint presentations than writing • Enjoys editing photos and listening to music on iPod • Collects figurines from movies (e.g. aliens). • Interested in cars & playing car games

Teacher.

While not the focus on a stand-alone case study, the classroom teacher of the autism support class, Adrian (pseudonym), was also a central participant in the study. With the exception of the researcher initially conducting a series of introductory lessons with the class (in the presence of the teacher) to model how to construct each digital media form, it was Adrian who navigated lessons that facilitated students' creation of digital media. Prior to this study Adrian was unaware of how to use digital technologies to create podcasts, digital stories, animations and blended digital media, and thus relied on information provided by the researcher. The researcher met with Adrian prior to implementing the DMIP so as to plan ways to integrate the use of digital technologies into lessons and transform class tasks to enable student creation of digital media as a means of communicating meaning instead of traditional essays, reports and PowerPoint presentations. Collaboration between Adrian and the researcher was fundamental to this study and data gathered from Adrian in the form of interviews, reflections and observations were significant for triangulation. Specifically, Adrian's involvement in the study comprised data checking and the provision of insights into student behaviours and experiences prior to, during and after the implementation of lessons designed for the study.

Digital Media Intervention Program

This study involved the researcher and classroom teacher planning and implementing a Digital Media Intervention Program (DMIP) to engage students in the creation of a progressive suite of digital media for representing and communicating meaning that attempted to develop modal complexity and included the creation of a podcast, digital story, slowmation and blended digital media. This program was an adaption of project that was part of an Office for Learning and Teaching National Senior Fellowship for supporting Science educators and their students in the creation of various digital media forms for explaining and communicating science content. The researcher worked as a facilitator during the project and decided to adapt elements of the national fellowship to suit the learning needs of high school students with ASD. Details of the program's design and implementation for students with ASD are provided as follows.

Design.

In term two the researcher met with the classroom teacher to discuss units of work planned for the class for terms three and four with the intent of integrating digital technologies as part of a DMIP to transform the mediums and processes by which assignments could be produced by students. During these meetings the teacher identified assignments for units of work that targeted outcomes from the English and HSIE (Human Society and its Environment) syllabus and consisted of written tasks including reports, essays and PowerPoint presentations. The teacher and the researcher used this initial unit plan as a foundation from which to redesign assignments to include digital media alternatives to written work.

Written tasks were a common form of assignment for the class prior to the study. Despite students being very capable with regards to using digital technology, students had never created their own digital media in class before, let alone as part of an assignment. There was one instance where students had participated in a short film competition that required their involvement in making a video. Nevertheless, this process was heavily structured and teacher-led thus constituting a co-construction as opposed to an opportunity for students to design and produce their own video as a means of communicating their own ideas.

Students' lack of experience creating digital media for class assignments was largely due to the teacher's lack of experience creating digital media, and limited awareness of how to teach students necessary digital technology skills. Upon viewing the teacher's original unit plans, the researcher discussed various options for alternative mediums of assessment (drawn from the National Senior Fellowship) that integrate digital technologies such as podcasts, animations, videos, digital stories and blended digital media (a combination of media forms). Together, the researcher and teacher redesigned the output of written tasks to digital media products in the unit plans. Such a change did not affect the content outcomes proposed, but rather added outcomes related to written, visual, oral and digital literacy skills. Table 3.2 details the changes that were made to assignments as part of the DMIP.

Table 3.2

Redesigning Assignments for a Digital Media Program

Assignment Goal	Original Task	Digital Media Alternative	Due Date
Choose a leader from World War 2 and discuss their leadership style	Report	Podcast	Term 3
Based on the theme of friendship in the Boy in the Striped Pajamas, write a short essay detailing the reasons that friendships are important.	Essay	Digital Story	Term 3
In your own words a significant event from the novel Oliver Twist	Recount	Slowmation	Term 3
Write a speech about your interests for sharing with peers during Social Club		Blended Digital Media (images, video and narration)	Term 4
Write a report that compares and contrasts life in Victorian Times with life today.	Discussion (report)	Blended Digital Media (images, video and narration)	Term 4

The digital media that students were required to produce for each of their assignments was deliberately designed to incrementally increase in terms of modal complexity. This was consistent with the design of the National Senior Fellowship project that informed this study, and was necessary to align with the study's theoretical framework of multimodality. For example, a podcast (first assignment) is made up of the mode of an audio narration, whereas a digital story (second assignment) and slowmation (third assignment) are similarly comprised of the mode of an oral narration, but also use the modes of still and slow-moving images. Further, a blended digital media (assignment four) is the culmination of the modes of an oral narration, images (still and/or slow-moving) and video (fast-moving images). Figure 3.1 shows the incremental progression of modal complexity for each of the digital media assignments identified by Table 3.2.
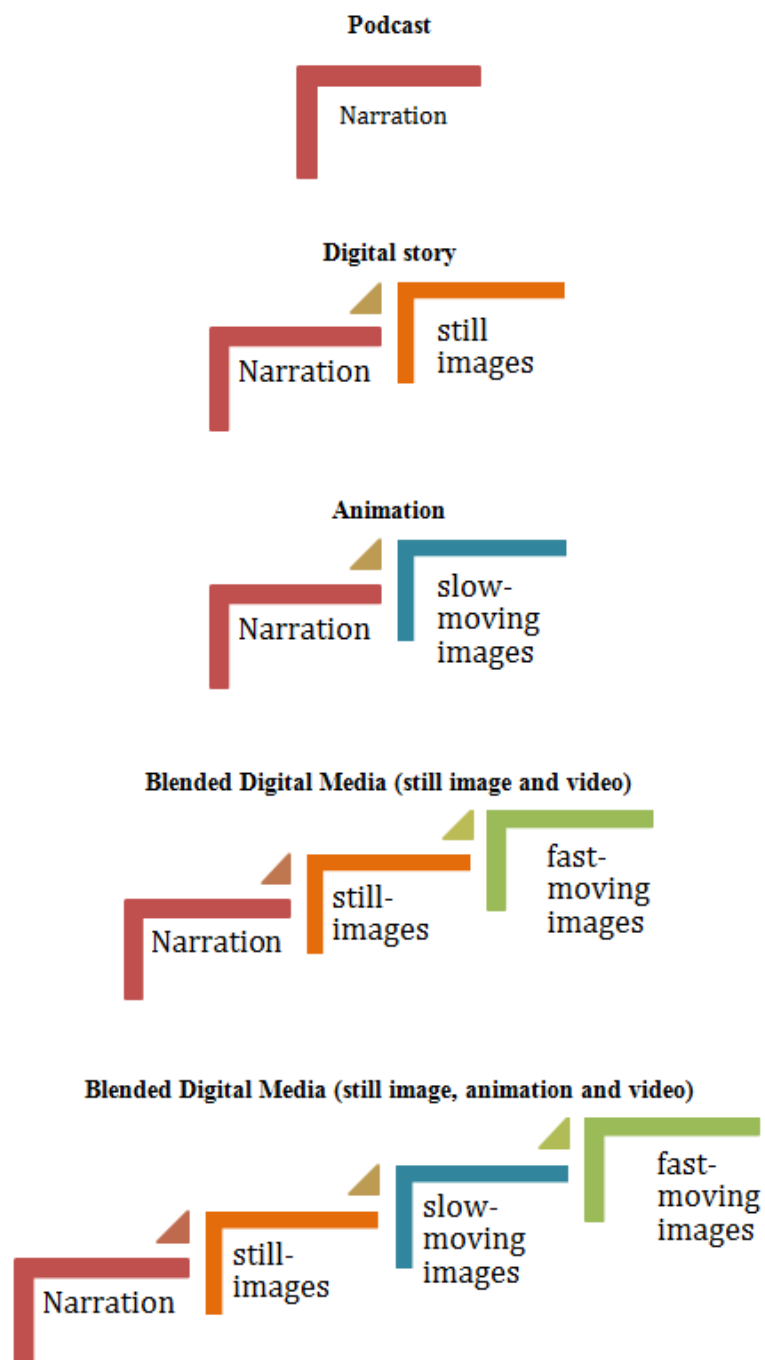
Figure 3.1   Incremental Development of Modal Complexity for Digital Media

Implementation.

With digital media assignments to work towards, the teacher and researcher planned for ways in which to teach students the skills necessary to create various media and provide opportunities to explore different software and co-construct various digital products as a class. As the teacher had no experience creating digital media, it was decided that the researcher would deliver introductory lessons to the class to teach them skills for creating a range of digital media. Such an exercise enabled the teacher to gain skills and observe ways in which to teach students how to create digital media for different communicative purposes. It was then decided that once students developed the skills, the researcher and teacher would team teach during lessons where students were co-constructing various digital media products, but that the teacher would run classes that provided students with the opportunity to work on their digital media assignments. Data for this study was only gathered during the lessons in which students prepared and produced digital media assignments (after having previously participated in lessons that offered modelled and guided experiences of co-constructing digital media).

Conceptual Framework.

Aligning with a constructivist approach that values Vygotsky's (1978) notion of scaffolding student learning through collaboration with experts, implementation of the DMIP by the researcher and classroom teacher was informed by a gradual release of responsibility pedagogical model (Pearson & Gallagher, 1983) that frames learning and teaching experiences into a cycle of modelled, guided and independent phases (Harris, McKenzie, Fitzsimmons, & Turbill, 2003). Such a model advocates for the provision of a high level of teacher support when introducing a particular task, and then a decrease of support as students are given opportunities to engage with tasks and develop skills, and ultimately produce their own product. This approach differed with the direct-instruction believed to be offered by the teacher as a means of teaching students outside of the intervention prior to the study. Figure 3.2 shows the modelled, guided and independent teaching and learning framework used to guide the implementation of the DMIP. It identifies the relationship between teaching and learning across each phase. Figure 3.2 reveals that as a new digital media form was introduced to students, lessons were primarily teacher-directed. Nevertheless, teacher support gradually reduced as students

were given opportunities to explore creating digital media and were ultimately assigned the tasks of producing various digital media assignments.

Modelled	**Guided**	**Independent**
Student Control Teacher Support	Student Control Teacher Support	Student Control Teacher Support
Teacher demonstration	Teacher -guided digital media creation	Student-created digital media assignment

Figure 3.2   Modelled, Guided and Independent Teaching and Learning Cycle

Each time a new form of digital media was introduced to the class, lessons adhered to the three phases of the teaching and learning cycle (modelled, guided and independent). Each phase consisted of approximately 1-2 lessons, with the exception of the independent phase as students were given multiple opportunities across each school week to work on their own digital media assignments, and worked at their own pace until task completion. Across each phase of lesson implementation, the teacher and researcher adopted different roles. For example, as the role of the student increased across the second and third phase of the teaching and learning cycle, so too did the role of the classroom teacher. This is because it was decided that as the researcher was the expert with regards to digital media construction, the researcher would conduct introductory lessons but that as the teacher and students became familiar with the tasks and gained skills in creating digital media, the researcher would take on a facilitative role, thus enabling the classroom teacher to conduct lessons in the lead up to students' independent creation of digital media. This relationship is illuminated Figure 3.3.

Modelled	Guided	Independent
Teacher input Researcher input	Teacher input Researcher input	Teacher input Researcher input
• Researcher introduces digital media form and teaches skills. • Teacher learns skills and observes researcher teaching.	• Research and teacher team teach to guide students in their co-construction of digital media	• Teacher teaches the class and provides instruction as students attempt to create their own digital media. • Researcher observes teacher and students.

Figure 3.3   Teacher and Researcher Roles Across Teaching and Learning Phases

With the exception of the researcher initially conducting a series of introductory lessons with the class (in the presence of the teacher) to model how to construct each digital media form and guide students in the co-construction of digital media as a whole class, it was Adrian who navigated lessons that ultimately guided students toward their independent composition of digital media assignments. In contrast to the teacher, the researcher's role was initially that of a facilitator of digital media skill development, a program and assessment collaborator, and as the teacher and students became more competent users of digital media skills the researcher relinquished instruction and provided more passive/guided teaching and learning support.

Reflection/evaluation phase.

The teacher kept a journal to record observations and reflections about learning new skills and about the happenings of lessons. The researcher and teacher spoke at the end of each lesson to reflect on the lesson, clarify, plan and redesign lessons so as to meet student needs. This was also an opportunity to evaluate the effectiveness of instructions given to students and to identify if any alterations to planned lessons needed to be made.

Data Gathering

Data collection took place over a period of two school terms and consisted of student and teacher interviews, observations of lessons, student work samples, and student records relating to the students' creation of digital media assignments. Data were gathered before, during and after the implementation of the "independent phase" of DMIP lessons to capture information addressing specific aspects of the study's research questions. Table 3.3 summarises the data collection phases and methods related to students' creation of digital media assignments. As shown in Table 3.3 three methods of data collection were used in the study. Specific details for each method are provided below.

Observations.

Open-ended observations were a primary data collection tool in this study. They sought to observe and record "ongoing, natural behaviours" (Kervin et al., 2006, p. 84) and facilitate 'thick descriptions' (Mertens, 2010). Observations gathered data that addressed the first research question relating to what students could create using digital media. Observations of student interaction and communicative behaviours were conducted prior to the study as a means of collecting baseline data. Such data were captured by video camera and notes and was later compared to observational data of student interaction during and after the study.

Observation data in the form of video recordings were gathered for the lessons in which students worked on their digital media assignments. This enabled the researcher to observe and take detailed field notes regarding students' experiences as captured by the video camera. In particular, the researcher observed the ways in which each student engaged with the various stages of creating digital media, and the written, visual, oral and digital technology skills that they employed. Video-recorded observations were also conducted as students discussed their digital media assignments and shared their digital media with peers so as to identify their multimodal awareness (research question two) and the ways in which the DMIP impacted upon their communication (research question three).

The teacher also took on the role of an observer. Throughout class time, as is consistent with regular practice, the teacher observed student learning and recorded reflections where necessary. The teacher was able to casually share observations with the researcher at the end of each lesson, and more formally in a final interview and by

means of written records. These observations addressed research questions two and three regarding the impact of the digital media program on students' multimodal awareness and communication.

Interviews.

One-on-one semi-structured student and teacher interviews conducted by the researcher acted as a valuable data gathering method for addressing research questions. The purpose of using interviews was to attain rich responses which would assist the "researchers' understanding of the social setting under investigation" (Kervin et al., 2006, p. 88). Semi-structured interviews were employed because of their flexibility and capacity to elicit opinions from participants in a conversational style that allowed the researcher to develop a relationship with participants (Mertler & Charles, 2005; Yin, 2003).

Students were interviewed prior to the study to ascertain their initial skills and experiences with regards to creating their own digital media and then again at the conclusion of the DMIP. Throughout these pre and post study interviews students were also asked to complete a survey that enabled them to self-report their capacity to employ a range of digital media-making skills. Data from these interviews and surveys were compared to identify changes in students' skills and knowledge over time as a result of making their own digital media assignments (addressing research questions 1 and 2). Students also participated in short (15 minute) semi-structured interviews before and after their composition of each digital media assignment. These interviews were compared to identify students' multimodal awareness and to provide information about their digital media –making decisions (addressing research question two).

The teacher was interviewed every week during the DMIP when planning for assignments and/or reflecting on lessons. Teacher interviews were used as a means of triangulating observational and interview data concerning students' skills, knowledge and awareness (research questions 1-2), and were also key to addressing research question three concerning the communication implications of the DMIP.

All interviews were audio recorded to "provide an accurate rendition of an interview" (Yin, 2003, p. 92). Written notes were also compiled by the researcher during interviews so as to record information that would otherwise be lost in the case of technological failure with recording equipment (Mertens, 2010). Video cameras, tripods and video and audio recording equipment were trialled prior to the study to minimise

technological difficulties that could hinder the progress of lessons conducted with students (Griffee, 2005).

Student Work Samples.

Student work samples were collected and photographed during the two school terms that data collection took place. Work samples included students' storyboards, character models, photographs, drawings, audio recordings and completed digital files (in the form of podcasts, digital stories, slowmations, videos and blended digital media project files). Work samples were triangulated with interview and observation data to address research questions 1-3. This was particularly important given that the students experience communication difficulties and thus work samples provide an additional means of evidencing student knowledge and skills in ways that verbal interview responses may not capture or reflect on their own.

The systematic gathering and reviewing of work sample artifacts enabled the researcher to capture the reality of participants' experiences (Mertens, 2010), obtain the language and perspectives of participants (Kervin et al., 2006), and thus strengthen the development of "the thick description a qualitative researcher seeks" (Kervin et al., 2006, p. 92). In particular, the collection of student work samples throughout the different stages of digital media creation offered insight into the ways in which students engaged with specific processes and strategies. It also enabled the researcher to identify challenges experienced by students (Mertens, 2010).

Student Records.

Students' academic and school behaviour records were collected as baseline data prior to the study, during, and up to three weeks after the DMIP with the aim of responding to research question three that sought to explore the implications of the study on students' communication. These records can be classified as a document data type in that they were produced for reasons other than the research and offered comprehensive historical information related to the students' personal background (Kervin et al., 2006). Behaviour records were ongoing and would have been consistently completed by teachers regardless of the study if students were involved in incidents at school.

Table 3.3

Overview of Data Collection Phases and Methods

Phase	Time	Data Collection Methods
Phase 1: Preparation • Identification of participants • Collection of baseline data • Design of Digital media program/assignments • Implementation of introductory lessons (e.g. intro to podcasting, digital stories, slowmation, & blended digital media), • Implementation of guided lessons (class co-construction of a podcast, digital story, slowmation and blended digital media)	Term 2, week 7	• 3 x 20-minute semi-structured student interviews (one with each student participant regarding their digital media-making skills, experiences and interests). • Collection of students' school literacy and communication records (dating back to Term 1, Week 1). • 10 x 60 minutes video recorded observations of class & social club time
Phase 2: Digital Media Assignments • Independent lessons (time allocated throughout each week for students to independently work on digital media assessments) • Viewing of digital media products as a class	Term 3- 4	• Photography of student work throughout lessons. • 14x 60-minute class video observations of students creating digital media assignments • 5 x 30-minute class video observations of students sharing their digital media with the class • 15 x 15-minute interviews with each student (five with each student) regarding each of their digital media products • 5 x 15-minute interviews with teacher (at the conclusion of each digital media assessment)
Phase 3: Follow up • Collection of follow-up data (e.g. final interviews)	Term 4 week 9	• Collection of teacher reflection notes • 1 x 30-minute final teacher interview • 3 x 20-minute semi-structured final student interviews (one with each student participant regarding their digital media-making skills, experiences and interests throughout the project).

Role of the Researcher

Constructivist epistemology maintains that separating the researcher to be objective and independent from the research context is futile (Simpson, 2001) in that the two are "interlocked in an interactive process; each influences the other" (Mertens, 2010, p. 19). Further, McGrath and Johnson (2003) suggest that practices cannot be explained from a macro-level as reality only exists in individuals' perceptions. In accordance with this subjectivist stance, this study values the researcher's role to interpret the complexity of a participants' situation and gain meaning through experience in the research setting (Simpson, 2001; Creswell, 2009) rather than uncover a particular truth (Kervin et al., 2006). Accordingly, this study employed an "interactive mode of data collection" (Mertens, 2010, p. 19) and phenomenological approach of listening to data (Corbin & Strauss, 2008) that allowed for researcher immersion in the studied context. The researcher was central to the design and implementation of the DMIP and adopted the roles of observer, designer, consultant, teacher and interviewer throughout the study.

Prior to the implementation of the DMIP, the researcher spent time in the class as an observer to get to know the students and gather baseline data regarding their needs. This enabled students to become familiar with a new person in the classroom, which was especially important given the fact that as a result of their autism students would not have felt comfortable with a stranger immediately interviewing and teaching them. Without this orientation observation period students would have likely felt anxious, withheld information and displayed different behaviours throughout the DMIP, thus defeating the intent of capturing real data in an authentic classroom context with minimal disruption to students' regular routines. The researcher was later able to use the information gathered from pre-study observations and experiences, alongside the rapport built with students, to design the DMIP.

The researcher designed the DMIP drawing on the conceptual and theoretical framework of the OLT National Senior Fellowship project that it was adapted from. Ongoing planning meetings with the classroom teacher were also central to the design of the program. During these meetings the researcher was able to take on a consultant role to advise on how to transform written assignments into digital media assignments and supported the teacher in the redevelopment of assignments for the program.

In phase one of the study the researcher adopted the role of teacher and conducted modelled and guided lessons with the autism support class about how to

make digital media. These lessons also acted as a source of professional development for the classroom teacher who had no prior knowledge, skills or experience teaching students how to create digital media. After observing the researcher conducting modelled and guided lessons the teacher was then able to lead lessons that involved students independently working on their own digital media assignments (phase two of the study). At this point the researcher adopted the role of participant as observer (Mertens, 2010) who was able to provide teaching support (when required) but primarily conducted lesson observations (recorded field notes to aide video recordings), interviewed students, and photographed student work samples. This approach enabled the researcher to ask students questions relating to their experiences as they occurred. Moreover, as the students were familiar with the researcher's presence in the classroom their behaviour did not change as it would have if the researcher were a stranger. Consequently, data gathered pertained to authentic classroom experiences.

Data Analysis

Consistent with the qualitative nature of this study, data were thematically analysed (Braun & Clarke, 2006). Such analysis was an ongoing recursive process that took place throughout data collection (Mertens, 2010). Preliminary thematic data analysis was conducted across each phase of data collection so as to identify emerging similarities, differences and themes among the data (Braun & Clarke, 2006). As patterns within case study data sets emerged through familiarisation they were categorised into initial codes and mapped to research questions. Themes were then identified among and across case study data and original case study specific categories were revised to produce the most suitable themes for analysis of all data in accordance with research questions. For example, students' initial interviews were coded after phase 1, and video recorded observations and interviews that occurred throughout the digital media program were coded after phase 2. Students' final interviews were coded after phase three and then underwent comparative analysis with initial coded interviews.

Case study analysis processes as illuminated by Stake (1995) were employed to identify conceptual categories among and separate to each case study. Consequently, major ideas that cut across data were identified yet themes unique to particular case studies were not lost in an effort to match them to the experiences of other participants (Stake, 1995; Mertens, 2010).

In an effort to prepare data for analysis the researcher transcribed all audio recorded interviews and video recorded lessons. Hesse-Biber and Leavy (2006, p. 347) explain that such a step is "interactive" and enables the researcher to "actively engage with the research material" in the "process of deep listening, analysis and interpretation". The researcher then continued to read through all data within and among case studies numerous times from beginning to end so as to become familiar with certain themes (Stake, 1995) and determine categorisation of data which Hesse-Biber and Leavy (2006 as cited in Mertens 2010, p. 425) refer to as "synergistic" data exploration and reduction phases. Such processes were aided by the researcher's use of electronic memos to document thoughts (Mertens, 2010) and open and axial coding in which the researcher progressed from the identification of specific codes from within each data set to the relation of categories among extensive data and multiple case studies (Corbin and Strauss, 2008).

Data collected from participants was primarily categorised and analysed according to research questions and then later linked to other research literature. The use of rigorous 'open coding' processes and drawing on relevant literature facilitated the identification of recurring patterns, themes and interrelationships among the qualitative data until saturation or redundancy (Gelo, Braakmann, & Benetka, 2008). Furthermore, as this study utilised an extensive range of data collection methodologies, as part of analysis procedures various sources could be triangulated, therefore promoting "thicker and richer data" (Onwuegbuzie & Leech, 2007, p. 244).

Video recorded lessons and audio-recorded interviews were transcribed upon completion and underwent ongoing thematic analysis (Braun & Clarke, 2006) in relation to students' participation in each of the lessons, and their capacity to use digital media to represent and communicate meaning. Collected and photographed work samples were analysed using multimodal analysis video software in relation to the modes of communication that they utilised as well as what they demonstrated about students' multimodal literacies and decision making across digital media creation (research question two). Table 3.4 summarises the analytical procedures for the study. A more detailed overview of data gathered is provided in an audit trail in the Appendix.

Table 3.4

Research Questions, Data Gathering Methods and Analysis

Questions	Data Gathering Methods	Analytical framework
1. What digital media forms did students with ASD create and what skills did they develop as part of a Digital Media Intervention Program?	• Student **work samples** (e.g. storyboards, scripts and digital products) • **Observations** of students creating digital media to identify students' skills and knowledge. • Teacher **interviews** and reflections • Student **interviews**	• Thematic analysis of observational data to identify what students were able to create and what skills they used to create different media. • Coding and comparison of student interview data regarding digital media creation with observational and work sample data (triangulation) • Data categorised according to the identification of students' strengths and weaknesses drawn from observations and interview responses, with reference to teacher comments about student learning (and how learning & student outcomes from digital tasks differ from traditional assignments).
2. In what ways did students with ASD demonstrate multimodal awareness in the making of blended digital media?	• Student **interviews** (after creating each digital media) to ascertain multimodal awareness • **Observations** of students creating digital media and viewing/critiquing the digital media of peers • Digital media **work samples** • **Teacher interviews**	• Multimodal software analysis of digital media products (student work samples) to identify the components of each digital media product (e.g. the modes used) • Examination of student decision making in accordance with multimodal analysis to map communicative intentions conveyed in student interviews to modal components of digital media products (work samples)
3. How did the DMIP influence the communication of students with ASD?	• **Observations** of students creating, sharing & discussing media with peers • **Interviews** with students about their digital media and what they thought about the digital media of their peers • **Interviews** with teacher about student interaction	• Thematic analysis of data gathered during social club interactions prior to the study took place • Thematic analysis of data regarding student interaction and collaboration during co-construction and sharing of digital media with peers • Comparison of coded data relating to student interaction prior to and during the study. • Comparison of coded data from assignments and behaviour records prior to study with observational and work sample data from the study regarding students' communication and social skills. • Teacher interviews used to support observational and student interview data (triangulation)

Trustworthiness

A variety of steps were taken by the researcher to maximise trustworthiness of data.

Erlandson, Harris, Skipper and Allen (1993) describe the criteria of trustworthy research

as that which has credible, transferrable, dependable and confirmable findings.

Techniques implemented by the researcher that sought to achieve such elements of

trustworthiness in this study are explained as follows.

Credibility.

Erlandson et al. (1993, p. 30) explain that credible research presents data through accurate descriptions that "ring true" for participants of a particular setting. To strengthen the credibility of findings in this study the researcher utilised a variety of data collection tools to gain insight into the perceptions and experiences of students and their teacher as the participated in lessons that enabled students the opportunity to use digital media to communicate their experiences. This facilitated the process of triangulation for the researcher in that the researcher was able to corroborate evidence from different individuals and types of data, thereby minimising researcher bias facilitating a "coherent analysis of data gathered" (Kervin et al., 2006, p. 203). Triangulation strengthened the credibility of the research in terms of promoting "descriptive, interpretative and explanatory legitimacy" (Gelo et al., 2008, p. 8) in the following ways:

- Consulting data gathered from observations was the primary means of analysing the ways in which students were able to create digital media assignments. Nevertheless, data were triangulated with information gained from student work samples that demonstrated the employment of skills throughout lessons, teacher interviews, and student responses from interviews relating to personal experiences with the digital media across each phase of design and creation.

- Student work samples were used to support data gained from student interviews and observations regarding students' level of multimodal awareness in relation to the modes they used to communicate meaning in their digital media assignments. Data gathered from work samples, observations and student interviews were also triangulated with teacher interview responses.

- Data gathered from teacher interviews was triangulated with information obtained from lesson observations and student school reports and behaviour records related to social communication (collected during Phase 1) to inform the researcher of any influences that the DMIP may have had on students' social communicative behaviours.

The credibility of the study was also enhanced by means of member checking. Creswell (2007) explains "member checking is a process whereby the researcher asks one or more participants in the study to check the accuracy of an account" (p. 252). Accuracy was maximised in this study by the researcher posing questions to students to confirm

or disconfirm understandings and interpretations gained from other data sources or previous lessons. Specifically, students were interviewed after their creation of each digital media product that they produced to clarify their decision-making and multimodal awareness. The researcher also took the opportunity to informally consult the classroom teacher throughout the study to confirm the credibility of lesson observations and data collected from student and teacher interviews.

Peer debriefing was another strategy employed to promote credibility. By sharing data with research supervisors and critical friends from within the University of Wollongong HDR student cohort, the researcher was able to receive much support. In particular the provision of various peer debriefers' probing questions was valuable and strengthened credibility in that such questions challenged subjectivity and provoked discussions that offered alternative explanations of data interpretation (Erlandson et al., 1993).

Transferability.

The researchers' use of thick description relating to the experiences and awareness of each student promoted transferability of findings in that the depth of detail reported enables the reader to gain a broad understanding of the research context (Creswell, 2009). Consequently, trustworthiness is heightened as the reader is able to make their own "tentative judgments about applicability of certain observations" (Erlandson et al., 1993, p. 32).

Dependability and Confirmability.

Flick (2002) asserts that research dependability is best achieved through the process of auditing. Similarly, Erlandson et al. (1993) reason that an audit trail adds to the rigour of fieldwork and confirmability of data collected. Accordingly, with the aim of providing a check of dependability, the researcher of this study documented an audit trail (see Appendix 10) that provides a dated overview of all gathered data. Such a running account of the research process promotes trustworthiness in that it demonstrates consistency and facilitates "an external check of the processes by which the study was conducted" (Erlandson et al., 1993, p. 34). The collection of student school behaviour records also strengthens the research's dependability and confirmability in that extensive background information was presented regarding student behaviour before, during and after the intervention. Such information was documented by a range of

teachers and would have continued to be collected regardless of the research, thus minimising researcher bias.

Ethical Considerations

Ethical approval was granted for this study by the University of Wollongong's Human Research Ethics Committee (see Appendix) and the NSW Department of Education and Training (see Appendix). Upon receiving ethics approval, the school principal was contacted by telephone and emailed a letter (see Appendix) to attain permission to conduct research within the school. Consent was received by the Head of the Special Education Unit and the Classroom Teacher (see Appendix) to conduct research with students from the autism support class, and student participants and their parents/caregivers also consented to involvement in the study (see Appendix). Participant information sheets illuminated that participation in the study was voluntary and that participants could withdraw themselves and their data at any point during the project with no detrimental consequences.

The names of all participants involved in the study were changed to pseudonyms to ensure confidentiality. Data collected was kept in a secure locked cabinet in the home of the researcher and is currently in a locked cabinet at the University of Wollongong where it will remain for a period of five years, after which it will be destroyed.

Summary

This qualitative study employed a multiple case study design using a range of data-gathering methods and analytical tools to address the research questions and purpose of the study. Methodological procedures were designed to gather detailed, descriptive data and thus build up a "'rich' and 'thick' account" (Kervin et al., 2006, p. 84) of the participation and impact of four high school students with ASD creating digital media assignments as part of a DMIP. By positioning the role of the researcher as a participant observer, the design of the study was intended to enable a rich involvement and familiarity with the student experiences within the authentic context of the classroom. Research was conducted ethically and provisions were put in place to promote research trustworthiness and minimise researcher bias.

While many measures were put in place to enhance the trustworthiness of data, it was impossible to separate the researcher from the design and implementation of the

DMIP and thus the study is not without researcher bias. Especially given the fact that the researcher adopted the role of participant as observer and built rapport with students as their teacher throughout the study. One way to minimise researcher bias would have been to employ a research assistant to conduct observations. Nevertheless it would be recommended that they conduct observations of the video recorded lessons rather than participate as an observer within the setting of the classroom. Given the context and nature of the students' personalities, needs and autism, the study relied on gaining students trust, and so the introduction of a research assistant in the classroom who did not interact with students or understand students with ASD would have hindered the study and limited the potential for gathering rich data reflective of authentic student experiences. The data gathered was possible because the researcher first developed a rapport with the students, and thus while the inclusion of a passive research assistant in the classroom setting may have reduced researcher bias, it would have ultimately been at the expense of data credibility and ethical considerations. If replicated in the future, employing a research assistant to observe video recordings would further minimise researcher bias without impacting student behaviours and actions. The next chapter presents data that addresses each of the study's research questions for the case study of Charlie.

Chapter 4: The Case of Charlie

This chapter addresses each of the study's research questions in relation to the individual case study of Charlie. It opens with background information that sets the scene and context for Charlie's involvement in the study. It subsequently explores his experiences creating a range of digital media assignments as part of the study's Digital Media Intervention Program (DMIP) with a focus on his written, oral, visual and digital literacy skills (research question one). The chapter then assesses Charlie's multimodal literacies by examining his awareness of modal affordances and decision-making in the combination of a range of digital media forms to create blended digital media assignments (research question two). Finally, the impact of the DMIP on Charlie's communication (research question three) is investigated with regards to his social interaction, peer feedback, digital communication, and theory of mind skills across digital media-making experiences.

Charlie's Background

Charlie is a 14-year-old boy in year 8 who has an ASD. His Individual Education Plan and school records indicate that he is diagnosed as having high functioning autism (level 1). School behaviour records show that he was placed in the autism support unit from year 7 because he lacked the social skills to be able to interact with other students and consequently experienced bullying from students in mainstream classes. When talking about how his autism affects his behaviour during a class presentation about ASD prior to the study Charlie explained: "Because of my autism I have a short attention span, poor short-term memory, I get impatient, I have mood swings, I'm easily distracted, and sometimes I don't respect people's space" (BP: 07/02/13).

In an introductory interview and throughout subsequent ongoing observations of Charlie talking about his interests during Social Club, it was revealed that his interests include Lego, animations, computer games and trading cards. Observations of him interacting with other students showed that these interests were the focus of most of his conversations and he failed to show interest in other hobbies, or the interests of others.

Charlie expressed a desire for using technology to learn and complete school tasks: "I like to use computers for school stuff as it's very entertaining and fun and it gives me…I get more happiness from it" (BSI: 25/02/13). In accordance with this

interest in technology, in a short survey Charlie communicated a preference for creating something on the computer or iPad over producing a written task such as a report or essay, or delivering a speech to the class.

1. Charlie's Digital Media Forms and Skills

Evidence of the digital media that Charlie was able to create as part of the Digital Media Intervention Program (DMIP), and the skills he used to do so are examined in this section so as to address research question one. Data are presented in three parts. Firstly, evidence identifies the development of his digital media-making experiences and knowledge of digital media forms since the study. Secondly, data reveal the digital media assignments he created throughout the DMIP. Thirdly, data are examined to uncover the written, oral, visual and digital literacies he employed to create digital media assignments.

Charlie's Digital Media-Making Experience and Knowledge

A comparison of Charlie's interview and survey responses prior to and after the study showed an increase in his digital media-making experiences and knowledge of different digital media forms since involvement in the DMIP. Charlie's pre-study survey responses as shown by Table 4.1 revealed that prior to the DMIP he had never made a podcast, digital story, slowmation, or blended digital media. Table 4.1 showed the survey that Charlie completed before and after the study. It reveals that prior to the study he ticked the "I have never done this" column for making a podcast, digital story, slowmation and blended digital media. Nevertheless, since being given the opportunity throughout the DMIP to learn about and produce his own digital media assignments for the first time, Charlie expressed that he would be able to create this digital media on his own in the future as evidenced by his selection of the "I can do this by myself" column for each digital media form.

Table 4.1

Charlie's Digital Media-Making Experience Before and After the DMIP

Digital Media-Making	I have never done this	I can't do this	I need some help	I need a lot of help	I can do this myself
Making podcast	▒				✓
Making a digital story	▒				✓
Making a slowmation	▒				✓
Making a blended media	▒				✓

Key: ▒ = Before DMIP; ✓ = After DMIP

Evidence gathered from comparing Charlie's pre and post-study interview responses further supports that his experience creating digital media and his knowledge of digital media forms increased since the DMIP. Pre-study interview comments made by Charlie as shown by Table 4.2 support pre-study survey data in that they similarly indicate that Charlie had not made his own digital media prior to the study. Moreover, a comparison of pre and post-study interview responses reveals the extent by which his awareness of different digital media forms developed since the study commenced. Table 4.2 compares Charlie's knowledge of different types of media before and after the DMIP. As can be seen in the table, he lacked awareness of what a podcast, a digital story or blended media were. His comments also indicated that he lacked awareness of what a digital story was and confused it with an e-book. Further, prior to the study Charlie's interview responses indicated that while he was familiar with the process of stop-motion animation he lacked awareness of what a slowmation was and confused it with "slow motion".

Following the DMIP, when asked about each media form Charlie was able to articulate his awareness by describing features and processes in some detail. Often during these explanation as shown by Table 4.2 Charlie referred to his experience making digital media throughout the DMIP thus indicating that his experiences shaped his awareness and capacity to explain his knowledge.

Table 4.2

Charlie's Awareness of Digital Media Before and After the DMIP

Media	Awareness Before DMIP	Awareness After DMIP
Podcast	• "I'm not sure what a podcast is… I don't know how I record it as podcast"	• "Well a podcast is just your voice… • "I recorded my voice"
Digital Story	• "Isn't it just a digital story that you can read on your iPad or on a plane… not a book but one with a screen so it is digital?"	• "…a digital story is your voice and pictures…" • "digital story was basically just sound and pictures" • "Well firstly I typed the information down, secondly, I had to import the pictures, thirdly I had to put a voice recording to it and then voilà it worked" • "The photos helped me think of what to say"
Slowmation	• "I have done it before (animation) with coloured match sticks back in primary school… but the teacher helped me a bit and I don't exactly remember how to because she did the computer stuff" • "slow-motion…is that the same thing?"	• "First of all, you need to make a script because you need to figure out how your stop-motion is going to play out…" • "The animation had 161 pictures… it was frames per second"
Blended media	• "Not sure what that is…is it an App?"	• "Blended media…I can do that!" • "…I like to call it movie smoothie… it is voice recording, words, nick knack's and of course video" • "…it's all of them together how you want them" • "Well first of all you make as many slides as you can but if you don't want to add pictures you can add words and a few arrows for pointing. You also have to add videos and don't forget the voice narration" • "…you can all use voice recording and pictures. There's little extras. There's words and videos all in one place"

Charlie's Digital Media Assignments

The following section addresses data specific to Charlie's experience creating digital media assignments as part of the DMIP in the form of a podcast, digital story, slowmation and blended media.

Podcast. Transcribed video observations, field notes and work samples including written notes and a recorded podcast provide evidence that Charlie was able to create his own podcast about World War 2 leader Hirohito as part of a History assignment for a unit of work on war. Field notes show that some of the processes by which Charlie designed and created his podcast included gathering information, taking notes, practising reading notes, and recording and saving audio.

> Charlie used the Internet to gather information about Hirohito… he typed "Hirohito leadership style" into search engine, scrolled down to see the website results, selected first website that appeared from list, and copied information into a Word document…
>
> …he printed the document off and practised reading it….
>
> …he used Sound recorder to record his narration…
>
> …he did not make a mistake and was happy with first recording…
>
> …he saved the recording and refused to listen to it or edit it. *(Field notes, PL1: 07/05/13)*

Further evidence of Charlie participating in the design and creation of a podcast is shown by the notes that he gathered during research as mentioned in the field notes above and depicted by Figure 4.1.

<figure>

Emperor Hirohito

Hirohito became the Emperor of Japan on December 25 (Christmas Day), 1926.

Interesting facts:

Hirohito

What was the leadership style of Hirohito? His leadership style was authoritarian. Authoritarian means favoring or enforcing strict obedience to authority, especially that of the government, at the expense of personal freedom.

What were some of the goals and ideas of Hirohito? Hirohito's goal was to control the pacific and the world. He wished for Japan to remain independent.

What side was Hirohito on? Hirohito was with the Axis powers.

How did Hirohito communicate to the Japanese his vision for the nation? (Speeches, talks, radio, by force etc.) Hirohito communicated by radio. He broadcasted via phonograph. Some of his recordings were often smuggled out.

</figure>

Figure 4.1   Charlie's Podcast Notes

The digital sound file that Charlie was able to produce himself provides evidence that he was able to create a podcast that addressed the assignment theme of World War 2 leadership. The transcript of his podcast recording is shown by Figure 4.2.

Hello my name is Charlie and I'm here to tell you now about Japanese emperor 124, Hirohito.

Now Hirohito became emperor on December 25 1926 and that is actually Xmas day. It's amazing and I know what you are thinking.

By the way what was the leadership style of Hirohito? His leadership style was authoritarian. Authoritarian means favouring or enforcing strict obedience to authority especially that of the government, at the expense of personal freedom.

Now if you were wondering what some of his goals and ideas were, Hirohito's goal was to control the pacific and the world. He even wished for Japan to remain independent.

Now what side was he on? He was with the axis powers. And if you are wondering how he communicated to Japan. Well, that's easy. He communicated by radio. He even broadcasted from a phonograph.

So back then there were no screens just audio and sound. By the way, some of the recordings were often smuggled. That happened very often back then.

Please mind my cough though. I have a bit of asthma. That's all I have typed up. So, see you later…

Figure 4.2   Charlie's Podcast Transcript

Digital Story. Observation and work sample data indicate that during the DMIP Charlie was able to create his own digital story about the importance of having friends as part of an English assignment. An analysis of observation data revealed the processes by which Charlie designed and created his digital story involved brainstorming ideas, gathering images, creating a storyboard, importing images into Windows Movie Maker, editing the frame speed of images and practising a voice-over narration, recording the narration, saving, viewing and sharing the digital story with the class. Evidence of these observations is seen in excerpts from field notes and is supported by work samples. For example, field notes identify his brainstorming process: "Charlie is using his English workbook to brainstorm notes about why he thinks friendship is important. He pauses to think and writes ideas" (Field Notes, DS1: 03/06/13).

The work sample of Charlie's brainstormed notes strengthens these field notes as it demonstrates the ideas he was observed to have been writing. His notes were brief and included the following: "Friends can cheer you up. They can play games with you.

They stop you from feeling lonely. Friends socialise and help you with company (Charlie's Digital Story Brainstormed Notes, DS1: 03/06/13).

After brainstorming his ideas Charlie was observed to search for appropriate images to include in his digital story. Field notes provide evidence of this and reveal that he used Creative Commons to filter Google image search results when gathering images.

> Charlie types "friendship" into the search tab of Creative Commons, selects Google Images and scrolls through the image results. Charlie clicks on a cartoon image of two friends, selects "view image", right clicks on the full-size photo and selects "save picture as" from drop-down menu. Charlie selects the desktop for the image location and clicks "save". Charlie returns to the Creative Commons search engine and types the word "friends" into the search bar… *(Field notes, DS1: 03/06/13).*

Observation videos show that Charlie proceeded to save 10 images to the computer desktop for inclusion in his digital story and that he imported these into a Microsoft Word document alongside typed writing to form a storyboard (DS1:03/06/13) Evidence of what this looks like can be seen by the screen capture of Charlie's digital storyboard as shown by Figure 4.3.

Figure 4.3   Charlie's Digital Story Storyboard

Observational data revealed that as Charlie audio recorded a narration for his digital story he referred to his printed-out script and the images imported into Movie Maker. Nevertheless, instead of reading the entire script word-for-word Charlie improvised and added information in a conversational manner. Evidence of this can be seen in the transcription of his recorded digital story narration as shown in Figure 4.4. The sections highlighted in yellow indicate comments that Charlie made that were not written in the script of his storyboard. The other sections were read out word-for-word from his notes.

> Hello my name is Charlie and I'm going to teach you why friendships are important.
> Friends are very good pick-me-ups.
> But did you know that friends are even also very helpful when you need cheering up. Take a look at these two cookie pictures and you will know what I mean.
> Friends can even help you out when you have a problem and you don't know what to do. Say you are trying to create the umm what was it called again? Ah yes… the jigsaw of life but you need friends to help put all of the pieces together. Otherwise it will all end up in just one big mess.
> Friends can socialise really well with you and you can share common interests with them.
> Some of the things that I like are chess, fishing and trading card games. Especially one called Yugio. I also really love monopoly if anyone wants to play with me and besides you really need help playing with friends.
> Friends can make sure you don't feel lonely at all and can also be good company. Take a look at this Lego head for example; he is scared that he is going to be on his own but the next picture you will see a cat going to a birthday party. He's holding a balloon in one hand, an ice-cream in the other, a horn in his mouth and a hat on his head.
> But friends also like to have lots of hugs and appreciation once in a while or every day just like this chimpanzee and snow tiger.
> What you are about to see is my final picture which is of a very cute dog. It is very cute I know.
> And that's why friendships are important.

Figure 4.4   Charlie's Digital Story Transcript

Slowmation. Analysis of observational data and work samples show that Charlie was able to co-create a slowmation about a scene from the novel Oliver Twist with his peer Riley as part of an English assignment. Data indicates that Charlie experienced difficulty communicating and collaborating to make decisions during the making of the slowmation. Observations show that he was least involved in the processes of script writing, Lego manipulation, and narration, but actively involved in processes of re-enacting the script to the class and capturing and editing images (e.g. adjusting the frame-speed). Evidence that supports each of these claims is captured by transcripts of video recorded observations that detail direct dialogue between Charlie and Riley and describe his non-verbal actions and experiences. For example, extracts

from the students talking reveal that he and Riley could not agree on an Oliver Twist scene to animate. Consequently, Charlie appeared disinterested in the task, focussing on reading the novel on his computer instead of communicating with Riley:

Charlie: I want to look at the one where Oliver runs away to London.

Riley: No, I didn't agree to that… Listen I have a suggestion. You know that online book we were looking at Charlie? Why don't you look that up and go to the chapter where he is arrested?

Charlie rolls his eyes and begins to read from the novel on his own computer (SL1: 12/08/13).

Data also indicate that Charlie became agitated and was reluctant to respond to Riley when asked questions or invited for input into the slowmation:

Charlie is reading the novel on his own computer while Riley is writing the script on his own. Riley is speaking aloud as he types the script.

Riley: Oh crud how do you spell business?

Riley looks over at Charlie's computer screen

Charlie: Leave me in peace.

Riley: But you can't concentrate

Charlie: See my eyes Riley. They are not happy!

Riley returns to his own computer. Charlie appears to be angry. He has clenched fists, is breathing heavily and has begun rocking in his chair. Riley continues to write the script on his own. Charlie continues to read the novel from his computer screen and ignore Riley. Riley looks over at Charlie's screen again briefly.

Riley: Charlie?

Charlie: Riley, leave me alone!

Riley: Charlie I was just wanting to ask (*points to computer*) …well I've done some… a lot

Riley reads his script aloud to himself and makes minor edits and spelling corrections. Charlie ignores Riley and continues reading the novel.

Riley: Charlie I would like you to see what I have done so far?

Charlie briefly glances over at Riley's computer. Riley starts reading the script. As Riley starts reading Charlie moves back to his computer and ignores Riley. Riley appears unaware/unconcerned that he is reading to himself. Riley continues to write script. Charlie continues to read novel on his own computer. (SL1: 12/08/13).

Charlie's comments confirm that he made minimal contributions to the writing of the slowmation script. He expressed that he was happy for Riley to write the script: "No I am fine with it… I am just ok with what Riley is doing" (SL1: 12/08/13). Nevertheless, he was observed to contribute to the script that Riley had written by typing stage directions:

Charlie: I know Riley, how about I add the actions after your bits of what the actors are doing

Riley: Well ok but they can't be silly ones because you have to be serious... we will need a lot

Charlie snatches keyboard from Riley and starts typing stage directions. (SL1: 12/08/13)

Riley similarly took on the primary role of manipulating the Lego characters leaving Charlie with the role of using the iPad to taking photos of the Lego figures as Riley moved them:

Riley: I will do this bit. You just take the photographs when I say.

Charlie: But that's the fun bit.

Riley: It's my Lego Charlie!

Charlie: Fine! (SL2: 13/08/13)

When it came to narrate the slowmation Charlie expressed that he didn't want to record his voice and so Riley agreed to narrate. It was apparent that he did not like the sound of his voice and felt more comfortable with Riley recording his voice instead:

Charlie: I'm not speaking for it. You can do it Riley

Riley: But there are lots of Characters you have to speak

Charlie: I have changed my mind it will sound better if you do it

Riley: Fine then so I just do everything all the time

Riley takes iPad off Charlie and records narration. Charlie observes. (SL2: 13/08/13)

Data revealed that Charlie was actively involved in the re-enactment of the script in front of the class. Field notes indicate that Charlie demonstrated confidence and appeared to enjoy acting out the script as evidenced by his smile and laughing and his bow and "thank you".

> Riley requests that he and Charlie act out their script to the class. The teacher projects their script on the interactive whiteboard. Charlie and Ryan stand up at the front of the class and proceed to read their script. Charlie reads dialogue for the Artful Dodger character. As Riley and Charlie read they re-enact the scene. Charlie has a big smile on his face. Charlie acts out grabbing a hankie and running away as Riley chases him

shouting "stop thief!" As Charlie runs he and Riley laugh. As the class applaud the pair, Charlie takes a bow and says: "Thank you very much" *(Field notes, SL2: 13/08/13).*

Charlie's active involvement and the enthusiasm that he demonstrated when re-enacting the script is surprising in light of how little he had contributed to the writing of the script. His observed willingness to participate in the re-enactment of the script contrasts with his reluctance to collaborate with Riley and contribute to script writing.

Blended Digital Media. Data from observations, interviews and work samples reveal that during the DMIP Charlie was able to create two blended digital media assignments. The first one was for an English assignment that required him to express his interests and the second one was for a History assignment that required him to compare and contrast life in Victorian and present times. Observations and interviews reveal that making each blended digital media assignment involved different processes. Further, the blended digital media files that Charlie produced for each task (work samples) reveal structural differences. Evidence of these differences can be seen when comparing the use of media between the two tasks as identified by Table 4.4 and Table 4.5. These tables provide descriptive evidence of Charlie's blended digital media-making through presentation of screen captures, narration transcripts, and a breakdown of the combination of media/modes used to digitally communicate his ideas for each task.

Table 4.3

Transcript of Charlie's First Blended Digital Media

Digital Media	Narration
Digital Story	Hello, my name is Charlie and I am going to talk about my interests. My first interest is my dog Mate. I don't know exactly how long he has been with me. Maybe a few years.
Digital Story	My second interest is a card called the dark magician. He is my favourite Yugio trading card and he has never let me down before and I have trust in my dark magician.
Digital Story	And my third interest is books. Now I know some of you may not like books but I like books and I mostly like books about Lego. Especially the Lego book.
Digital Story	My fourth interest is movies. I like all movies and my favourite movie is The Mask. Other movies that I like are Iron Man, Spiderman 3, Batman Begins, Thor, Hulk, the Avengers, Captain America and Wreck-it Ralph. I also like this TV show called Horrible Histories. It is hilarious!
Video of Charlie and friend playing cards	My fifth interest is playing card games like Yugio. Card games involve strategy, excitement and surprises. In fact I haven't had a dual in quite a while. I really should dual with my brother my often. Here are some videos of me and my carer dueling each other.
Digital Story	The sixth interest is making movies. A few months ago my class and I made a movie in a film competition. We won and earned the grand prize of $3000 for our class.
Video	My seventh and final interest is my brother. He is really funny. He too likes Horrible Histories. He also likes Lego as well. He has his own Lego mini figures encyclopaedia. And those are all of my interests

Table 4.4

Transcript of Charlie's Second Blended Digital Media

Digital Media	Narration
Slowmation	"I think I will catch the tram and go into the city today. It sounds like a good idea and I am a bit bored just staying at home"
Digital Story	Here is a picture of an old 18th century tram. This what used to be rode on by posh gentlemen back in the 18 hundreds.
Slowmation	Earlier that same day: "Let's make some bacon and eggs" "Sure thing" 10 minutes later. "Here are your bacon and eggs" "Thank you butler" "Call me when you're finished" "Oh goodie! Yum yum yum yum… Done" "Oh good…I knew you would like it Master Alexander" "That's very good of you"
Digital Story	Here is a posh person eating all types of food including drinking wine. There's even some bread here. I'm not sure what's in the bowl but it looks good.
Slowmation	same place 13 minutes later "There's the tram. I wonder what kept it so long"
Video	Here is a video all about a tram. It is really amazing and I am not sure how they did it. But what I can tell you is that it is blue and there are two different colours and it has a number 335 and there are lots of people on it…and it is quite an amazing video of all of the different trams during the Victorian era"

As shown by Table 4.3 Charlie's first blended digital media assignment combined elements of podcast, digital story and video whereas in Table 4.4 his second blended digital media combined these digital media forms with the addition of slowmation.

Observation and interview data further supports evidence presented by tables 5.3 and 5.4 as it confirms that the processes by which Charlie created and combined digital media differed across each assignment. For example, observation transcripts show that in the planning of his second blended digital media assignment he documented a draft written plan by brainstorming his ideas as shown by Figure 4.5.

> My ideas so far…
>
> Transport. Trams.
>
> Posh people eating posh food
>
> Posh clothes for upper class
>
> Butler's to do everything
>
> Slowmation: Alexander upper class he is a master. Very rich and proper.
>
> Scene 1: Alexander catches the tram
>
> Scene 2: Alexander eats posh food
>
> Scene 3: Butler serves Alexander
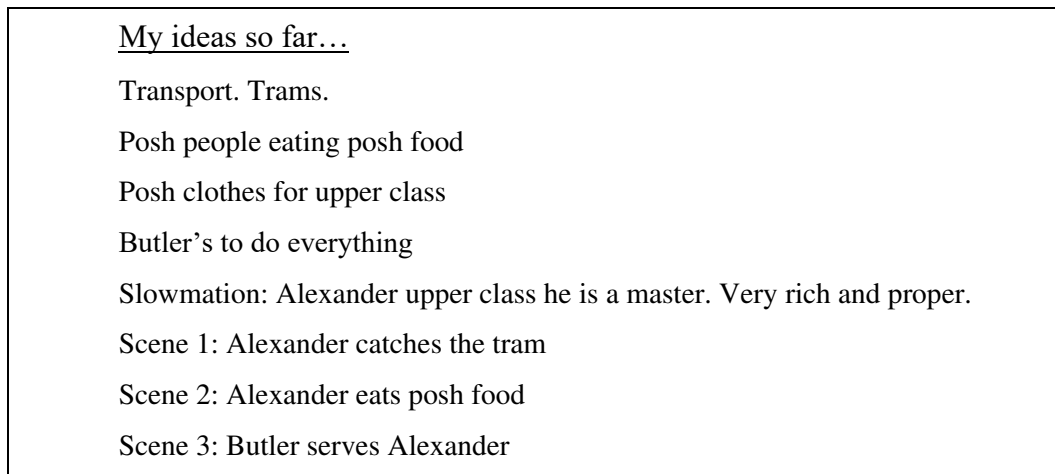
Figure 4.5   Charlie's Plan for Second Blended Digital Media Assignment

In contrast, interview data indicates that he did not write a plan for his first blended digital media assignment, but rather gathered and organised his ideas by capturing and editing images and videos:

> I didn't write anything down it was just in my head so I didn't have to. I thought about things and then I just went around and took photos and videos of them… I had to go through them all and decide which ones to use and I deleted a lot (BDM1SI: 17/09/13).

Charlie's Digital Media-Making Skills

This section investigates the skills Charlie used to create digital media assignments so as to identify the extent and role of his written, oral, visual and digital literacies across each task.

Writing Skills. Evidence of Charlie's writing skills supporting his planning, organisation and communication of ideas, and acting as a support for his narration is demonstrated by work samples and observational data relating to his digital media-making experiences. Work samples in the form of planning notes (e.g. storyboards and scripts) and digital media show that writing was a key component of organising his ideas in the design of different digital media assignments. For example, for his podcast, as shown by Figure 4.1, he typed his ideas into a document. Similarly, Charlie was

observed to brainstorm ideas (DS1: 03/06/13) and create a storyboard for his digital story that consisted of sentences typed under images in a word document as shown by Figure 4.3. Observational data also revealed that while his involvement in planning for the creation of a slowmation was minimal, he contributed in the form of writing stage directions:

Charlie: I know Riley, how about I add the actions after your bits of what the actors are doing

Riley: Well ok but they can't be silly ones because you have to be serious... we will need a lot

Charlie snatches keyboard from Riley and starts typing stage directions. (SL1: 12/08/13)

Further, observation transcripts show that he documented a draft written plan of his ideas for the creation of his second blended digital media assignment as shown by Figure 4.5.

Data revealed that Charlie's writing was sometimes used to guide his narration of digital media. While Charlie did not read his written notes word-for-word, observations indicated that he referred to his written notes as a guide when recording a narration for his podcast (PL2: 08/05/13) and digital story (DS3: 05/06/13). Evidence of this is supported by work samples as the transcript of his podcast shown by Figure 4.2 bares strong resemblance to his written notes in Figure 4.1. Similarly, the language of the transcript of his digital story as shown by Figure 4.4 closely aligns with the language documented by his storyboard in Figure 4.3.

Charlie's use of written language in both of his blended digital media assignments revealed that an additional function of his writing was to label images and communicate ideas that were not represented by images, video or voice. For example, in his first blended digital media, as shown by Table 4.3 he used the drawing tool to create a title for his assignment "My Interests", and to express his interests with words including "I like movies", "I like making movies" and "These are videos of my brother". It can be seen that this use of written language serves to label, clarify and complement meaning communicated by images, videos and audio. In contrast, Charlie's use of written language in his second blended digital media appeared to act as a vehicle for representing the passing of time and storytelling: "Earlier that same day", "Ten minutes later", "Same place 13 minutes later".

Visual Literacy Skills. Observational, interview and work sample data relating to Charlie's visual literacies reveals that his use of images and videos served a range of functions including supporting his organisation of ideas, and written and oral communication. Field notes reveal that Charlie gathered images to organise his ideas in the design of a storyboard for his digital story. He was observed to use Creative Commons to filter image search results, save 10 images to his computer, and import these into a storyboard.

> Charlie types "friendship" into the search tab of Creative Commons, selects Google Images and scrolls through the image results. Charlie clicks on a cartoon image of two friends, selects "view image", right clicks on the full-size photo and selects "save picture as" from drop-down menu. Charlie selects the desktop for the image location and clicks "save". Charlie opens storyboard document, selects "insert picture" and imports the image into the document. Charlie returns to the Creative Commons search engine and types the word "friends" into the search bar… *(Field notes, DS1: 03/06/13)*

Similarly, interview data indicates that the gathering of images and videos guided the plan of Charlie's first blended digital media assignment. Charlie explained that planning for the production of his first blended digital media involved capturing images and videos to represent his interests and later deleting and editing footage so as to filter a selection of digital content to be included in the final product:

> I didn't write anything down it was just in my head so I didn't have to. I thought about things and then I just went around and took photos and videos of them… I had to go through them all and decide which ones to use and I deleted a lot (BDM1SI: 17/09/13).

Data suggests that Charlie's visual literacy skills supported his writing. Evidence of this can be seen by comparing his written ideas before and after he gathered images for inclusion in a storyboard for his digital story. Observations indicate that he proceeded to rearrange and elaborate on the information he had initially written after importing images into his storyboard. As shown by Table 4.5 it can be seen that there was an increase in the detail and sophistication of written expression since gathering images. Such an increase supports claims that the storyboard (in particular the use of images) helped scaffold his written expression.

Table 4.5

Charlie's Digital Story Ideas Before and After Gathering Images

Ideas Before Images	Ideas After Images
- Friends can cheer you up. - They can play games with you. - They stop you from feeling lonely. - Friends socialise and help you with company	- Friends are very good pick-me-ups. - Friends are even also very helpful when you need cheering up. - Friends can help you out when you have a problem and you don't know what to do. - Friends can socialise really well with you and you can share common interests with them. - Some of the things that I like are chess, fishing and trading card games. Especially Yugio. I also really love monopoly if anyone wants to play with me. - Friends can make sure you don't feel lonely at all and can also be good company. - But friends also like to have lots of hugs and appreciation once in a while or every day - And that's why friendships are important.

Just as Charlie's visual literacy skills may have supported his writing in the creation of a digital story, data indicates that such skills may have similarly guided his oral narration skills. Evidence of this is multifaceted and demonstrated by a range of observations pertaining to the nature of his recorded oral narration for a digital story and both blended digital media assignments. One observation that indicates his visual literacy skills may have supported his digital story narration is that as shown by the transcript of his oral narration (Figure 4.4) his language is conversational and delivered in a way that talks to the pictures and directly addresses the audience. For example, unlike was written in his storyboard, when recording an oral narration, he expressed:

> …Take a look at these two cookie pictures and you will know what I mean… Take a look at this Lego head for example… The next picture you will see a cat going to a birthday party… What you are about to see is my final picture… *(Excerpts from Charlie's Digital Story Transcript- see Figure 4.4).*

Data indicates that Charlie's visual literacy skills may have supported his oral narration of both blended digital media assignments. In support if this claim, evidence gathered from observations and work sample shows his use of image/video and verbiage mirrors each other. As Charlie did not have a written script of storyboard for either of these assignments data revealed that his narration in each instance relied on orally explaining images and videos as they appeared on the screen. As is consistent with the conversational tone of his digital story narration, the narration of his first blended digital

media similarly addressed the audience a "you" and directly addressed visual media as it appeared on screen with comments such as "Here are some videos of me and my carer…" (Excerpt from Charlie's First Blended Digital Media Transcript- see Table 4.3). Similar language is also evident in the transcript of his second blended digital media assignment: "…Here is a picture of an old 18th century tram… Here is a posh person eating… Here is a video all about a tram…" (Excerpts from Charlie's Second Blended Digital Media Transcript- see Table 4.4) Further, the narration of his second blended digital media assignment indicates that the use of images and video enabled Charlie to improvise dialogue for each of the characters as field notes reveal there was no script but rather Charlie spoke to the media as it appeared.

> Charlie is looking at the image of the food scene and speaking off the top of his head into to computer microphone. As the slowmation scene plays he takes on the role of the characters and improvises speaking. The images play too fast while he records narration so he stops and deletes recording, edits stop-motion image frame-speeds and attempts recording narration a second time. *(Field notes, BDM23: 17/10/13)*

Observational data and work samples indicate that while Charlie's use of images supported his oral and writing skills, on occasion, as was the case when making a digital story the images also served as a distraction. This is evidenced by the inclusion of images that did not appear to relate to the arguments that he proposed in his digital story narration. An example of this is his inclusion of an image of a dog for his final picture. Charlie's digital story narration for this image makes no reference to friendship: "What you are about to see is my final picture which is of a very cute dog. It is very cute I know" (DS3: 05/06/13). Further, during a post-task interview Charlie's explanation of his use of this image indicates that he was aware it did not relate to his story but that he deliberately included it regardless: "I just randomly chose it… I don't know how it fits but don't you think it's cute?" (DSTI: 06/06/13). As this image lacked relevance to the task it can be viewed as a potential distractor that has the power to inhibit Charlie's capacity to stay on task and stick to the topic. Nevertheless, his inclusion of such an image may further demonstrate awareness of audience. It is possible that he was aware that his digital story was a unique platform and opportunity for sharing information (such as the dog picture) with others.

> *Oral skills.* An analysis of instances where Charlie was shown to be employing oral skills throughout the creation of digital media assignments reveals that on occasion

he was able to express more information verbally than written in his notes, he was self-conscious about the sound of his voice, and he both demonstrated and lacked confidence sharing oral narrations with others in certain situations. Evidence that he expressed more information orally than through writing as gathered from transcripts of observational data and work samples can be seen in Table 4.6. This table compares information that Charlie was able to communicate in a written form and in the form of a practise and official podcast. Bolded writing indicates new information that was orally expressed but not recorded in a written form.

Table 4.6

Facts Expressed in Writing, Practise & and Recorded Podcasts

Facts in written response	Facts in practise podcast	Facts in recorded podcast
1. Became the Emperor of Japan on December 25 (Christmas Day), 1926.	1. Became the Emperor of Japan on December 25 (Christmas Day), 1926.	**1. Japanese emperor 124**
2. His leadership style was authoritarian.	2. His leadership style was authoritarian.	2. Became the Emperor of Japan on December 25 (Christmas Day), 1926.
3. Authoritarian means favoring or enforcing strict obedience to authority, especially that of the government, at the expense of personal freedom.	3. Authoritarian means favoring or enforcing strict obedience to authority, especially that of the government, at the expense of personal freedom.	3. His leadership style was authoritarian.
4. Hirohito's goal was to control the pacific and the world.	4. Hirohito's goal was to control the pacific and the world.	4. Authoritarian means favoring or enforcing strict obedience to authority, especially that of the government, at the expense of personal freedom.
5. He wished for Japan to remain independent.	5. He wished for Japan to remain independent.	5. Hirohito's goal was to control the pacific and the world.
6. Hirohito was with the Axis powers.	6. Hirohito was with the Axis powers.	6. He wished for Japan to remain independent.
7. Communicated to the Japanese through speeches, talks, radio, by force etc.)	**7. Germany's, Adolf Hitler and Italy's, Benito Mussolini were also with the Axis powers**	7. Hirohito was with the Axis powers.
8. He broadcasted via phonograph.	**8. Hirohito was just one of 125 Japanese emperors.**	8. Communicated to the Japanese through speeches, talks, radio, by force etc.)
9. Some of his recordings were smuggled out.	**9. The current Emperor is Akito**	9. He broadcasted via phonograph.
	10. Communicated to through speeches, talks, radio, by force etc.)	**10. Back then there were no screens just audio and sound.**
	11. He broadcasted via phonograph.	11. Some of his recordings were smuggled out.
	12. Some of his recordings were often smuggled out.	**12. Recordings were smuggled out very often back then.**

Table 4.6 reveals that Charlie orally expressed more information about Japanese Emperor Hirohito than he did in a written form. For example, Charlie's podcast explained that Hirohito was the 124th Japanese emperor and that during the time he was leader there were "no screens just audio and sound" and "recordings were smuggled out very often back then". None of these facts were written in Charlie's notes. Rather, this information was recalled from his prior research of the field.

As was the case with Charlie's design and creation of a podcast, he orally expressed more information in the oral narration of his digital story than the written language of his storyboard and brainstormed notes. The script of his digital story narration in Table 4.7 shows this. The bolded sections indicate comments that he made in his narration that were not written in his storyboard notes.

Table 4.7

Ideas Expressed in Digital Story Writing and Oral Narration

Written Notes (Storyboard)	Oral Narration
Friends are very good pick-me-ups. Friends are even also very helpful when you need cheering up. Friends can help you out when you have a problem and you don't know what to do. Friends can socialise really well with you and you can share common interests with them. Some of the things that I like are chess, fishing and trading card games. Especially Yugio. I also really love monopoly if anyone wants to play with me. Friends can make sure you don't feel lonely at all and can also be good company. But friends also like to have lots of hugs and appreciation once in a while or every day. And that's why friendships are important.	**Hello my name is Charlie and I'm going to teach you why friendships are important.** Friends are very good pick-me-ups. **But did you know that** friends are even also very helpful when you need cheering up. **Take a look at these two cookie pictures and you will know what I mean.** Friends can **even** help you out when you have a problem and you don't know what to do. **Say you are trying to create the umm what was it called again? Ah yes… the jigsaw of life but you need friends to help put all of the pieces together. Otherwise it will all end up in just one big mess.** Friends can socialise really well with you and you can share common interests with them. Some of the things that I like are chess, fishing and trading card games. Especially **one called** Yugio. I also really love monopoly if anyone wants to play with me **and besides you really need help playing with friends.** Friends can make sure you don't feel lonely at all and can also be good company. **Take a look at this Lego head for example; he is scared that he is going to be on his own but the next picture you will see a cat going to a birthday party. He's holding a balloon in one hand, an ice-cream in the other, a horn in his mouth and a hat on his head.** But friends also like to have lots of hugs and appreciation once in a while or every day **just like this chimpanzee and snow tiger. What you are about to see is my final picture which is of a very cute dog. It is very cute I know.** And that's why friendships are important.

When recording his digital story narration observations suggest that Charlie was able to 'talk to the images'; that is, he elaborated the arguments and provided examples that strengthened his case. For example, Charlie referred to a picture of two cookie cartoon figures holding hands as evidence to support his argument that friends cheer each other up: "Take a look at these two cookie pictures and you will know what I mean" (DS3: 05/06/13). Further, Charlie used the image of a sad Lego face to support his argument that friends "can make sure that you don't feel lonely": "Take a look at this Lego head for example; he is scared that he is going to be on his own" (DS3: 05/06/13). Charlie also referred to an image of puzzle pieces to make the analogy of friends being able to help put things together and keep things in check:

> Say you are trying to create the umm what was it called again? Ah yes… the jigsaw of life but you need friends to help put all of the pieces together. Otherwise it will all end up in just one big mess (DS3: 05/06/13).

Findings suggest that a primary reason for not wishing to listen to or review his narrated digital media was his dissatisfaction with the sound of his voice. For example, observational data revealed that after Charlie recorded his podcast he did not want to listen to it or review it. Nor did he wish to share it with the class, becoming visibly distressed at the idea of listening to his voice as evidenced by the following excerpt of transcribed observational data:

Researcher:	Do you want to hear it?
Charlie:	No, I'm a bit nervous
Researcher:	Really? But it's really good
Charlie:	(Puts fingers up to ears)
Researcher:	You're welcome to listen to it, record it again, make changes or leave as is.
Charlie:	(Shakes his head) No
Researcher:	You don't want to hear it?
Charlie:	Noooo! I just don't feel like it. I saw it recording. I already know I did it
Researcher:	Why don't you want to listen to it?
Charlie:	I'm a bit nervous that I may have a squeaky voice. (PL2: 08/05/13)

It is possible that Charlie did not wish to listen to his recording or share it with others because of his awareness of his voice quality, in particular, his flat monotonous speech patterns. This is supported by his comment during a post-task interview that indicated

he did not like the sound of his voice: "In the podcast I sound terrible". It is perhaps also for this reason that Charlie requested that his partner Riley narrate the slowmation task:

Charlie:	I'm not speaking for it. You can do it Riley
Riley:	But there are lots of Characters you have to speak
Charlie:	I have changed my mind it will sound better if you do it
Riley:	Fine then so I just do everything all the time

Riley takes iPad off Charlie and starts recording narration. Charlie observes. (SL2: 13/08/13)

Despite refusing to listen to his podcast narration, Charlie was observed to listen to his digital story narration during editing. Specifically, observation videos show that Charlie viewed and listened to what he had created several times and made adjustments to the images including rearranging their order and changing the frame speed of images to align with the narration: "Charlie is practising reading his script quietly to himself and pausing to alter the frame speed of images accordingly before beginning to record his narration" *(Field Notes, DS3: 05/06/13)*.

Observations also reveal that Charlie reviewed and re-recorded his digital story narration multiple times. Unlike was the case with recording audio for his podcast after the first attempt; field notes reveal that recording a digital story narration took Charlie multiple four attempts (DS3:05/06/13). Charlie similarly listened to the recording of his narration for both blended digital media tasks to ensure that it was matched to the images and videos used.

Despite not narrating his slowmation or wishing to share his podcast with the class, there were instances where Charlie was observed to show confidence in his speaking skills. For example, as revealed by field notes, when reading out his slowmation script to the class Charlie appeared confident as demonstrated by his smile, laugh, bow and "thank you".

Riley requests that he and Charlie act out their script to the class. The teacher projects their script on the interactive whiteboard. Charlie and Ryan stand up at the front of the class and proceed to read their script. Charlie reads dialogue for the Artful Dodger character. As Riley and Charlie read they re-enact the scene. Charlie has a big smile on his face. Charlie acts out grabbing a hankie and running away as Riley chases him shouting "stop thief!" As Charlie run he and Riley laugh. As the class applaud the pair, Charlie takes a bow and says "Thank you very much" *(Field notes, SL2: 13/08/13).*

Charlie's confidence to speak in front of the class contradicts his refusal to listen to his podcast or record a narration for his slowmation because of dissatisfaction with the sound of his voice. Perhaps acting out the scene distracted Charlie from thinking about his voice. Further, it is possible that the idea of recording his voice and listening to such a recording is more confronting than speaking as while he spoke in front of the class he was focussed on what he is saying and doing, thus not appearing conscious of how he may have sounded.

Digital Technology Skills. Interview revealed that after the DMIP Charlie expressed an increase in technology skills fundamental to making digital media. Table 4.8 demonstrates this increase by comparing his digital technology skills for media-making prior to (as represented by red ticks) and after the study (as represented by yellow highlights). This information was gained from pre and post interview and survey data. The table shows that prior to the study Charlie possessed six skills. Specifically, he identified that he was able to use the Internet to research, and was capable of capturing, editing, saving and manipulating photographs, and taking videos. The only skill of the six that he identified as needing help to achieve was saving/importing photos to the computer. Table 4.8 further indicates that Charlie lacked 10 digital technology skills for making media prior to the study. Such skills were primarily concerned with downloading, importing, and editing video and audio data, and combining media using movie-making software.

While initially Charlie only possessed 37.5% of the technology skills identified by the survey, when surveyed and interviewed again after the DMIP he expressed capability in all 16 skills for media-making. Such an increase is more than double the skills he originally possessed prior to the study (62.5% increase) thus suggesting that his digital media-making experiences throughout the study shaped his development of new skills. Further, not only did Charlie express capability in all skills after the study, but also, he reported that he felt comfortable employing each skill independent of the teacher as evidenced by the yellow highlighted boxes in the "I can do this myself" column of Table 4.8.

Table 4.8

Charlie's Digital Technology Skills Before and After the DMIP

Digital Technology skills	I have never done this	I can't do this	I need some help	I need a lot of help	I can do this myself
Internet research					🟨 ✓
Storyboarding/script writing	🟨				✓
Taking photos					🟨 ✓
Saving/importing photos to computer			🟨		✓
Downloading photos from internet	🟨				✓
Editing photos					🟨 ✓
Adding photos to slideshow					🟨 ✓
Taking videos					🟨 ✓
Editing videos	🟨				✓
Saving videos to computer	🟨				✓
Importing videos into movie making program	🟨				✓
Downloading/saving videos from internet	🟨				✓
Recording voice	🟨				✓
Saving voice recording to computer	🟨				✓
Import sound into movie making program	🟨				✓
Combine photos & videos using Movie Maker	🟨				✓

Key: 🟨 = Before DMIP; ✓ = After DMIP

Data revealed that there were instances where Charlie sought to extend his newly acquired digital technology skills and apply them outside of the DMIP thus strengthening the reflective claims of skill acquisition outlined by Table 4.8. Specifically, on two occasions observational data captured situations where his skills had applicability and were transferrable to experiences outside of the DMIP. For example, observational data revealed that after saving his podcast Charlie asked the researcher to teach him how to attach it to a slideshow, as he wanted to make a PowerPoint presentation about Hirohito in his own time and include his podcast. He then proceeded to show the researcher a series of images he had saved from the Internet that he could use in his PowerPoint slides.

    Charlie: Excuse me but can I put it on a slide?

    Researcher: A disk?

    Charlie: No a slideshow on the computer

    Researcher: Why would you do that?

Charlie:	I just want to make a slideshow about everything I have done and I can put the podcast in it at the end
Researcher:	You can do that if you like but its not necessary for your assignment
Charlie:	Yes I know but I would like to do it… can you show me how to put it in?
Researcher:	Yes that is fine. It is a similar process to adding images to slides. Do you know how to do that?
Charlie:	Yes I do that all the time I have pictures I want to put in it too

Charlie shows researcher the images he wants to import and the researcher proceeds to demonstrate how to import audio into a PowerPoint slide (PL2: 08/05/13)

Charlie's interest in wanting to create a PowerPoint presentation in his own spare time may reflect that he was interested in the topic. Further, the fact that he wanted to include the podcast in his presentation may indicate that he saw value and purpose in what he had created even though he did not wish to listen to it or share it with the class. It is also possible that he saw the limitations of merely expressing information in a written and/or spoken way. The creation of a PowerPoint enables the inclusion of images and it is possible that he preferred such a task as it appeals to his familiarity with visual modes of communication.

Charlie's level of engagement with creating a slowmation as part of the DMIP and the skills that he gained from this experience are further demonstrated by his decision to create a storyboard for his own Lego stop-motion animation about Oliver Twist and download the MyCreate app on his personal iPad to produce it (without narration) at home. This information was revealed during an interview that took place after the production of his slowmation:

I wanted to do one completely out of Lego so when I got home I got mum to let me buy the app and I set up the scenes and took the photographs and put it at about 3 frames per second (SSI: 15/08/13).

During the same interview Charlie showed the researcher what he had created. The stop-motion was not narrated. Charlie explained: "It doesn't needs words because you can see what is happening" (SSI: 15/08/13). When asked about the process that he engaged with in the making of this animation he showed the researcher his notes as shown in Figure 4.6. As can be seen in this figure Charlie intended to animate a variety of scenes. When interviewed he explained: "I have only done the first couple of bits but

I am going to do slowmation for all of the bits (points to notes) eventually. It just takes a bit of time" (SSI: 15/08/13).
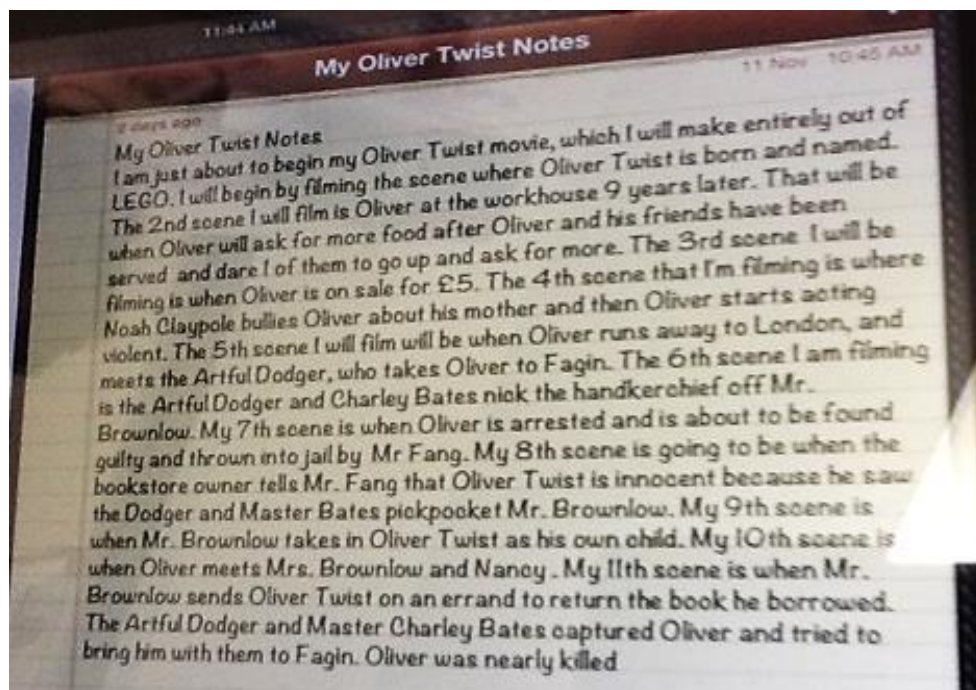
Figure 4.6   Charlie's Homemade Slowmation Notes

The fact that Charlie made his own animation after his assignment demonstrates that he was able to apply his newly gained animation skills outside of the DMIP. It may also indicate that he was engaged with the process. Each of these examples of digital technology skill application external to digital media assignments strengthens claims of Charlie's skill acquisition and alludes to evidence of deep learning as defined and measured by the application and transferability of new skills in different contexts.

In summary, data presented thus far answers research question one with respect to Charlie. It has presented evidence that he was able to create a progressive suite of digital media forms. While he was able to create his own podcast, digital story and 2 blended digital media assignments independent of direct teacher instruction, he experienced difficulty working alongside his peer Riley to co-construct a slowmation and withdrew his participation and interest, allowing Riley to complete most of the work. Data show that in creating digital media assignments Charlie employed a range of written, visual and oral skills. Both written notes and visual media equally supported his planning and organisation of ideas for each assignment, but on occasion visual media appeared to distract him from his work. Further unlike his peers, when it came to recording a narration for his assignments Charlie expressed a strong dislike for the

sound of his recorded voice and refused to listen to or review the narration that he recorded. Charlie utilised a variety of digital literacy skills and gained new skills in this field since the DMIP. Evidence that these skills were transferrable to other contexts outside of the DMIP were demonstrated by his capacity to attach a podcast to a PowerPoint presentation and create his own stop-motion animation (without narration) at home. The following section explores Charlie's multimodal awareness. Specifically, it investigates his awareness of modal affordances and multimodal design of two blended digital media assignments.

2. Charlie's Multimodal Awareness

Pre and post study interview data were compared and triangulated with ongoing observational, work sample and interview data concerning Charlie's digital media-making experiences to address research question two regarding his multimodal awareness. Analysis of data revealed Charlie demonstrated a developing awareness of modal affordances and was able to purposefully combine and justify his use of a range of modes to communicate meaning in the form of two blended digital media assignments. Evidence of his capacity to articulate modal affordances and design blended digital media assignments are reported as follows.

Charlie's Awareness of Modal Affordances

Data indicate that by the end of the DMIP Charlie was able to articulate the different features and processes of the digital media forms he created, and more significantly, he demonstrated a developing awareness of modal affordances. Table 4.9 includes excerpts from interviews with Charlie following the creation of each digital media assignment, dialogue from digital media-making observation transcripts, and responses during a final interview as evidence of his capacity to identify and explain modal affordances. As Table 4.9 shows, he was able to articulate why certain modes including oral narration, images (still and slow-moving), video, written language and symbols were more suited to different communicative purposes than others in the making of his digital media.

Table 4.9

Charlie's Awareness of Modal Affordances Throughout and After the DMIP

Modes	Explanation of Modal Affordances
Oral narration	• "Well a podcast is just your voice… (PSI: 11/11/13) • "The words explain it, they narrate what you want to say" (PSI: 08/05/13) • "I was trying to describe my interest in Yugio with what I was saying" (BDM1SI: 17/09/13)
Still images	• "…a digital story is your voice and pictures…" (PSI: 11/11/13) • "digital story was basically just sound and pictures" (PSI: 11/11/13) • "The pictures say different things…I prefer to explain with pictures…well pictures are a good way of letting the audience know about what is important to you" (BDM1SI: 17/09/13) • "The photos add ways of knowing what you like" (BDM1SI: 17/09/13) • "…photos helped me think of what to say" (BDM1SI: 17/09/13) • "I prefer a digital story instead of the podcast because there are pictures… and only a voice - that's a bit rubbish" (PSI: 11/11/13) • "… a photo is freeze still" (BDM1SI: 17/09/13) • "This picture is frozen so you can see it not moving" (BDM2SI: 21/10/13)
slow moving images	• "The animation had 161 pictures- a lot more than the digital story" (SSI: 15/08/13) • "Well in the digital story I chose my own pace for the pictures but in the stop-motion it was frames per second" (SSI: 15/08/13) • "The slowmation has lots and lots of pictures and you can make them into a video" (SSI: 15/08/13)
Video (fast moving images)	• "…well the point is you can't take a picture of something moving when you're going somewhere" (BDM1SI: 17/09/13) • "…well its action detail so in my case you can't take a photo of action detail so why not try a video…photos are for things that are regular and video is for things with action" (BDM1SI: 17/09/13) • "…the video shows the tram speed and its action" (BDM2SI: 21/10/13) • "I chose video to show him moving not standing still… it wouldn't be funny if it was just a picture. The video shows dancing but a photo is freeze still" (BDM1SI: 17/09/13) • "I figured for this that pictures wouldn't be enough so I decided to add two videos at the same time" (BDM1SI: 17/09/13)
Written language (scripts & captions)	• "The words tell the viewers what the clips are all about" (BDM1SI: 17/09/13) • "You need to make a script because you need to figure out how your stop-motion is going to play out…" (SSI: 15/08/13) • "I chose to write it there on the pictures so you know what it's about" (BDM1SI: 17/09/13)
Symbols	• "Arrows are for pointing" (PSI: 11/11/13) • "…the arrow is pointing at the pictures" (BDM1SI: 17/09/13) • "The arrows point to each of the films" (BDM1SI: 17/09/13) • "I thought that putting in arrows would help me… help me explain my interests… the arrow is pointing at the pictures" (BDM1SI: 17/09/13)

Charlie's comments about oral narration suggest awareness of the affordance of such a mode to provide an explanation. Further, his comments about the use of images in digital media suggest an awareness of the affordances of image as a mode. For example,

his comments suggest awareness of the affordances of images to: communicate information visually in a way that other modes cannot; demonstrate and/or complement other modes (e.g. spoken or written language), prompt ideas/narration; and make information clearer. Charlie's interview responses indicate that he was able to identify the difference between the affordances of different types of images (e.g. still and slow moving) in that still images capture static objects, but slow-moving images provide the illusion of movement like video. He was also able to discriminate between the affordances of video and image identifying that the affordance of images capturing static objects/scenes differs to the affordance of video capturing movement and action. Charlie's comments in Table 4.9 also indicate that he was aware of the affordance of written language to help organise information in the form of a script or storyboard and as a means of clarifying and/or adding additional information to images, video and voice. The use of symbols as a means of pointing out certain aspects of images, video and written language was also an affordance identified by Charlie as demonstrated by his comments in Table 4.9.

Charlie's Multimodal Design

For the purpose of the research it was decided to focus on data gathering for Charlie's blended digital media assignments to explore his application of modal awareness in combining different media forms. Data revealed that after making a podcast, digital story and slowmation, Charlie was able to combine a range of modes fundamental to each of these digital media forms so as to produce blended digital media. Interviews following each of his blended digital media assignments demonstrated his capacity to justify his combination of different digital media (e.g. slowmation, digital story, video) and use of multimodal communication (written language, still images, slow-moving images, video, voice narration, symbols etc.). His purposeful decision-making was also demonstrated by his ability to articulate the relationships between different modes and media combinations. Charlie appeared to be aware of the modes he used in each of his blended digital media tasks as evidenced by his reflection after the study: "Well I used pictures, words, arrows and videos as well as narration" (PSI: 11/11/13).

The following two tables provide insight into the decisions that Charlie made regarding ways to communicate meaning through combining different digital media forms. Table 4.10 shows Charlie's explanation of media use for his first blended digital

media task about his interests. As can be seen in this table, he combined the media forms of podcast, digital story and video and in doing so communicated meaning through use of the modes of written language, still images, symbols (arrows), voice narration, and video. As evidenced by his responses during an interview about his blended media, his use of modes was purposeful and reflects knowledge of the features of different media and an awareness of modal affordances.

The "Explanation of Design" column in Table 4.10 shows Charlie's explanation of each section of his first blended digital media assignment. Comments that refer to specific reasons for the use of modes are highlighted in yellow and are brought together in the column entitled purpose. The data from this table reveal that his selection and use of images was intentional and included as a means of visually representing different interests. For example, as shown in Table 4.10 Charlie acknowledged that the opening image of the dog was intended to represent his interest in his dog, that the images of books were representative of his favourite books, and that he included pictures of movies to represent his interests in specific movies. He was also able to articulate that he chose specific images to help him explain his interests thus suggesting an awareness of the need for the modes of voice narration and image to complement one another in communicating meaning.

Charlie's awareness of the affordances of such images are realised in his capacity to justify why he used images instead of video to communicate certain interests and his explanation of the inadequacy of alternative modes to achieve his intended purpose. Charlie was able to reason that images capture still objects and are thus better suited to representing his interests in books, movies and cards. He was also able to explain his organisation of images. For example, he explained that he decided to put the image of a Lego book and Mask DVD side-by side in one frame for two reasons: (i) to show his favourite book and movie at the same time, and (ii) because he was unable to fit seven images in one screen.

Charlie's awareness of the modal affordances of video were demonstrated by his ability to reason that unlike images, videos show movement and are thus better suited to showing actions such as playing cards and dancing. He was also able to identify that video was better able to communicate humour as images could not have captured the humourous nature of the way that his brother dances like video could: "I chose video to

show him moving not standing still… it wouldn't be funny if it was just a picture. The video shows dancing but a photo is freeze still" (BDM1SI: 17/09/13).

Charlie's interview comments show an awareness of the power of the mode of speech to communicate meaning. On various occasions he expressed that his narration helped explain his images. Further, he identified that he deliberately muted the sound when capturing videos with the aim of narrating an explanation as a separate media file instead: "Well I didn't put the sound on so I could talk about it later…" (BDM1SI: 17/09/13).

Charlie explained that his use of written language, as was the case with his audio narration, was included as a means of complementing images and video content. He explained that he included written language to both reinforce and explain the significance of certain aspects of his interests that may have otherwise been unclear to viewers if only depicted through image or video. Nevertheless, on one occasion Charlie solely used written language as an alternative visual mode to an image or video to represent his interest in making movies. He included a slide that read: "I like making movies". He explained this decision was motivated by his want to share this interest but his lack of access to an appropriate image or video to support his spoken explanation.

Charlie also explained his use of arrows in various parts of his blended digital media. His comments reveal that the arrow symbols served a similar purpose to written language in that it was used to clarify meaning represented by images and videos. He explained that he decided to position arrows pointing to different visual media as a means of drawing the viewers' attention to specific ideas and complementing information that was communicated orally by the narration.

Table 4.10

The Multimodal Design of Charlie's First Blended Digital Media Assignment

Media	Modes	Explanation of Design	Intention & Purpose
Digital Story	• Writing: My interests • 4 images • 1 arrow (pointing to images) • Voice narration	"Well basically I love my dog Nate which is why I decided to put all of the pictures of him in it…wait do you like dogs?" "I felt that taking pictures of my dog would help explain my interest in my dog…" "Well he wouldn't stand still for a video and I would have to keep following him…why photos are much better because if I take a video he will never stand still" "I thought that putting in arrows would help me… help me explain my interests… the arrow is pointing at pictures coz I like dogs"	• To show what his dog looks like • To represent his interest in his dog • Because it captures him still • Video not suitable because of movement • Arrows used to point to images & support explanation
Digital Story	• Writing: Dark Magician • 2 images • Voice narration	"I don't know I just think that a picture would be nice… I like playing trading cards games and this helps me explain it…."	• Pictures support spoken explanation
Digital Story	• 2 images • Voice narration	"I just put them together… They were separate photos didn't you see that bit cut out? I just thought I could show my favourite movie and my favourite book" "Oops I forgot to mention the video in that bit I just said about the books" "I couldn't add all seven of them (favourite videos) on the one screen"	• To visually show favourite movie and book alongside one another • Two images chosen as seven would not fit on screen • Audio to complement image (awareness of gap in audio explanation)
Digital Story	• Writing: I like movies • 6 images • Voice narration	"There's six of them well I just thought I would add six movies I am interested in but two of them are actually tv shows…" "I like movies that's why I chose to write it there on the pictures so you know what it's about"	• Images represent six movies that Charlie is interested in • Writing to reinforce that Charlie likes movies • Writing to explain the significance of images

Video of Charlie and friend playing cards	• 2 videos (side by side) • Voice narration	"That's my carer… I figured for this that pictures wouldn't be enough so I decided to add two videos at the same time….well I didn't put the sound on so I could talk about it later…" "I figure that I can do more than just the pictures if I can add videos too…well pictures would be just standing still and when you are describing something moving that doesn't help" "I was trying to describe my interest in Yugio with what I was saying- see that is me playing it with my carer"	• Chose to mute video sound with intention of explaining video content using oral narration • Use of video as images are not sufficient/suited • Use of videos to capture movement • Use of narration to explain interest in Yugio • Use of narration explain/complement videos
Digital Story I like making movies!	• Writing: I like making movies! • Voice narration	"Well I like making movies and that's why added words in. I made it myself… I just thought it would be a good idea because I didn't have a photo of the movie competition"	• Writing used to represent that Charlie likes making movies • Writing used as an alternative to image as an appropriate image was not accessible
Video	• Writing: These are videos of my brother • 5 videos • 5 arrows (pointing to videos) • Voice narration	"Well my brother is a bit funny so I thought I would show a few video clips of him dancing to a song. I chose video to show him moving not standing still… it wouldn't be funny if it was just a picture. The video shows dancing but a photo is freeze still" "The arrows point to each of the films… these are all of the videos of my brother dancing and it tells that… "The words tell the viewers what the clips are all about"	• Use of video to communicate humour • Use of video to show movement (dancing) • Use of arrows to point to videos • Use of writing to explain nature of videos

Unlike Charlie's first blended digital media task, his second attempt added the digital media form of slowmation to communicate what life was like in the 18th century Victorian era. Hence, as can be seen in Table 4.11, his second blended digital media included a combination of podcast, digital story, video and slowmation. While Charlie did not use written language or arrows to communicate meaning in his second blended digital media as he did his first, he similarly communicated meaning using the modes of

still images, slow-moving images, video, and voice narration. Table 4.11 shows excerpts from Charlie's post-task interview that reflect purposeful combination of media forms and use of modes to communicate meaning. The yellow highlighted written language in the "Explanation of Design" column of Table 4.11 indicates Charlie' intentions and specific purposes for meaning making. These comments were used to identify points in the purposeful communication column. For example, his comment that he designed his slowmation character to reflect "he is from the upper class" indicates a purposeful intent to visually represent clothing from the Victorian era. Charlie's justification of including an image of a tram in the second scene because he could not draw it and wanted to show it "frozen so you can see it not moving" (BDM2SI: 21/10/13) similarly demonstrates that such a modal choice was deliberate and reflective of an awareness of the modal affordance of an image to visually depict something in a still form. Comparably, his comments about including an image of a painting in scene four of a man eating demonstrates his knowledge of the capacity of an image to provide a visual means of communicating meaning in ways that other modes cannot. Charlie explained that he chose the image because it more realistically represented a scene from the 18th century than his slowmation: "this is more real of what they ate than the stop-motion and makes it…it makes more understanding…" (BDM2SI: 21/10/13).

Charlie's justification of the use of slowmation reveals his decisions were based on what was accessible and communicated meaning in the clearest and most practical way. For example, he explained that he chose slowmation because he likes it and that he would have potentially acted out the scenes as a movie but as he lacked the costumes it was easier to animate each scene with paper characters. Charlie's comments about the use of slow-moving images and character dialogue enabling inanimate characters to move: "I had to make it look like he was on the tram" (BDM2SI: 21/10/13) and facilitating the telling of a "story" further reveals deliberate design choices with the intention of optimally communicating meaning.

As is consistent with the other design choices made by Charlie, his use of a video in the final scene of his blended digital media reflects deliberate selection of media to communicate meaning. He explained that ideally, he would have liked to include authentic video footage from the 18th century but as this was not possible he chose modern footage a tram with the intention of showing how it moved. In his

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justification of the inclusion of this video, Charlie demonstrated awareness of the affordance of video to visually communicate movement: "the video shows the tram speed and its action" (BDM2SI: 21/10/13).

Table 4.11

The Multimodal Design of Charlie's second Blended Digital Media Assignment

Media	Modes	Explanation of Design	Intention & Purpose
Slowmation	• Slow-moving image • Voice narration	"That's my character in a Victorian era. As you can see he is from the upper class that's why he is dressed so posh with a vest, top hat, boots. That's how they dressed up back then…I print out the pictures from internet and cut them out to make the character and of course there's my face on the character but I called him Alexander"	• Chose outfit to show what people wore in Victorian era
Digital Story	• Still image • Voice narration	"Well I don't think this is actually from the 18th century because they didn't have photos back then. But I am not very good at drawing so I found a picture on the internet of trams… that was the way people got to places in the Victorian era… well the posh people did… I got tram photos and videos but this picture is frozen so you can see it not moving.	• Chose photo because didn't want to draw • Used photo to show still image of what tram may have looked like not moving
Slowmation	• Slow-moving image • Voice narration	"Here is my slowmation again. This bit is funny. Riley let me borrow his character so I made it the Butler. Do you like the bacon and eggs I made? I ripped up the paper into eeny weeny pieces and stuck them together onto little plates. See there's the fork and knife. I had to cut that coz the ripping gets… well I kept breaking with all the tearing" "The animation is to show the scene with a butler. The posh people had butlers that did everything for them. "Well you wouldn't get a video of that on the internet. Anyway I like doing stop-motion and this is me and Riley in the movie. We are like actors… maybe if we had these clothes we could have done a movie with videoing us... that would be super!"	• To show that butlers served posh people • Because he likes stop-motion • To be included as a characters in the movie • Because they didn't have access to costumes to act it out

Digital Story	• Still image • Voice narration	"Here is a posh person eating all types of food including drinking wine. There's even some bread here. I'm not sure what's in the bowl but it looks good". "This picture actually looks like the 18th century. I am not sure if it is a real painting from then but this person would have… they would have rich and posh… look at all of the food. He isn't poor that's for sure." "this is more real of what they ate than the stop-motion and makes it…it makes more understanding… you might now know what they ate and then look there is all the painted foods "	• Because it looks more like a scene from the 18th century than the other media • It shows food that upper class ate • Provides a more visually realistic example of an upper class eating scene than animation
Slowmation	• Slow-moving image • Voice narration	"This bit was tricky because I had to make it look like he was on the tram. I used the duster with three wheels. Blue round ones but really there are more than three I think on the real ones. I will have to look at the video." "…this was the scene where Alex got the tram back coz he got it at the start and now it's the end of the story so he goes home how he started"	• To animate character catching tram • To achieve symmetry/conclude the story
Video	• Video (fast-moving image) • Voice narration	"Here is the video… definitely more than three wheels" "…well I already showed the photo but the video shows the tram speed and its action… I couldn't get footage from the 18th century so this will just have to do but you get the idea… I like the blue tram the best"	• Provide different representation than photo • Video shows tram movement • Unable to get authentic footage

In summary, analysis of data revealed that Charlie demonstrated a developing awareness of modal affordances since the DMIP and was able to purposefully combine and justify his use of a range of modes to communicate meaning in the form of two blended digital media assignments. The following section explores the influences that the DMIP had on Charlie's communication. Specifically, it examines the ways in which his digital media-making experiences supported his communication of ideas and interests, and influenced his social interaction with others.

3. Charlie's Communication

In response to research question three data were analysed to compare Charlie's behaviour across a range of classroom social situations before and during the DMIP. Results indicate that his communication was positively impacted upon since the DMIP. Specifically, evidence suggests that Charlie's involvement in the DMIP facilitated social interaction (e.g. conversations, media sharing, partner work), digital communication and peer interest and feedback. These findings are presented as follows.

Charlie's Social Interaction

Baseline observations of Charlie during regular class time indicate that prior to the DMIP he preferred to work alone. Specifically, Charlie was observed across a range of social settings including regular class and a lunchtime Social Club that provided a news sharing space for students from support classes. In-class observations identified that Charlie worked independently on class tasks and that during free time he preferred to keep to himself with the exception of occasionally joining in a game of chess with another student called Riley. This is evidenced from an analysis of field notes that indicates across a two week period on 33 occasions Charlie chose to participate in solitary activities (primarily computer games) during free time and only twice engaged in a partnered activity in the form of chess. Observations also demonstrate that it was Charlie's peer Riley who initiated each chess game. Further, on four occasions across the two weeks Charlie declined Riley's invitation to play a game of chess and expressed a preference to play a game on his own. Field notes provide a snapshot of the first of these instances:

> *Charlie is playing car game on back classroom computer. He has headphones on and appears very focussed and engaged. Charlie is controlling the cars on the screen by pressing keys on computer keyboard. Riley approaches Charlie's computer holding chess set and ask if he would like to play a game with him:*
>
> Riley: Charlie do you think we could have a game of this now
>
> Charlie: I think…. No… I don't feel like it
>
> Riley: But I don't have anyone to play with.
>
> Charlie: I'm busy
>
> Riley: Oh alright then
>
> *Riley stomps back to desk, puts chess set beside chair and folds arms.* (PCO: 04/02/13)

In contrast to his solitary behaviour during class prior to the study, findings suggest that since the DMIP Charlie experienced unique opportunities for social interaction with his peers. For example, the DMIP slowmation task involved Charlie working with a partner. While field notes and interviews indicate that Charlie experienced difficulty working as a pair (see research question one), results indicate that such an experience facilitated interaction that may not have otherwise occurred if he was working alone. For example, when working on the slowmation partner task he engaged in social interaction related to his shared interest with Riley of trains:

Riley:	Did you know Charlie that Oliver is one of my favourite names?
Charlie:	I wish I was named Oliver
Riley:	Yeah?
Charlie:	But don't ask why. My mum chose Charlie not Oliver…
Riley:	Yes that brings me to another subject. You know James?
Charlie:	Yes I know James. The red train.
Riley:	Well he crashed into a field and in that episode he was actually black before he became red.
Charlie:	Oh I get it when he crashed into a field he went into change colour.
Riley:	But he was black before that
Charlie:	Yes remember the break down episode of Thomas? That was a really useful episode!
Riley:	Yes explain that! (SL1: 12/08/13)

The dialogue above is a short extract from the conversation that took place between Charlie and Riley. Video observations confirm that such a conversation lasted for seven minutes. This interaction demonstrates that Charlie was able to identify a common interest that he shared with Riley and could use the cues of a social conversation to express and share this interest with him. Even though much of the conversation appeared to be one-sided, the language used in the transcribed excerpt above indicates that Charlie made an effort to interact through use of posing questions such as "do you remember…?" and by answering questions posed by Riley such as "Yes I know James. The red train". Charlie also kept the conversation going by using the social skill of rephrasing what Riley had said, communicating his understanding, and reaffirming this as can be seen by his comment "Oh I get it when he crashed into a field he went into change colour."

Baseline data from interviews and class observations revealed that prior to the study Charlie rarely initiated sharing interests and ideas with peers during class. While he did talk about his life and interests in the context of Social Club, such a conversation was often prompted by the teacher and even then he did not appear eager to share such information. Rather, video observational data shows that when talking about himself during Social Club, Charlie's comments were brief and as he delivered them he did not appear excited to share information with others. It was also evident in field notes that even though Social Club involved Charlie speaking to a group of peers, his lack of eye contact and direct engagement with the audience using language (e.g. student names, questions and conversational phrases and tone) made him appear disengaged with the social nature of the setting. Further, he appeared to speak without purpose, out of obligation, and to himself. It was also revealed prior to the study that Charlie's teacher was the primary audience for most class tasks and that Charlie rarely showed his work to peers. A teacher interview revealed that prior to the study on occasion his work was shared with the class because it was a requirement for the task (e.g. a presentation) or it was the teacher's idea:

> Well sometimes I set tasks that involve them presenting to the class so they have to be each other's audience for that… and sometimes if students have done something well I will ask their permission to show it to the class as an example or to build their confidence. But apart from that few students stand up and share something without being asked… Charlie often gets shy about his work being shared and he doesn't initiate it probably because of his shyness (BTI: 25/02/13).

Observations (as previously mentioned) revealed that Charlie did not feel confident with the sound of his voice. This lack of confidence may explain why Charlie felt shy about sharing his work and why during the DMIP he did not want to listen to his podcast or share it with peers. It may even explain why when he did share his digital media he demonstrated signs of embarrassment and shyness. Nevertheless, unlike was the case prior to the study, Charlie initiated the sharing of specific digital media tasks including his digital story, slowmation, and especially his two blended digital media tasks. Despite feeling shy he also expressed pride in his work. While initiating the sharing of his finished media products with the whole class, Charlie's comments to other students and requests made prior to finishing tasks revealed his desire to share what he had created across various stages of the design process as well. For example, Charlie and Riley asked if they could act out their Slowmation script to the class prior to animating:

Riley:	Sir we want to show what we have done so far
Charlie:	We want to act it to everyone and be the characters
Riley:	Yes can we print it out and act it on the stage please?
Teacher:	Yes that would be great. It might give other students some ideas.

Riley and Charlie print out copies of their script, the teacher enlarges script on interactive whiteboard and Charlie and Riley begin to read the dialogue and act out the scenes of their script (SL2: 13/08/13).

Interestingly, Charlie did not appear shy when acting out his script to the class. Unlike other observed instances of sharing his work with the class Charlie did not show signs of embarrassment or concern about his voice. It is possible that his engagement with the task and pride in what he created distracted him from an awareness of his vulnerabilities as a presenter.

Another example of Charlie initiating sharing his work with other students was revealed by observational footage of a lesson during the making of his second blended digital media task. During this task Charlie approached his peer Jack to ask him for his opinion about the animation characters that he had made. It appears that the purpose of such an action may have been reflective of satisfaction with what he had created and the need to seek approval from his fellow classmates. The interaction between Charlie and Jack was documented by the following observational data:

Charlie stops animating his first scene, picks up his character and approaches Jack (Jack is working with another student on his design for the blended digital media task). Charlie interrupts John and his partner Marion:

Charlie:	Jack what do you think of this guy?
Jack:	Cool
Charlie:	I dressed him in upper class clothes doesn't he look great?
Jack:	Yeah. Cool.
Charlie:	I'm putting his in my slowmation and he is going to catch the train I mean the umm the tram... silly me!

Charlie smiles and walks back to his desk to continue animating his scene (SL3: 14/08/13).

This behaviour is out of the ordinary as confirmed by Charlie's teacher who in an interview explained:

I was surprised to see him approach Jack because he often keeps to himself during class tasks and it's not like him to approach other students to share his work or seek feedback

like this so he must be really proud of it. I think the animation stuff is particularly up his

alley (STI: 15/08/13).

Such behaviour supports that making digital media facilitated peer interaction in ways that previous class tasks did not.

Charlie's Digital Communication

An examination of data relating to Charlie's creation of a blended digital media assignment about his interests reveals that digital multimodal communication enabled him to represent and explain 7 interests in a clear and descriptive way. The process of creating a blended digital media involved planning, layering modes and pre-recording and reviewing information before sharing with peers. Such a progression likely supported Charlie in clearly representing and communicating meaning.

Prior to the DMIP, observations of Charlie's communication of interests to his peers in the context of Social Club were recorded. These observations show that his communication of meaning during Social Club was limited in a number of ways and by a range of factors and challenges. His limited capacity to represent and express his interests is shown by the transcribed accounts of two Social Club presentations in Figure 4.7.

Social club observation 1:
"Well on the weekend I played with my Lego and… I don't really remember. I had take away and my brother and I got to well…oh I think that was on Saturday… I'm not sure… Did you know guess what… they are making a Lego movie so it will be like my Lego book but the movie should be great. I can't wait…." (PCO: 04/02/13).

Social club observation 2:
" I have been playing this car game and its very tricky coz you have to be quick but sometimes I can't get it in time. I really love it… I have my YuGhiOh cards to show but I left them at home. They have special properties because my favourite one well my brother has this one that he likes but mine is different coz the Magician is very cool. I don't remember anything else…. I've had enough" (PCO: 18/02/13).

Figure 4.7   Charlie's Explanation of Interests during Social Club

As shown in Figure 4.7, Charlie's expression of interests during each Social Club session was brief. Also, during Social Club Charlie spoke on the spot and because he relied on his memory he occasionally lost his place and forgot his line of thought as evidenced by his comments "… I don't really remember" and "I don't remember

anything else… I've had enough". In contrast to this experience, Charlie had the opportunity to prepare the spoken explanation for his blended digital media task (e.g. script & practise recordings) and took the time to record this explanation. Consequently, making digital media enabled him to express his ideas in a clear structure with topic sentences that ordered and organised information. Further, unlike his communication during Social Club where his expression of interests relied solely on the mode of voice, Charlie's blended digital media utilised a range of modes including voice, written language, image, video and symbols to communicate his ideas. It is possible that a combination of these modes acted as a guide to help him remember and focus on his key points.

As shown by Figure 4.7, when speaking to his peers (during Social Club) Charlie did not provide adequate context for the listener to understand the nature of what he was saying. For example, he started to introduce a new idea but failed to execute it in a meaningful way when he expressed "I got to well…oh I think that was on Saturday… I'm not sure…". Further, he spoke about his car and card games as though the audience was aware of them without providing context to help them understand his interests further: "Sometimes I can't get it in time… the Magician is very cool". In contrast, Charlie's was able to plan his blended digital media and thus review information to ensure the provision of adequate detail and context for a listener to understand. Charlie even directly addressed the audience in his blended digital media with comments like "I know some of you may not like books…"

Interview data revealed that Charlie enjoyed digitally communicating his interests in the form of a blended digital media assignment because: "The pictures say different things…I prefer to explain with pictures…well pictures are a good way of letting the audience know about what is important to you" (BDM1SI: 17/09/13). Further, when asked about his preference for communicating his interests to peers, he explained that he favoured making a blended digital media because "you get to actually see it" and "the photos add ways of knowing what you like" (BDM1SI: 17/09/13).

Charlie's Peer Interest and Feedback

Video observations of Charlie's reaction to viewing the digital media of his peers indicates that he listened and demonstrated interest in digital information communicated by others. For example, after watching a peer's digital story Charlie discovered that he

shared a common friend: "I didn't know you knew Mark from JB Hi Fi he is both a friend to us" (SV: 15/08/13). In contrast, during Social Club observations he appeared disengaged when peers spoke about their interests as demonstrated by a lack of eye contact, swinging on chairs, an inability to repeat what others said, and a lack of comments or questions in response to the shared experience of others (PCO: 04/02/13-18/02/13). It is possible that the visual modes that accompany the oral explanation of digital media forms may contribute to Charlie's enhanced interest.

Data indicate that Charlie was able to offer feedback to his peers upon viewing their digital media. For example, after viewing the animation of a peer Charlie offered positive feedback: "I liked the way you used the Lego like that. It was really funny too with the voices" (SV: 15/08/13). He also posed questions such about a peer's blended digital media such as: "How did you get the video of playing drums on the iPad?" (BDM1V: 17/09/13). It appears that viewing the media of provoked interaction between Charlie and his peers and that he was able to pay attention to information presented enough to learn about his peers. Moreover, he expressed an interest in others and discovered common interests and new skills. In contrast to this experience, observations of Charlie in Social Club situations indicate that he did not appear interested in information expressed mono-modally in the form of speech by his peers (PCO: 04/02/13-18/02/13).

In conclusion, data presented in this section answer research question three by revealing that the DMIP enabled Charlie unique opportunities for communication including interaction opportunities with Riley regarding the co-construction of a slowmation, conversations with Jack regarding the design of digital media, the voluntary re-enactment of his slowmation script, and the sharing of his digital media assignments. Evidence indicates that the composition and review of DMIP assignments also encouraged him to engage with the digital media of others and provide feedback in ways that were not accessible during previous class tasks. He was observed to listen to the digital media presentations of his peers, pose questions and offer praise. He also demonstrated an ability to digitally and multimodally express a clear and detailed account of his interests in the form of a blended digital media assignment. It is possible that the opportunity to plan and review his digital media enabled him to address a range of interests in a structured and clear way that addresses the audience.

Summary

This case study has addressed each of the study's research questions for Charlie. A synthesises of findings concerning his creation of different digital media forms and use of skills in DMIP assignments (research question one), his multimodal awareness (research question two) and the impact of the DMIP on his communication is provided in Table 4.12. As shown by Table 4.12 this case study revealed that as part of the DMIP, Charlie created a suite of digital media forms (podcast, digital story, slowmation & blended digital media) that increased in modal complexity and relied on the development and application of a range of writing, visual, oral and digital technology skills. Charlie gained 16 new digital technology skills, showed greater awareness of digital media forms and demonstrated particular strengths in the area of visual literacy that were seen to support his written and oral communication skills. His experiences also revealed challenges such as collaborating with a partner, insecurities about the sound of his voice and a tendency to become distracted by visual stimulus. Nevertheless, the case of Charlie also presented evidence that he gained awareness of the affordances of various modes of communication and demonstrated an ability to purposefully combine modes and media forms to create two blended digital media assignment tasks. It also suggests that the DMIP facilitated his communication in that it afforded unique opportunities for social interaction and peer feedback, and allowed him to clearly present his ideas in a multimodal and digital way.

Table 4.12

Summary of Findings for Case of Charlie

Digital Media Forms & Skills (RQ1)	Multimodal Awareness (RQ2)	Communication (RQ3)
Gained awareness of digital media forms **Gained digital media-making experience** since DMIP: Created own podcast, digital story, slowmation and blended digital media for first time **Developed and applied a range of skills** to create digital media assignments: *Writing skills:* used storyboard and script to organise ideas; labeled images *Visual literacies:* used images to organise ideas (e.g. storyboard) and support writing and oral narration; occasionally distracted by images. *Oral skills:* Orally expressed more than written notes; re-enacted script; insecure about voice. *Digital technology skills:* Gained 16 digital technology skills (62.5% increase since DMIP); self-reported increase in skill level since DMIP; demonstrated transfer of skills outside of DMIP assignment tasks (e.g. Imported podcast into PowerPoint & used MyCreate to create Legomation.	**Gained modal awareness:** Could identify modal affordances and articulate relationships between different modes and media combinations after DMIP **Created multimodal digital media:** Combined a range of media and modes to create two blended digital media assignments. **Demonstrated purposeful multimodal decision-making:** Justified use of modes and combination of digital media to communicate meaning in blended digital media assignments	**Participated in social interaction** throughout DMIP: identified common interests & used social cues to participate in conversations **Experienced difficulty working as a pair** to co-construct a slowmation **Initiated and sought peer feedback:** Expressed interest in others **Digitally communicated range of interests** in clear and detailed way in blended digital media assignment

The next chapter addresses the study's research questions with respect to the case of Riley.

Chapter 5: The Case of Riley

This chapter presents the case of Riley with respect to the study's three research questions. It provides background information about Riley and proceeds to explore his involvement and use of skills (written, oral, visual and digital literacies) in creating digital media assignments as part of the DMIP (research question one). The chapter then examines his awareness of multimodality throughout the DMIP (research question two) including his knowledge of modal affordances and his capacity to purposefully combine media forms to create blended digital media assignments. Subsequently, the case study explores the implications of the DMIP for Riley's communication (research question three). In particular, it considers his contribution to social interaction, group work and peer feedback, as well as his digital communication experiences.

Riley's Background

Riley is a 14-year-old boy in year 8 who was diagnosed at age 12 with high functioning autism (level 1). School records show that he was placed in the autism support unit from the time he started high school in year 7 as it had been demonstrated that his social and communication difficulties prevented him from coping with the daily routines of mainstream classes (BTI: 25/02/13). In particular, as evidenced by behaviour records (SBR: 04/02/13) and observations (PCO: 04/02/13), Riley experiences anxiety and becomes easily frustrated and angry when faced with situations that he does not understand or wish to be a part of. Such behaviours have caused him to hyperventilate, to repetitively rock and hide underneath classroom desks, and in some cases to push furniture around the room and enter into verbal arguments with other students. During an interview Riley's teacher described an ongoing social issue between Riley and one of his peers:

> Riley has appeared to take a particular disliking to a student in the class from year 7 and often confronts him and enters into arguments that result in him losing his temper and yelling, growling and sometimes he will even throw objects across the room. (BTI: 25/02/13).

When talking about how his autism affects his behaviour during a class presentation about ASD prior to the study, Riley acknowledged his tendency to become angry: "I feel scared around loud noises and angry when people tease me" (BP: 07/02/13).

School records reveal that Riley works very hard at school and particularly excels in History as it is a field that he finds interesting (SBR: 04/02/13). Riley's teacher also explains that he is creative when it comes to English tasks that allow him to explain various topics: "he is often the first student in his class to initiate class discussions and contribute innovative ideas" (BTI: 25/02/13).

Baseline interview data shows that Riley has a range of interests including superheroes, games, books and trains:

> …things I like are Minecraft, good TV shows, funny books, fresh brownies… oh and I love the best of all going to railway museums and HobbyCraft stores… did you know they have all kinds of models of different trains there? I really like batman but not so much Spiderman like the only good stuff is the cartoons and no thanks to Disney Spiderman is total rubbish but batman and his friends are awesome (BSI: 25/02/13).

Riley's pre-study survey results (BSS: 25/02/16) and interview data (BSI: 25/02/13) reflect his passion for using technology and reveal that apart from using computers at school and home for school assignments, he spends most of his time on computers and his personal iPad viewing images and videos, and playing games: "I mostly play games, I watch videos sometimes (from YouTube) and I just bought some spectacular Spiderman episodes- it is one of my favourite shows…" (BSI: 25/02/13).

In a pre-study interview Riley commented that he would prefer to make a PowerPoint presentation than write an essay for a school assignment and that he would like to gain skills so that he could make his own movies and YouTube series: "PowerPoint is much better… I am particularly interested in making stop-motion animation movies. I have never done that before… I would also like to make a YouTube Minecraft series" (BSI: 25/02/13).

1. Riley's Digital Media Forms and Skills

The digital media forms that Riley made throughout the DMIP and his digital media-making skills are described in this section in response to research question one. Data are presented in three parts, starting with evidence of the development of his digital media-making experiences and knowledge of digital media forms since the DMIP. Data that explore Riley's digital media assignments (including a podcast, digital story, slowmation, and blended digital media) are then considered, followed by an examination of the written, oral, visual and digital literacies he developed and utilised for each assignment.

Riley's Digital Media-Making Experience and Knowledge

Evidence uncovered from comparing Riley's pre and post study interview and survey responses indicates that as was the case with Charlie, the DMIP also marked the first time he had ever created his own podcast, digital story, slowmation and blended digital media. Further, data indicate that as a result of the DMIP, like Charlie, his digital media-making experiences increased. Table 5.1 demonstrates this as it shows that prior to the study Riley ticked the "I have never done this before" column for each of the digital media forms in a pre-study survey (BSS: 25/02/13). Nevertheless, after having participated in the DMIP, he self-rated himself as capable of independently creating digital media as represented by his selection of the "I can do this myself" column for each digital media form in his post-study survey (BSS: 25/02/13).

Table 5.1

Riley's Digital Media-Making Experience Before and After the DMIP

Digital Media-Making	I have never done this	I can't do this	I need some help	I need a lot of help	I can do this myself
Making podcast					√
Making a digital story					√
Making a slowmation					√
Making a blended media					√

Key: = Before DMIP; √ = After DMIP

A comparison of pre and post-study interview responses reveal that just as Riley's experience making digital media increased throughout the DMIP, so too did his knowledge of digital media forms. This growth in knowledge is represented by Table 5.2 which suggests that pre-study interview responses about each media form appear limited when compared with responses after the study. For example, when referring to a podcast and digital story he expressed "I haven't heard of a podcast", and "no I don't know what this is" (BSI: 25/02/13). In contrast, after making podcast and digital story assignments, in a post-study interview he was able to clearly identify and explain each of these media forms in detail: "It's when you speak into the microphone and there's no pictures just your voice", and "It's pretty much a podcast with pictures" (PSI: 11/11/13). Similarly, prior the study when asked about his experience making blended digital

media he stated: "I haven't done that" (BSI: 25/02/13). However, after having created two blended digital media assignments he explained: "It's basically putting it all together…" (PSI: 11/11/13). After the study he was also able to talk about combining a range of different media forms: "…you don't have to just do a video you can add some animation to it or if you want you can just do pictures with music and maybe add video or something it depends what you want to make…" (PSI: 11/11/13).

Another example of Riley's increased knowledge of media forms can be seen by comparing his pre and post-study interview responses about the slowmation media form. Prior to the study, like Charlie, Riley appeared to initially confuse the word slowmation with slow-motion: "slow-motion is when things move very slowly" (BSI: 25/02/13). Unlike Charlie however he expressed prior knowledge of the process of creating a stop-motion animation: "…you need wire and modelling clay and you make a wire skeleton and put the stuff over it…" (BSI: 15/02/13). Nevertheless, his explanation of slowmation (as a form of stop-motion animation) during a post-study interview was much clearer and more succinct: "It's like Claymation…. Slowmation is taking photos and putting it into a video" (PSI: 11/11/13).

The fact that Riley's post-study interview comments about each media form include reference to the specific digital media assignments he created throughout the DMIP, suggest that the DMIP was a key component of his increased knowledge of media forms and has provided a foundation from which to speak using personal examples and applications.

Table 5.2

Riley's Knowledge of Digital Media Before and After the DMIP

Media	Knowledge Before DMIP	Knowledge After DMIP
Podcast	• "No I haven't heard of a podcast but it sounds interesting"	• "It's when you speak into the microphone and there's no pictures just your voice" • "In my podcast I talked about Hirohito…"
Digital Story	• "No I don't know what this is, is it a story that you put on iPads and stuff?	• "It's pretty much a podcast with pictures" • "You get the pictures and then you speak and the pictures come up so it is like reading a book a bit…" • "The pictures match the story you tell" • "First you get some pictures and then you put the pictures into a movie document and then you put the sound in and voila…."

		• "Digital story is better because it just has more pizazz because it has pictures but the podcast doesn't"
Slowmation	• "Well slowmotion is when things move very slowly" • "I've not really made stop-motion… I have made some Claymation models but I haven't actually used them yet… you need wire and modelling clay and you make a wire skeleton and put the stuff over it… and well you take a photo, move it a little and take a photo again"	• "It's like Claymation but I used Lego instead of clay." • "Slowmation is taking photos and putting it into a video" • "We took the pictures on the iPad and it turned them into slowmation" • "I did the speaking parts… it let me record but it was probably a bit fast I think"
Blended media	• "Never done that"	• "It's photos, videos and other things like voice, animation and things…" • "It's basically putting it all together… you do what you want and add all the things you want to it…maybe animation… maybe your voice and some video" • "…you don't have to just do a video you can add some animation to it or if you want you can just do pictures with music and maybe add video or something it depends what you want to make…"

Riley's Digital Media Assignments

This section examines data relating to Riley's experience creating a range of digital media assignments throughout the DMIP including a podcast, digital story, slowmation, and two blended digital media tasks.

Podcast. Data in the form of video observations, field notes and work samples provide evidence that like Charlie, Riley was able to create his own podcast as part of a History assignment about World War 2 leader Hirohito. During the creation of his podcast unlike Charlie who copied and pasted information directly from websites into his Word document, Riley was observed to carry out internet research and type his own notes and script using his own words. Riley was also observed to record an narration (reading from his script) using Sound Recorder. These observations are supported by field notes from the two lessons he spent planning and creating his podcast assignment:

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Riley has his assignment sheet in front of him and is reading about Hirohito from an internet website. He is scrolling through the page and pauses to open a word document. He begins typing information about Hirohito in his own words. He reads what he has written out loud and reads the assignment task questions. His gaze returns to the webpage and he begins scrolling again… (Field notes, PL1: 07/05/13)

…he prints out his script and opens sound recorder on the computer. He moves his face close to the microphone, presses record and begins to read his script… he presses stop and saves the audio file to the Desktop as "Hirohito podcast" *(Field notes, PL2: 08/05/13)*

In support of these field notes, further evidence of Riley's ability to document ideas from his internet research and to create a plan for his podcast is shown by the script that he produced as displayed by Figure 5.1

Hirohito

His leadership style authoritarian Definition: - someone who people blindly follow and rules with absolute power

His goals was to take over all of Asia- War against America; Pearl Harbour; Counties he invaded he invaded china Korea and almost Australia and attacked pearl harbour

Human rights issues: He attacked and brutally murdered people. 60 million people were killed in ww2. 10 million people were killed by the Japanese. These people included: Chinese, Indonesians, Koreans, Filipinos and Indo-Chinese. These incidents were called the Japanese holocaust.

Hirohito was an Emperor and on the side of the axis. The axis included: Germany, Italy and Japan. They were against the allies who included: Britain, America and Russia. Hirohito was very brutal, constantly killing innocent people. He attacked Asian countries such as china and Korea. Hirohito often wore army uniforms. He was forced to surrender when the allies nuked Japan. Hirohito announced on radio that he was going to surrender. This was the first time that the people heard their leader's voice on radio.

The countries against Hirohito included: China, Korea, Britain, Commonwealth countries and America.

http://en.wikipedia.org/wiki/Japanese_war_crimes#Mass_killings

Figure 5.1   Riley's Podcast Notes

Data indicates that Riley's script guided the recording of his podcast. This is demonstrated by comparing his written script in Figure 5.1 with the transcript of his recorded podcast in Figure 5.2. Such a comparison shows that his recorded podcast reads the same as his script with the exception of the opening three sentences and a few omitted and/or contracted words. Consequently, it can be seen that when recording his podcast, rather than solely improvise, he primarily read his script out word-for-word.

Hirohito, his lead…Hirohito was one of the leaders in WW2 of the axis. His leadership style was authoritarian. That means someone who people blindly follow and rules with absolute power.

His goal was to take over all of Asia- and he had a war against America; Pearl Harbour; and Countries he invaded were china Korea and almost Australia and he attacked Pearl Harbour.

Human rights issues: He attacked and brutally murdered people. 60 million people were killed in ww2. 10 million people were killed by the Japanese. These people included: Chinese, Indonesians, Koreans, Filipinos and Indo-Chinese. These incidents were called the Japanese holocaust.

Hirohito was an Emperor and on the side of the axis. The axis included: Germany, Italy and Japan. They were against the allies who included: Britain, America and Russia.

Hirohito was very brutal, constantly killing innocent people. He attacked Asian countries such as China and Korea. Hirohito often wore army uniforms. He was forced to surrender when the allies nuked Japan. Hirohito announced on radio that he was going to surrender. This was the first time that the people heard their leader's voice on radio.

The countries against Hirohito included: China, Korea, Britain, Commonwealth countries and America. And where I got the information from? Wikipedia. The end.

Figure 5.2   Riley's Podcast Transcript

Digital Story. Observation data and work samples reveal that as part of an English assignment during the DMIP, like Charlie, Riley composed his own Digital Story about the importance of friendship. Field notes highlight that he also created a written plan in the form of a word document and turned it into a storyboard as he located, saved and imported images he gathered from the internet that supported his ideas.

> He is typing ideas about friendship in a word document… he opens CreativeCommons browser and types "Friends pictures" into the search bar…he is scrolling through pictures… he selects one of a cartoon basketball scene, right clicks his mouse and saves the image to the Desktop… he opens his word document and inserts the picture after his first sentence… he reads his sentence and types more words to complete the sentence: "…like the kids in this photo" *(Field notes, DS1: 03/06/13)*

Evidence of the storyboard Riley created to organise his written ideas alongside seven images is shown by Figure 5.3.
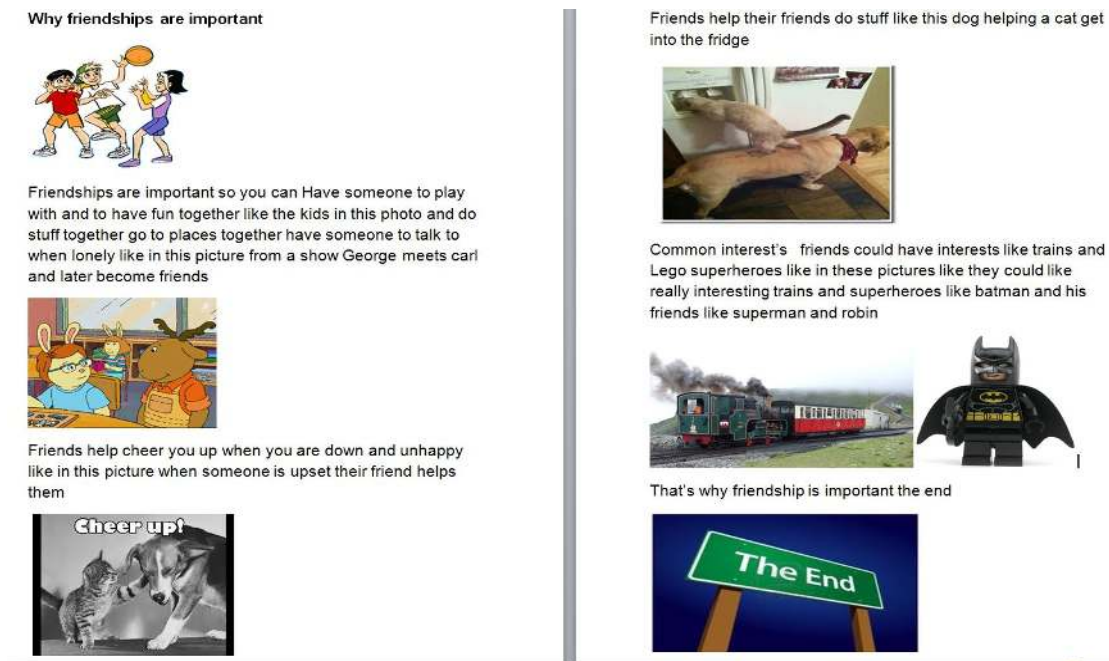
Figure 5.3   Riley's Digital Story Storyboard

Field notes indicate that after making his storyboard he printed it out and began using Windows Movie Maker software to import and edit images (from his storyboard), and record himself reading his written notes:

> …he opens Windows Movie Maker and clicks "Import image". He selects his storyboard images from the desktop…he drags the images in the correct order… he has his printed out storyboard in front of him and is practising reading from it and adjusting the frame speed accordingly after each sentence (making speed faster)… he presses "record narration" and reads from his printed out storyboard into the microphone… *(Field notes, DS2: 04/06/13)*

Data confirms that as was the case with his podcast, Riley used his storyboard notes as a script to guide his recording of an oral narration for his digital story *(see Figure 5.4)*. Unlike Charlie, who added improvised comments when recording his digital story narration, Riley's transcript demonstrates that Riley read his script aloud word-for-word when recording his digital story narration.

Why friendships are important.

Friendships are important so you can have someone to play with and to have fun together like the kids in this photo and do stuff together and go to places together.

Have friends to talk to when lonely like in this picture from a show George meets Carl and later become friends.

Friends help cheer you up when you are down and unhappy like in this picture when someone is upset their friend helps them.

Friends help their friends do stuff like this dog helping a cat get into the fridge.

Common interest's   friends could have interests like trains and Lego superheroes like in these pictures like they could like really interesting trains and superheroes like batman and his friends like Superman and Robin.

That's why friendship is important. The end.

Figure 5.4   Riley's Digital Story Transcript

Slowmation. Observational data and work samples showed that that Riley participated in an English task that required him to work alongside a peer (Charlie) to animate a scene from the novel Oliver Twist. Data revealed that his involvement in this task included the co-creation of a slowmation. Observations indicated that Riley found partner work difficult and was unable to communicate effectively with Charlie or work as a team. Rather, he was often observed to take control and make most of the slowmation on his own. Data revealed that Riley's involvement in creating a slowmation included selecting a scene, writing a script, manipulating Lego figurines and audio recording a narration. Evidence that supports each of these claims includes field notes, work samples and transcripts of dialogue that occurred between Riley and Charlie throughout the slowmation task. For example, rather than considering Charlie's ideas for a scene to animate, Riley insisted they agree upon the scene he prefers: "No I didn't agree to that…" (SL1: 12/08/13). Riley similarly insisted that he be the one to manipulate the Lego figurines despite Charlie expressing that he would like to contribute as well: "I will do this bit. You just take the photographs when I say" (SL2: 13/08/13). Evidence of the character manipulation executed by Riley was shown by the screen captures from the completed slowmation in Figure 5.5.

Figure 5.5   Riley's Lego Character Manipulation

Observational data revealed that Riley similarly took control of writing the script; however, unlike scene selection and character manipulation, this was the case because Charlie refused to contribute. Field notes indicated that he lacked interest in writing the script as he was unhappy with the selected scene for animation and so Riley wrote it on his own. Observations indicated that on occasion he reached out to Charlie for input on the script but was rejected and that he similarly recorded the slowmation narration on his own as Charlie expressed that he did not want to (see the case of Charlie).

Evidence showed that when recording a narration for the slowmation, unlike was the case for his podcast and digital story, he improvised character dialogue as shown in Figure 5.6 instead of reading from a script. When asked about why he decided to improvise his narration he explained: "it fits better with the timing of it and when I started moving the characters I ended up changing the story from what I had written down anyway" (SSI: 15/08/13).

"Oliver, Fagan wants me to show you how we do things around here".
"Charlie, Charlie, Charlie!"
"I'm coming, don't need to rush!"
Come one! We've got to show Oliver"
"Wow I wonder what this job is…"
"Come on this way"
"Are you sure we should be taking that rusty old ladder down?"
"Well it's the only way down. I told you before didn't I?"
"Well yeah, I suppose"
"Watch this."
"Pinch"
"Oh my God he is a pick-pocket! Oh dear what am I getting mixed up in?"
Stop thief! Stop thief! Stop thief! Stop thief!
"Quick grab him!"
"What's going on here?"
"He robbed me! Hey there's something familiar about that boy…"

Figure 5.6   Riley's Slowmation Transcript

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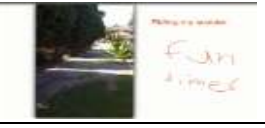
Blended Digital Media. Observation and work sample data revealed that like Charlie, Riley created two blended digital media assignments as part of the DMIP. His first assignment was an English task that involved representing his interests, and the second was a History assignment that required him to compare and contrast life in Victorian and present times. Table 5.3 and Table 5.4 provide screen captures of these tasks alongside a transcription of narration and breakdown of the media combinations used.

As shown by Table 5.3, Riley was able to combine the digital media forms of digital story and video to create a blended digital media assignment that represented eight interests. Specifically, he employed images to represent his interest in cooking brownies, books, digital entertainment, food, trains and Lego. Videos were employed to demonstrate his interests in riding scooters and making pancakes.

Table 5.3

Transcript of Riley's First Blended Digital Media

Digital Media	Narration
Digital Story	My Interests, by Riley.
Digital Story	I like to cook brownies delicious num num I had to chop the butter and later melt it, then break eggs and lightly beat eggs, then get all the ingredients, and mix the brown sugar into the melted butter (had a bit of an incident with that), and then stirred the flour and cocoa powder into the mixture then stirred it up and I got brownies out of the oven (I had a shower before they were done) and then skewered the brownies and put them on a rack and ate a brownie.
Digital Story	Books I like are Andy Griffiths books, Dav Pilkey books, books on superheroes, Asterix books and Tintin books. Those books really crack me up. They are so funny!
Digital Story	Things I like to do for digital entertainment is to play on my iPad and watch YouTube and watch Dad's Army, or other classic videos, or other classic shows I mean.
Digital Story	Things I like to eat are pancakes and Red Rooster. They are so delicious and yummy.

Digital Story	Train related things I like to do are go to museums, heritage railways and hobby stores to see the trains.
Video	Hello. This is me riding my scooter up and down the driveway. I like to do this. It's good exercise and good fun. Next…
Video	Now I am just flipping the pancakes out. Well done on each side. Crispy and… well maybe not crispy but delicious all the same. Just the way I like it. Nice and brown on one side and bits of crispy bits on the other side… Now… those are freshly made pancakes.
Digital Story	Lego is the best toy in the world and I hate Lego imposters. Lego can be practically anything in the world and more and did you know that Lego was originally wooden toys?
Digital Story	Yeah! Goodbye!

As shown by Table 5.4 Riley combined digital story and slowmation to compare life in Victorian and present times. Unlike Charlie who used video in this assignment, Riley blended digital story images with slowmation (slow-moving images of Lego figurines) to show transport in Victorian times.

Table 5.4

Transcript of Riley's Second Blended Digital Media

Digital Media	Narration
Slowmation	"Where is the train? It's late again"
Slowmation	"Hello Wilfred" "Hello Alfred" "Are you waiting for the train?" "Yes my uncle wants to help with sports or something and wants me to catch a train to Bristol" "Which uncle? The cranky one or the fat one?" "The cranky one"

	"Oh" "I remember when horses pulled the trains but now modern steam engines pull the trains" "Well I just heard of a new device called the automobile."
Digital Story 	"What does it do?" "I hear it's like a carriage but no horses"
Slowmation 	"Wow I have to get one of those. I am sick and tired of horse droppings on the road."
Digital Story 	"Well technology is evolving."
Slowmation 	"What are you doing at the station?" "Well my company needs from fresh timber and I am overseeing the shipment."
Digital Story 	"Also, I need to go to France to organise a contract between the big shipping companies so I have to go to Brighton."
Slowmation 	"I hear there are steam ships that take you across the English channel" "Yes. My dad showed me one of those when I was a child. But to be honest I am scared stiff of those boats."
Digital Story 	"Why?" "Well those big paddles are dangerous. In my mind they could easily kill someone if they fell"
Slowmation 	"Well I see your concern but they are fast and stronger than sailing ships" "Well it looks like my train is here" "Bye Alfred. See you later." "Bye Wilburt" "Now when will my train arrive?" "Goodbye, goodbye, goodbye, goodbye!"
Slowmation 	"Bye… now check the timetables…"

Data suggest that Riley wrote down his ideas prior to capturing and combining media for each blended digital media assignment. Unlike Charlie whose allowed photographs and videos to guide the plan of his first blended digital media assignment, Riley wrote a list of interests to include in his assignment: "I made a list of things to talk about for it" (BDM1SI: 17/09/13). After having compiled the list he captured images and videos to represent each interest, he then drafted a script. Evidence of this is shown in Figure 5.7.

My interests by Riley.

I like to cook brownies delicious num num I had to chop the butter and later melt it, then break eggs and lightly beat eggs, then get all the ingredients, then mix the brown sugar into the melted butter (had a bit of an incident with that) , then sifted the flour and cocoa powder into the mixture then stirred it up then I got the brownies out of the oven (I had a shower before they were done) and then skewered the brownies and put them on a rack and then ate a brownie.

Books I like are Andy Griffiths books, Dav Pilkey books, books on superheroes Asterix books and Tintin books those books really crack me up they are so funny.

Things I like to do for digital entertainment play on my iPad and watch YouTube and dads army.

Things I like to eat are pancakes and red rooster chicken they are so delicious.

Train related things I like to do are go to museums, heritage railways and hobby stores to see trains.

I like riding my scooter and making pancakes and these things are good fun.

Lego is the best toy in the world and I hate Lego imposters. Lego can be practically anything in the world and more and did you know that Lego was originally wooden toys?

Figure 5.7   Script of Riley's English Blended Digital Media Assignment

Data revealed that unlike was the case when he composed his first blended digital media assignment, Riley did not produce a script or storyboard for his second blended digital media assignment like Charlie did. Rather, he documented brief notes prior to capturing and combining media as shown by Figure 5.8, and improvised as he manipulated Lego models and recorded a narration.

Riley's animation ideas:

- Mainly just ships and trains
- Have train station characters talk about the olden days with trains were not around and ships that were different to sailing ships
- Slowmation with Lego and photos from the olden times

Figure 5.8   Riley's Plan for History Blended Digital Media Assignment

Riley's Digital Media-Making Skills

The skills that Riley employed in the creation of a range of blended media for assignments throughout the DMIP are explored in this section. Specifically, his written, oral, visual and digital technology skills are described in response to research question one.

Writing Skills. Data revealed that writing was Riley's primary means of organising ideas and creating plans that guided his use of visual media and oral narrations across tasks. For example, his creation of a storyboard for his digital story assignment (Figure 5.3) and the scripts and notes that he wrote prior to creating his podcast (Figure 5.1) and blended digital media tasks (Figure 5.7 and Figure 5.8) revealed that documenting his ideas in a written way was a significant initial step in his design and creation of digital media. This claim is further supported by his interview comments: "I had to write it down first" and "I made a list of things to talk about for it" (BDM1SI: 17/09/13). Each of these responses reinforces that he had a need to organise and represent ideas in a written way before capturing digital media.

Data revealed that like Charlie, the ideas that Riley documented in a written form guided his use of visual media. For example, observations revealed that when creating a storyboard to organise his ideas for a digital story he typed his ideas into a word document and then searched for images to accompany his written language (DS1: 03/06/13). Further, during an interview Riley explained: "I had my ideas then looked for pictures" (DSSI: 06/06/13) thus confirming that his written ideas influenced his selection and use of images in his digital story assignment.

Evidence that Riley's written skills supported his oral narration of digital media is gathered through comparing his written notes with transcripts of each of the digital tasks he produced. In particular comparing his podcast script (Figure 5.1) with the transcript of the work sample of his recorded podcast task (Figure 5.2) shows that the language communicated is identical. Consequently, it can be seen that when recording his podcast, he read out his written notes word-for word. Similarly, he also read aloud his written notes when recording a narration for his digital story and first blended digital media task. This is evidenced by the fact that the complete written language of his digital story storyboard (Figure 5.3) and blended digital media script (Figure 5.7) appears in the transcript of his oral narration for each task (Figure 5.4 and Table 5.3). This claim is further supported by Riley's interview responses, "I read what I had to

say…" (PSI: 11/11/13) and "I had to write it down first and so I could read it…when I recorded it I didn't make mistakes then because it was all there" (PL2: 08/05/13).

Analysis of Riley's use of written language in the work samples of his completed digital media assignments reveals that his written skills were used to visually categorise ideas and communicate humour. For example, in his first blended digital media task, like Charlie, he used written language to label each of his interests as can be seen in the screenshots of Table 5.3. However, unlike Charlie he used both handwritten and typed words as labels. During an interview he explained: "I typed the titles and labels of things" because "typed is more official" (BDM1SI: 17/09/13). He further expressed that he used handwritten words because "it is more informal" and "I wanted it to look like graffiti" (BDM1SI: 17/09/13). Evidence of Riley using written language to label his ideas can be seen in a screenshot from his first blended digital media in Figure 5.9. In this screenshot the typed words: "Model trains at HobbyCo", and handwritten words: "Train-related", were used to identify and categorise images based on their commonalities.

Figure 5.9   Screenshot of Riley's Train-related Interest

In contrast to the use of written language in Figure 5.9, the screenshot presented by Figure 4.10 from the same task shows a different level of complexity to Riley's written expression. The typed words read: "Lego rules", and the handwritten words read: "Imposters suck", thus achieving a different purpose to the labelling that was evident in Figure 5.9.
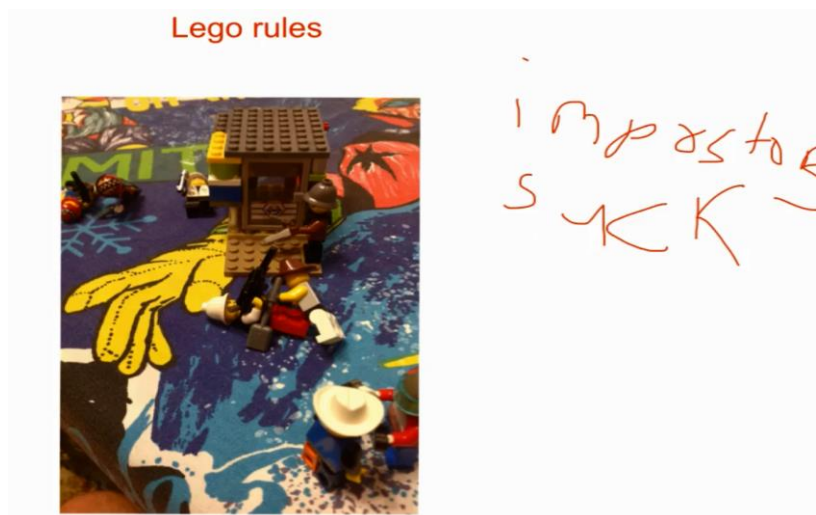
Figure 5.10   Screenshot of Riley's Lego Interest

It appears that the use of written language in this instance offers commentary about his opinion regarding Lego. Further, it may have been included as a means of adding humour as suggested by Riley's interview comment: "It makes it funny when it says imposters suck" (BDM1SI: 17/09/13).

Visual Literacy Skills. As was the case with Charlie, evidence from observations, work samples and interview data demonstrates that Riley's visual literacy skills may have similarly enhanced his written and oral expression throughout digital media-making. For example, field notes indicate that after having imported images into his digital story storyboard he typed more information:

> …he is scrolling through pictures… he selects one of a cartoon basketball scene, right clicks his mouse and saves the image to the Desktop… he opens his word document and inserts the picture after his first sentence… he reads his sentence and types more words to complete the sentence: "…like the kids in this photo" *(Field notes, DS1: 03/06/13)*

Data also suggests that images prompted him to clarify and elaborate on his written ideas. For example, Riley was observed to write additional information in his storyboard after importing images such as: "Have friends to talk to when lonely like in this picture from a show George meets Carl and later become friends". In further support of this claim in an interview Riley acknowledged: "Looking at the photos gave me more ideas…" (DS1: 06/06/13). Moreover, when asked to explain why he added more written language after viewing images in the creation of his digital story storyboard he explained: "I had to add more words coz the pictures made me think of

different things to say… like I had a picture from this show so I had to go back and write something about that…" (DSSI: 06/06/13).

Another example of images supporting Riley's use of language was in the "cooking brownies" section of his first blended digital media. In this section Riley used nine images that depicted different stages in the method of cooking brownies. When writing the script for the narration for this scene, observations reveal that he was able to look at each image and type a succinct explanation the process that he engaged with to make brownies (see Table 5.3, row 2). It would appear that the images scaffolded Riley's recounting of the experience. Further, he was able to explain the process without getting caught up with a particular step or without becoming distracted as would sometimes be the case according to pre-study observations (PCO: 04/02/13) and teacher interviews (BTI: 25/02/13). Observations did not indicate that Riley's use of images distracted him from his task as they occasionally did for Charlie. Further, unlike like Charlie, the images that Riley included in his digital media appeared to all have relevance for each of his assignments.

Data suggest that just as visual media may have enhanced Riley's written expression of ideas, it may have similarly supported and extended his oral narration of digital media assignments in the same way that it appeared to support Charlie. When the written language of his first blended digital media assignment (Figure 5.7) is compared with the transcript of his recorded narration for this task (Table 5.3), it seems that while Riley read the script aloud word-for-word, he elaborated on his ideas and orally expressed more information than was documented in his script. For example, additional information that he expressed that was not recorded in his script included: "Hello. This is me riding my scooter up and down the driveway. I like to do this. It's good exercise and good fun…" (see Table 5.3). Field notes support that Riley watched his video as he improvised an unscripted oral explanation: "… Riley looks up from his script and begins to speak about riding his scooter as his scooter video plays" *(Field notes: BDM12: 12/09.13).*

Further evidence of Riley's visual literacy skills supporting his oral expression is demonstrated by observations of him looking at images and videos when recording a narration for his slowmation and second blended digital media task. Data showed that like Charlie, for these two tasks he was not guided by a storyboard or script but rather captured photographs and videos as a means of visually organising his ideas. When

explaining this process Riley stated: "I chose the images first and then write some things…" (DSSI: 06/06/13).

Oral skills. An analysis of data pertaining to Riley's employment of oral skills in the making of digital media revealed that he was able to record a narration by both reading/elaborating on scripts, and improvising a narration without a script. For example, when recording an oral narration for his podcast, digital story and first blended digital media task, he read from a storyboard/script. This is further evidenced by the replication of script language in the transcripts of the recorded narration. For example, the transcript for his podcast is identical to his written script as he was observed to read it aloud (PL2: 08/05/13).

In the instances where he was observed to read a script aloud when recording an oral narration for digital story and first blended digital media task, data indicated that he orally elaborated and added information that was not scripted. For example, Riley's explanation of riding his scooter was scripted as "I like riding my scooter" (see Figure 5.7), but was recorded as: "Hello. This is me riding my scooter up and down the driveway. I like to do this. It's good exercise and good fun…" (see Table 5.3). He was similarly able to narrate a video for his first blended media task as he was filming without reading from a pre-prepared script. Unlike Charlie who narrated videos after they had been recorded, Riley recorded an improvised narration while capturing video footage. For example, in a video of himself cooking pancakes, rather than read from a document he spoke to the camera and explained the process unscripted and unrehearsed as he was cooking (see Table 5.6, row 8).

Data indicate that Riley did not feel the need to script a narration for his slowmation and second blended digital media task, as he felt confident in his ability to deliver and record unscripted and unrehearsed dialogue. In an interview he explained that he did not read from a script for his slowmation but rather improvised unscripted dialogue for narration by taking on the role of different characters: "I just spoke like the character I didn't really need a script for that bit" (SI: 15/08/13). Further, field notes reveal that that Riley rarely made mistakes when recording his narration and only re-recorded sections of his narration that were too fast or did not fit with the frame speed of images.

Analysis of observational data revealed that unlike Charlie who did not wish to listen to his recorded voice, Riley reviewed his voice recordings and re-recorded his

narration for assignments where necessary. Further, data show that he was able to record an oral narration for each digital media task in fewer than four attempts. Specifically, it took him two attempts to record his podcast (PL2: 08/05/13), three attempts to record his digital story (DS3: 05/06/13), and four attempts to record narration for his first blended digital media (BDM13: 16/09/13). Moreover, in the instance of recording an improvised oral narration for his slowmation (SL3: 14/08/13) and second blended digital media assignment, he made no mistakes and was satisfied after the first take, as was the case with Charlie who audio recorded and saved his first attempt at narration for each assignment. Upon reviewing what he recorded he expressed "it's fine" (BDM13: 16/09/13) and "that's good" (SL3: 14/08/13) thus reflecting a sense of satisfaction with his efforts.

Digital Technology Skills. A comparison of pre and post-study survey data revealed that, like Charlie, since the DMIP Riley's digital technology skills increased. Table 5.5 depicts this comparison. The red tick boxes indicate his skill level prior to the study and the yellow highlighted boxes represent the skills he identified as having after the DMIP. Of 16 digital technology skills listed by Table 5.5 for creating digital media, in a pre-study survey he identified "I can do this myself" for nine skills and "I need some help" for three skills. In the same survey he also acknowledged inexperience regarding four skills as evidenced by his selection of the "I have never done this" column as shown in Table 5.5. Specifically, the skills he did not possess prior to the study related to using movie-making software to record, save and import sound files, and combine photos and video. As a percentage the initial records of Riley's digital technology skills prior to the DMIP reveal he could implement 75 % of the skills (independently and with help) but lacked a quarter of necessary skills. This was more than Charlie prior to the study. Nevertheless, after the DMIP he reported that he possessed all 16 skills as evidenced by his selection of the "I can do this myself column" in Table 5.5. His post survey responses indicate a 25% increase in his digital technology skills and suggest that the DMIP may have contributed to such the acquisition and development of these new skills.

Table 5.5

Riley's Digital Technology Skills Before and After the DMIP

Digital Technology skills	I have never done this	I can't do this	I need some help	I need a lot of help	I can do this myself
Internet research					(Before) √
Storyboarding/script writing			(Before)		√
Taking photos					(Before) √
Saving/importing photos to computer					(Before) √
Downloading photos from internet					(Before) √
Editing photos					(Before) √
Adding photos to slideshow					(Before) √
Taking videos					(Before) √
Editing videos			(Before)		√
Saving videos to computer					(Before) √
Importing videos into movie making program			(Before)		√
Downloading/saving videos from internet					(Before) √
Recording voice	(Before)				√
Saving voice recording to computer	(Before)				√
Import sound into movie making program	(Before)				√
Combine photos & videos using Movie Maker	(Before)				√

Key: = ░░░░ Before DMIP; √ = After DMIP

Interview and work sample data supports survey results in that they similarly reflect a growth in Riley's digital technology skills since the DMIP. For example, in a pre-study interview he revealed that while he had experience capturing images and videos with his iPod, he had not transferred such files to the computer and edited and published them on his own. Also, while he was aware of an app that could record his voice he was unaware of how to use it. Riley explained: "I know that you can but I haven't… Usually I get my mum to do those sorts of things and she gets me games and things on my iPad" (BSI: 25/02/13). Nevertheless, his capacity to make a podcast and combine media in the form of two blended digital media tasks during the DMIP, demonstrates his capacity to apply the skills he previously lacked.

Table 5.5 also reveals an increase in Riley's self-perceived ability to apply digital technology skills since the DMIP. Not only did he indicate that he had gained four new skills since the study, but he identified "I can do this myself" for each of these skills. It is likely that his experience creating a suite of digital media as part of the

DMIP gave him the opportunity to apply new skills and thus demonstrate to himself he is capable.

In summary, data presented for research question one evidenced that Riley was able to create his own podcast and digital story assignments and could combine media forms to create two blended digital media assignments. He also demonstrated that he could co-construct a slowmation with his peer Charlie, but that in doing so he experienced difficulty communicating and collaborating, and appeared to be controlling and uncompromising in his approach to partner work, thus completing most of the work on his own. Data revealed that in creating a range of digital media he employed various written, visual, and oral skills, and utilised and gained digital technology skills. Like his peers, written notes and scripts were the primary means of Riley organising his ideas in the planning phase of digital media construction, and like Charlie, Riley used written language to add humour to his assignments and to support his oral narration (often read aloud word-for-word). Like Charlie, he also used handwritten text to accompany his images and videos as a means of labelling ideas, but was unique in his simultaneous use of typed text to further categorise information and achieve a more formal tone than was communicated by handwritten content. Unlike Charlie, Riley was not distracted by visual media and was able to review and re-record his narration where necessary. Further, unlike Charlie, he was able to record a narration for his videos as he captured footage without the aide of a script. The next section considers Riley's multimodal awareness and design of blended digital media so as to address research question two.

2. Riley's Multimodal Awareness

Data from pre and post study interviews, work samples and field notes concerning Riley's experience of making two blended digital media assignments were analysed to address research question two regarding his demonstrated multimodal awareness. Evidence of the nature of his multimodal awareness is presented in two parts. Firstly, data regarding his awareness of modal affordances are presented, followed by an examination of data pertaining to his design and combination of media in the creation of two blended digital media assignments.

Riley's Awareness of Modal Affordances

Evidence suggests that, like Charlie, since the DMIP, Riley demonstrated a developing awareness of the affordances of various modes fundamental to digital media. Table 5.6 presents post media interview excerpts, dialogue from observation transcripts and responses from a post study interview that reflects his capacity to explain modal affordances. In the creation of his blended digital media, like Charlie, Riley could similarly explain why particular modes such as oral narration, images (still and slow-moving), video, written language and symbols were suited to specific communicative purposes.

Table 5.6

Riley's Awareness of Modal Affordances Throughout and After the DMIP

Modes	Explanation of Modal Affordances
Oral narration	• "It's when you speak into the microphone and there's no pictures just your voice" (PSI: 11/11/13) • "… it was just a voice you would have to listen very carefully and you wouldn't know they look like" (BDM1SI: 17/09/13) • "I just spoke like the character I didn't really need a script for that bit" (SSI: 15/08/13)
Still images	• "It's pretty much a podcast with pictures" (PSI: 11/11/13) • "You get pictures and then you speak and the pictures come up so it is like reading a book…" (PSI: 11/11/13) • "The pictures match the story you tell" (PSI: 11/11/13) • "The pictures can show more interests but if there was video you could only watch one at a time and it would be distracting" (BDM1SI: 17/09/13) • "I took photos of the brownies because there were lots of steps and it would have taken too long to video…" (BDM1SI: 17/09/13) • "You can just look at the pictures and see what to do like a recipe but if it was a video you would have to watch it all the way through and remember…or if it was just a voice you would have to listen very carefully and you wouldn't know they look like" (BDM1SI: 17/09/13) • "I didn't need to take a video of this unless I took one of me eating… the food isn't moving so pictures will do the trick" (BDM1SI: 17/09/13) • "The pictures let you see each step at once" (BDM1SI: 17/09/13) • "Well sometimes the photos are better than the videos…" (PSI: 11/11/13) • "Digital story is better because it has more pizazz coz it has pictures but the podcast doesn't" (DS1: 03/06/13) • "Looking at the photos gave me more ideas…" (DS1: 03/06/13) • "…the pictures made me think of different things to say…" (DS1: 03/06/13) • "I chose the images first and then write some things…" (DS1: 03/06/13) • "I already had them so I took photos of them and used them instead" (BDM1SI: 17/09/13) • "There are videos I could have used too but I show more than one train with the photos" (BDM1SI: 17/09/13)

	• "…they show what the trains used to look like…photos are better because they don't make Lego trains like this and besides this is really what they looked like" (BDM2SI: 21/10/13) • "…look here the picture is of a car. The technology became cars after horses so that's why that picture is there…" (BDM2SI: 21/10/13)
slow moving images	• "It's like Claymation but I used Lego instead of clay." • "First you get some pictures and then you put the pictures into a movie document…" (PSI: 11/11/13) • "Let's say you are doing stop-motion… if you move a mini figure a little it looks like he is actually moving but if you use it by hand for a video then it won't look very good" • "Slowmation is taking photos and putting it into a video" • "We took the pictures on the iPad and it turned them into slowmation" • "I like animation… besides characters are much more interesting than just talking about something or reading something out" (BDM2SI: 21/10/13) *"The animation is for this bit so you know who is saying what bit" (BDM2SI: 21/10/13)*
Video (fast moving images)	• "Video shows me moving" (PSI: 11/11/13) • "…if it was a video you would have to watch it all the way through and remember…" (BDM1SI: 17/09/13) • "you can't really make videos of books because they don't move for the camera, they're still" (BDM1SI: 17/09/13) • "…it would have taken too long to video…if there was video you could only watch one at a time and it would be distracting" (BDM1SI: 17/09/13) • "I wanted to show how I ride my scooter up and down…" (BDM1SI: 17/09/13) • "A video is best because it shows how I ride not a freeze shot" (BDM1SI: 17/09/13) • "I could have done pictures of it like the brownies but it took quicker time to video" (BDM1SI: 17/09/13) *"…I just used the end bit of the video to see when they were ready…" (BDM1SI: 17/09/13)*
Written language (scripts & captions)	• "I typed the titles and labels of things… typed is more official". (BDM1SI: 17/09/13) • "The drawn writing it is more informal…I wanted it to look like graffiti" (BDM1SI: 17/09/13) • "...It makes it funny when it says imposters suck" (BDM1SI: 17/09/13) • "I didn't really have any pictures for that bit so I just drew what I was going to say..." BDM1SI: 17/09/13) • "I read what I had to say…" (PSI: 11/11/13) • "I had to write it down first and so I could read it…when I recorded it I didn't make mistakes then because it was all there" (PL2: 08/05/13) *"The writing says stuff I like to eat which is what I say and what you see" (BDM1SI: 17/09/13)*
Symbols	• "The arrow means this is the place I like to get trains at. It is pointing to Hobbyco" (BDM1SI: 17/09/13)

Riley's ability to explain the role of a range of modes in the digital media he created and his justification of his use of specific modes throughout the DMIP as shown by Table 5.6 demonstrates his developing awareness of modal affordances. For example, his comments about still images show an emerging awareness of the affordances of such a mode; for example, to capture still life ("the food isn't moving so pictures will do the

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trick"), to visually represent multiple ideas ("The pictures let you see each step at once"), to accompany audio ("The pictures match the story you tell"), to show real life ("they show what the trains used to look like"), and to provoke different ideas ("Looking at the photos gave me more ideas…made me think of different things to say").

Riley's comments about written language fonts further demonstrate his awareness of modal affordances. Unlike Charlie he used by handwritten and typed text and reasoned that he typed words because "typed is more official". In contrast he expressed that he used handwritten language because "it is more informal" and "I wanted it to look like graffiti". Analysis of the different fonts used in Riley's blended digital media supports his rationale in that it is evident that typed language was used to label specific images, and add informal commentary and humorous captions.

Like Charlie, Riley's comments also demonstrate his capacity to discriminate between different modes and justify their use based on their unique affordances. For example, when explaining why he chose to take photographs of books instead of videos, he said "you can't really make videos of books because they don't move for the camera, they are still". Such a comment reveals that like Charlie, he too had knowledge of how the affordance of image capturing 'still life' contrasts with the affordance of video capturing movement. Further, unlike he Charlie he was able to acknowledge and compare the relative demands on viewers made by still images with video and oral narration:

> You can just look at the pictures and see what to do like a recipe but if it was a video you would have to watch it all the way through and remember…or if it was just a voice you would have to listen very carefully and you wouldn't know they look like (BDM1SI: 17/09/13)

Riley's Multimodal Design

Data pertaining to Riley's creation of two blended digital media assignments yields most information on his modal awareness and purposeful media-making decisions. Analysis of observational, interview and work sample data revealed that, like Charlie, after having made his own podcast, digital story and slowmation assignment, Riley could purposefully combine modes fundamental to these media forms in the design and production of two blended digital media assignments. Evidence of the purposeful multimodal decisions underpinning each blended digital media was primarily sourced

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from interviews following his submission of each task. Specifically, each interview offered him the opportunity to review and explain each of his modal choices. Data were then triangulated with field notes and work samples. The reasons Riley provided for combining particular media forms are shown in the "Explanation of Design" columns of Table 5.7 and Table 5.8. Interpreted justifications are clarified/summarised in a column entitled "Intention & Purpose".

As shown by Table 5.7, like Charlie, Riley combined digital story and video for his first blended digital media assignment, using oral narration, still images, video, written language and symbols. Evidence as shown by his comments in the "explanation of design" column of Table 5.7 reveal that he made deliberate choices regarding his use of modes to represent meaning. For example, when explaining his use of images, he reasoned that it was his deliberate intention to visually represent a range of interests: "The pictures show all of the things". Further, data revealed that his arrangement of images was also deliberate. For example, he explained that his decision to present five images of books was made with the intent of representing "a pile" of books: "I put them in a circle to look like a pile of them". Similarly, as we have seen, his collage of 9 photographs depicting the process of making brownies was a deliberate decision to "let you see each step at once". Further he acknowledged that as a result of this decision the audience would be able to "just look at the pictures and see what to do". Unlike Charlie, he also justified that using image instead of video to represent certain interests was more time efficient: "video would have taken so long", and effective for capturing still life: "the food isn't moving so pictures will do the trick".

Riley's comments following the creation of his blended digital media suggest that his use of video was purposeful. This is evidenced by his explanation that he chose to capture a video of him riding his scooter because of the affordance of video to capture movement in ways that still images cannot: "A video is best because it shows how I ride not a freeze shot". He further reasoned that his decision to incorporate video was made because it was more time efficient: "it took quicker time to video" and because video could most accurately demonstrate the act of riding a "scooter up and down" and represent the final process of cooking pancakes "when they were ready…"

Riley's explanation of his use of written language also reinforces evidence of his capacity to make purposeful multimodal choices. For example, he was able to articulate that he used written language to complement, clarify and elaborate on the visual media
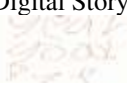
(images, written language and video) presented: "The writing says stuff I like to eat which is what I say and what you see". Further, like Charlie, he reasoned that written language enabled him to create "titles and labels of things". He explained that he used typed words because "typed is more official", and used handwritten words to give the visual effect of "graffiti" and to occasionally make "informal" comments such as "imposters suck", which simultaneously may have had the intent of adding humour as reflected by his comment "...It makes it funny when it says imposters suck".

Table 5.7

The Multimodal Design of Riley's First Blended Digital Media Assignment

Media	Modes	Explanation of Design	Intention & Purpose
Digital Story	• Writing: my interests • 4 images • Voice narration	"Well that's a lot of the interests but mostly books I guess and Lego…" "It tells you what it is all about otherwise you might think what is this?" "The pictures can show more interests but if there was video you could only watch one at a time and it would be distracting"	• To introduce media and set scene • To show different interests • To represent range of interest • Video not suitable because could distract
Digital Story	• Writing: cooking brownies • 9 images • Voice narration	"I took photos of the brownies because there were lots of steps and it would have taken too long to video…" "The pictures show all of the things I did to make them like a recipe book" "The pictures let you see each step at once" "You can just look at the pictures and see what to do like a recipe but if it was a video you would have to watch it all the way through and remember…or if it was just a voice you would have to listen very carefully and you wouldn't know they look like"	• More time efficient than video • Represents a range of steps at once • Visually represents method
Digital Story	• Writing: books • 5 images • Voice narration	"Here are some of my favourite books. I put them in a circle to look like a pile of them" "I wanted to put it all in one photo to show all of the books I liked in one section" "I took them each one so they could be big and clear because sometimes the pile picture could be blurry or you can't see the pictures and titles of them"	• Represents a pile of books • Capture still objects with still image (no need to capture movement)

		"…you can't really make videos of books because they don't move for the camera, ==they are still=="	
Digital Story	• Writing: digital entertainment • 3 images • Voice narration	"I had to get my mum to take these ==so that I could be in them==. I tried balancing them but the iPad kept falling" "…these are ==all forms of digital entertainment==" "I almost did a video for this one but couldn't decide so ==I thought a picture would do=="	• Representing participation in digital entertainment • Preference for photos
Digital Story	• Writing: stuff I like to eat • 2 images • Voice narration	"I didn't need to take a video of this unless I took one of me eating… ==the food isn't moving so pictures will do the trick==" "The writing says stuff I like to eat which is ==what I say== and ==what you see=="	• Representing still objects with still image • Writing describes images and supports narration
Digital Story	• Writing: train-related • 4 images • Voice narration • 1 arrow (pointing to image)	"The arrow means that ==this is the place I like to get trains== at. It is ==pointing== to Hobbyco" "I already had these photos so I took photos of them and used them instead. There are videos I could have used too but I ==show more than one train with the photos==." "I wanted ==to keep the train related stuff together=="	• Use of arrow to point to image • Convenient to use existing photos • To show multiple trains • To categorise ideas
Video	• Writing: riding my scooter fun times • 1 video • Voice narration	"I wanted to ==show how I ride my scooter== up and down…" "A video is best because ==it shows how I ride not a freeze shot==" "I typed the titles and labels of things… typed is more official".	• Demonstrate process of riding scooter • Capture movement
Video	• Writing: making pancakes mmm • 1 video • Voice narration	"I could have done pictures of it like the brownies but ==it took quicker time to video==." "I had more videos but ==it was too long== so I just used the end bit of the video ==to see them when they were ready…=="	• Time efficient to video • To show finished product: pancakes
Digital Story	• Writing: Lego rules imposters suck • 1 image	"This ==picture shows my Lego== and Lego rule you see" "I could have made an animation with the Lego like I did with the Oliver one but it probably ==would take a bit long=="	• Time efficient to use photo • Shows Lego • Writing supports image and adds humour
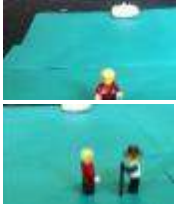
	• Voice narration	"..It makes it funny when it says imposters suck"		
		"The drawn writing it is more informal…I wanted it to look like graffiti"		
Digital Story	• Writing: yeah goodbye • Voice narration	"That's the end bit" "I didn't really have any pictures for that bit so I just drew what I was going to say... it's a bit loud though"	• To signify ending • Did not have alternative media

As shown by Table 5.8 Riley combined the media forms of podcast, slowmation and digital story in the making of his second blended digital media assignment and used the modes of still and slow-moving images, and oral narration. Unlike Charlie, he did not use video for this assignment. Riley's explanation of the design of this task similarly reflects that as was the case with his first blended digital media assignment, he made deliberate multimodal choices to represent and communicate meaning. For example, he was able to explain that he chose to animate Lego figurines as they can be posed: "they stand up", and because they can be used to represent characters and add interest: "characters are much more interesting than just talking about something or reading something out". In contrast, he explained that he included five still images with the purpose of visually representing what the characters were talking about and thus complementing the modes of oral narration and still image: ""Here is the ship he was talking about. So you can understand what he was talking about can't you?" He further reasoned that he deliberately included photographs to provide visual evidence of transport in Victorian times: "they show what the trains used to look like… this is really what they looked like".

Evidence of his multimodal decision-making being informed by his awareness of modal affordances is further demonstrated by his reasoning that images can more accurately depict transport in Victorian times than animation using Lego figurines: "…photos are better because they don't make Lego trains like this and besides this is really what they looked like".

Table 5.8

The Multimodal Design of Riley's second Blended Digital Media Assignment

Media	Modes	Explanation of Design	Intent & Purpose
Slowmation	• Slow-moving image • Voice narration	"Well these are the Lego characters for Wilbert and Alfred. I got the Lego not clay because well you see they stand up and I just think Lego is better" "I like animation… besides characters are much more interesting than just talking about something or reading something"	• Preference for using Lego and character dialogue • Lego more convenient than clay • Characters add interest
Digital Story	• Still image • Voice narration	"These are pictures I printed off from the internet and then I took pictures on the iPad… they show what the trains used to look like that's why they are black and white because there was no colour then" "…photos are better because they don't make Lego trains like this and besides this is really what they looked like"	• To show real images • Photos more realistic • Lego representation not feasible
Slowmation	• Slow-moving image • Voice narration	"It's back to the story so the characters are talking about the horses"	• Consistency/ continuing the story • Include characters • Dialogue provides commentary on previous images
Digital Story	• Still image • Voice narration	"Well as I just said, technology is evolving and look here the picture is of a car. The technology became cars after horses so that's why that picture is there"…	• To support oral explanation of evolving technology (evidence)
Slowmation	• Slow-moving image • Voice narration	"The animation is for this bit so you know who is saying what bit"	• To build characters/ support character dialogue
Digital Story	• Still image • Voice narration	"Oh whoops that's not supposed to go there. That was supposed to be when they talked about the horse droppings before… never mind"	• To show horse droppings
Slowmation	• Slow-moving image • Voice narration	"This bit is when he brings up the ships.	• To introduce new idea: ships

Digital Story	• Still image • Voice narration	"Here is the ship he was talking about. ==So you can understand what he was talking about== can't you?"	• To reinforce character dialogue • Visual evidence/ representation of real ship
Slowmation	• Slow-moving image • Voice narration	"So that's ==the end== of the animation. ==It finishes it how it started.== The train arrives so their talk is over and so is the whole thing…"	• To create symmetry (opens and closes with animation) • Conclude story (train arrives)

In summary, data revealed that like Charlie, Riley showed awareness of modal affordances and demonstrated that he could apply this knowledge through making purposeful multimodal decisions when combining media forms in the design of two blended digital media assignments. Like Charlie, he was able to articulate different reasons for using different modes to communicate meaning and could compare and differentiate between the affordances of visual modes. Nevertheless, when compared with Charlie, Riley's explanation of design and modal affordances was unique in that it referred to time efficiency, tone and the impact of media use on the needs of viewers. The next section investigates the implications of Riley's experience making digital media on his communication. Specifically, it examines the nature of his social interaction and digital communication, and his capacity to provide peer feedback and to show interest in others since the DMIP.

3. Riley's Communication

Riley's communication as observed throughout a range of classroom situations before and during the DMIP are examined in this section to address research question three. Data are presented in three parts, starting with evidence relating to his social interaction. Data relating to his digital communication is then considered, followed by an examination of his interest in others and capacity to provide feedback to peers.

Riley's Social Interaction

Baseline observations of Riley during class time indicate that, like Charlie, prior to the study he preferred to work on his own. This is reinforced by his teacher's comment in a pre-study interview:

> He hasn't really worked with other students on things. He works well on his own because well he is on his own level and he hasn't ever really wanted to do assignments with his peers… if he has a question or has trouble he will come to me he won't ask the other students or talk about it with them." (BTI:25/02/13)

In contrast, when participating in the DMIP Riley worked with Charlie to create a slowmation about a scene from the novel Oliver Twist. The fact that he would not normally work with a partner to complete school work suggests that the DMIP offered a unique opportunity for interaction that may not have otherwise occurred.

Analysis of dialogue that occurred throughout interaction with his peer Charlie revealed that he found it challenging to work in a pair. In particular, transcribed dialogue from video-recorded observations indicates that he experienced difficulty compromising and considering the suggestions and wishes of his partner: "No I didn't agree to that… Listen I have a suggestion…" (SL1: 12/08/13).

Further evidence of the challenges experienced by Riley working with a partner are revealed by observation transcripts that show him exercising control over the task without consideration of Charlie's wishes. In this particular instance he ordered Charlie to take photographs and refused to allow him to move the Lego figurines:

Riley:	I will do this bit. You just take the photographs when I say.
Charlie:	But that's the fun bit.
Riley:	It's my Lego Charlie!
Charlie:	Fine! (SL2: 13/08/13)

Observation and interview data revealed that prior to the DMIP, Riley tended to engage in social interaction with his peers during free-time in the classroom and Social Club (news time). This data also indicated that with the exception of occasional confrontations with a peer called Damien, these interactions were generally positive. Analysis of field notes gathered from observing Riley's social behaviour during class across a two-week period prior to the study indicated that he played chess 12 times with four different peers (PCO 04/02/13-18/02/13). Field notes suggest that Riley was usually the one to initiate chess games with his friends and that his offers were occasionally rejected:

Riley approaches Charlie's computer holding chess set and asks him to play:

Riley:	Charlie do you think we could have a game of this now
Charlie:	I think…. No… I don't feel like it
Riley:	But I don't have anyone to play with.
Charlie:	I'm busy
Riley:	Oh alright then

Riley stomps back to desk, puts chess set on floor next to chair and folds his arms.
(PCO: 04/02/13).

The only student that Riley was not observed to play chess with during this time was Damien. Teacher interviews suggest that this was due to the history of conflict between Riley and Damien:

Riley has appeared to take a particular disliking to a student in the class from year 7 and often confront him and enters into arguments that result in him losing his temper and yelling, growling and sometimes he will even throw objects across the room. (BTI: 25/02/13).

In contrast to his reported interactions with Damien prior to the study, observations of Riley during class time throughout the DMIP indicated that there may have been a decrease in the amount and severity of such conflict. In fact, field notes provide evidence of positive interaction between Riley and Damien during free time throughout the DMIP. For example, as indicated in the following transcript extract, after completing his first blended digital media assignment Riley approached Damien to play a game of chess as a free time activity. Teacher interview data confirms that this was "the very first time they have played a game of chess together" (PTI: 18/11/13). Further, analysis of video recorded observations of this experience reveal that the pair played together harmoniously for 20 minutes before having a disagreement and abandoning the game:

Riley:	Damien do you know how to play chess?
Damien:	I think so, why?
Riley:	Well I guess I could teach you if I have to…it's just there's no one else to play with me.

Riley sets up the chessboard on the table next to Damien's desk and begins to explain the Rules. Damien sits at the table and listens to Riley's instructions. They begin playing chess. Riley starts the game by moving a pawn and Damien follows (BDM3: 17/10/13).

While it cannot be concluded with certainty that Riley's positive interactions with Damien were not a direct result of his involvement in the DMIP, it is possible that viewing the digital media of Damien and jointly participating in class activities with him throughout the DMIP may have influenced a subtle change in his social behaviours and attitudes. This is supported by the reflections of his teacher as expressed during a post-study interview:

> We haven't had any real serious problems like we had before. It may be a coincidence but maybe it has something to do with the fact that they have been sitting in on a lot of things together lately and they have been seeing what each other has been learning … maybe that has made him more tolerant and open? I still can't believe they played a game of chess together as that would never have happened before (PTI: 18/11/13).

Prior to the study Riley was observed to approach his peers during free time to show them pages from his comic books or clips from YouTube but was often met with rejection or a lack of interest:

> Riley: Look at this guy (points to comic book image) he can lift four times his body weight. Did you know…
>
> Mario: I don't want to see it. I am doing this. I don't care about that stuff.

Data showed that peer responses were different since the DMIP. Riley was observed to similarly express eagerness to share his digital media with peers but was met with a different response upon doing so. Data revealed that Riley's peers viewed his digital media and indicated more of an interest than demonstrated when approached to look at books and videos. In response Riley expressed a sense of satisfaction with the opportunity to share what he had created. Evidence of this was gathered from interview data: "…it was good to show my video to the class so that they could see my interests instead of me just talking about them and it made them laugh, especially when I said in it that joke about Lego imposters" (BDM1SI:17/09/13). Interview data also reflected that Riley was proud of his work: "I felt proud. You have to take pride in your work" (BDM1SI:17/09/13).

Riley's Digital Communication

Work sample data demonstrated that when given the opportunity to represent his interests in the form of a blended digital media assignment, like Charlie, Riley was able to produce a structured explanation that addressed a wide array of interests spanning

eight categories. It is possible that his opportunity to use a range of digital media forms and modes to communicate meaning may have contributed to his clear, structured and comprehensive communication of meaning. Further, as was likely the case with Charlie, it is possible that such an opportunity may have provided Riley with support for challenges he experienced during Social Club conversations that merely relied on improvised oral presentations.

Riley's ability to communicate a range of interests in the form of a blended digital media assignment is in stark contrast to observations of his experience talking to the class about his interests as part of informal news sharing during Social Club (before and throughout the DMIP). Observations show that in these instances, like Charlie, Riley experienced a range of challenges that made it difficult for him to clearly communicate his interests to his peers. For example, during a Social Club session in which Riley was talking the class about his interest in trains he offered the following verbal explanation:

> "Ok so trains I want to talk about trains like I like the steam one that is opposite to Gordon and well did you know you can get the parts for a newer model. I wanted to get it there but mum said we had to wait a bit because well then we ended up going to Bunning's instead. Did you know I saw a giant what do you call those things again? Oh I don't know it was a… oh drat I can't seem to remember… we stopped at McDonalds too…" *(PCO: 04/02/13*

As can be seen in Riley's attempt to explain his interest in trains, his language assumed that his audience was familiar with the context of what he was talking about. Further, his comment about the events of his day detracted from his explanation of trains and appeared to lack relevance to the purpose and initial topic of his speech. Observations of Riley explaining his interests to his peers during other Social Club sessions similarly show these difficulties. Figure 5.11 provides two transcribed accounts of Social Club explanations provided by Riley prior to the DMIP. As shown by each of these examples, he tended to get caught up in the detail of one interest when talking to his peers.

Figure 5.11   Riley's Explanation of Interests during Social Club

In contrast to Riley's verbal explanation of interests during Social Club as shown in Figure 5.11, when given the opportunity to digitally express his interests as evidenced by his blended digital media transcript (Figure 5.7), he was able to use visual media and an oral narration to categorise interests and give multiple examples rather than get bogged down in superfluous detail regarding a few. As a result Riley was able to represent eight interests in his first blended digital media task.

Further, in contrast to Riley's often jumbled and repetitive speech in Social Club presentations, when digitally communicating his interests in the form of a blended digital media assignment, Riley was able to plan a script and use images and videos to express meaning which may have kept him on track and focused when recording an oral explanation about his interests. This may have also acted as a prompt and guide for reminding him about the content he needed to explain thus providing a visual context to verbally expand upon.

Riley's Peer Interest and Feedback

Just as Riley's peers lacked an interest in viewing his comic books and YouTube videos during free time prior to the study, he was similarly observed to lack concern for the interests of his peers. Evidence of this is gathered from field notes that show that on

occasion Riley would read books while his peers spoke about their interests or talk over the top of them about his own interests:

> Mario is speaking to the class about his interest in basketball. Riley appears to be reading his comic book instead of listening. Riley laughs at something he reads and calls out "imposter" interrupting Mario. The teacher tells Riley to put his book away and listen. Riley spins on his chair and talks to himself under his breath *(Field notes, PCO: 06/02/13)*

On occasion Riley was observed to raise his hand to ask his peers questions but rather made statements that did not acknowledge his peers' interests or demonstrate he was listening to them. Rather his statements reflected his own concerns:

> Teacher: Do you have a question for Mario Riley?
>
> Riley: Yes I do
>
> Teacher: Ok what is it?
>
> Riley: Well did you know that there are these new episodes out…
>
> Teacher: Is this a question for Mario about his basketball?
>
> Riley: Well… not exactly but he might find it interesting… you see they have released them to…
>
> Teacher: I will have to come back to you later Riley. Does anyone have a question for Riley about what he just shared with us about his basketball? *(Field notes, PCO: 06/02/13)*

In contrast to these experiences Riley appeared to be engaged during the viewing of digital media assignments produced by his peers. This claim is evidenced by observations of him intently watching the screen as each media product was presented rather than becoming distracted by his own interests. He was also observed to react to the media as it was playing through facial expressions and verbal acknowledgement (e.g. laughing and sighs):

> …Riley is watching the screen as Charlie's blended digital media is playing on the Interactive Whiteboard. He is smiling and has not broken direct gaze since it started. He yelled out "batman" as an image appeared on screen. He is laughing at his dancing brother. He is clapping and raising his hand to ask a question *(Field notes, BDM1V: 17/09/13).*

Riley's enjoyment watching the digital media of others is further confirmed by his interview response that he "enjoyed watching everyone else's movies" (BDM1SI: 17/09/13). He was even observed to have watched Damien's digital media and applauded after viewing despite their history of conflict. Further, evidence that he was

engaged and listened to the explanation of interests offered by the blended digital media of his peers is demonstrated by his acknowledgement that he "learnt about others, like how Mario likes clothes and Charlie likes a video game called Kirby" (BDM1SI: 17/09/13). Further, Riley explained: "Well I learned that Jimmy, Jack and Damien all have a common interest. They all like cats. And well Charlie liked Lego, and he liked books as well, as did I" (BDM1SI: 17/09/13). These comments indicate that as a result of watching the blended digital media of his peers he discovered common interests with his peers and learned new things about them.

Dialogue between Riley and his peers following the viewing of digital media assignments show that Riley posed relevant questions and provided feedback to his peers in ways that were not observed during Social Club. For example, in contrast to his self-focussed comments in response to Mario's Social Club speech about basketball, upon watching Mario's blended digital media about his interest in fashion, Riley raised his hand and asked relevant questions out of curiosity that did not relate to his own personal interests:

Mario:	Riley *(points to Riley who has raised hand)*
Riley:	Well that was very good. I especially like the bit where you showed the suit. Do you have other suits like that one?
Mario:	Why yes I do but that one's my favourite one coz I was trying to show best things
Riley:	So have you worn it outside before?
Mario:	Yes I wear it sometimes when I feel like it or for special occasions
Riley:	Cool *(BDM1SI:17/09/13)*

In summary, to address research question three, evidence indicated that since the DMIP Riley experienced working with a partner and that although his interactions appeared uncompromising and controlling, observations show that partner work facilitated unique interaction opportunities between Riley and Charlie that would not have occurred if the two had worked alone as they were primarily accustomed to prior to the DMIP. Data also showed that Riley demonstrated positive interaction with his peer Damien throughout the DMIP despite a history of conflict. He even applauded Damien for his digital media assignments and approached him for the first time to play chess. While this cannot be solely attributed to the DMIP it is likely that it facilitated unique opportunities for the two to interact. Further, like Charlie, Riley was able to

produce a clear and coherent explanation of interests when given the opportunity to represent and express his ideas in the form of a blended digital media assignment. Further, data indicates that he gained knowledge and interest in his peers after viewing and providing feedback on their digital media assignments. The following section provides a summary of these findings alongside evidence pertaining to the other research questions that have been answered by the case of Riley.

Summary

A summary of each of the primary findings pertaining to the case of Riley are provided in Table 5.9 under headings that correspond with the study's research questions. As highlighted by Table 5.9, the case of Riley revealed that as a consequence of the DMIP he was able to create a suite of digital media for the first time in the form of a podcast, digital story, slowmation and two blended digital media assignments, and that in doing so gained digital media-making knowledge and experiences. Further, he employed a variety of written, oral, visual and digital technology skills. His digital media-making experiences throughout the DMIP saw him employ a variety of written, oral and visual skills, as well as apply and develop digital technology skills.

The case of Riley also demonstrated that his digital media-making experiences were informed by an awareness of the affordances of a range of modes. Further, evidence presented that he was able to apply his knowledge of modal affordances by combining modes and justifying his use media forms in the design of two blended digital media assignments. Evidence also indicates that the DMIP may have influenced communication (research question three) in a primarily helpful way as he demonstrated unique and positive peer interactions throughout the DMIP. His experience working alongside a partner to co-construct a slowmation proved to be a challenge and revealed difficulties regarding the social skill of negotiation. Nevertheless, since the DMIP he gained knowledge about his peers, offered peer-feedback, and clearly expressed a range of interests in the form of a blended digital media assignment.

Table 5.9

Summary of Findings for the Case of Riley

Digital Media Forms & Skills (RQ1)	Multimodal Awareness (RQ2)	Communication (RQ3)
• **Gained awareness of forms of digital media** • **Gained experience making his own digital media** since DMIP: made own podcast, digital story, slowmation and blended digital media for first time • **Developed and used various skills** to create digital media assignments: 　1. *Writing skills:* used storyboard and script to organise ideas; labelled images 　2. *Visual literacies:* used images to organise ideas (e.g. storyboard) and support writing and oral narration 　3. *Oral skills:* Orally expressed unscripted ideas; recorded narration without script 　4. *Digital technology skills:* Gained 4 digital technology skills (25% increase since DMIP); self-reported increase in skill level	• **Gained modal awareness:** Could identify modal affordances and articulate relationships between different modes and media combinations after DMIP • **Created multimodal digital media:** Combined a range of media and modes to create two blended digital media assignments. • **Demonstrated purposeful multimodal decision-making:** Justified use of modes and combination of digital media to communicate meaning in blended digital media assignments	• **Participated in social interaction** throughout DMIP: interacted more positively with Damien (despite history of conflict) • **Difficulty working as a pair** to co-construct a slowmation (controlling) • **Digitally communicated eight interests** in blended digital media assignment • **Initiated and sought peer feedback** during DMIP • **Expressed interest in others:** discovered common interests, more engaged by digital communication of interests than Social Club

The following chapter addresses the study's research questions with respect to the case of Jimmy.

Chapter 6: The Case of Jimmy

The case of Jimmy opens with background information that sets the scene for his involvement in the study. The chapter then explores the digital media assignments that he was able to create throughout the DMIP, and the written, oral, visual and digital literacy skills he employed to do so (research question one). Following this, Jimmy's awareness of modal affordances and ability to purposefully combine media forms are examined (research question two). Finally, the chapter considers the impact that the DMIP may have had on his communication with regards to his experiences interacting one-on-one with peers in social situations, his digital communication, and his initiation of and response to peer feedback (research question three).

Jimmy's Background

Jimmy is a 15-year-old student in year 9 diagnosed with an ASD (level one autism). He was enrolled in an autism support unit at the beginning of high school as a result of experiencing social skill difficulties associated with his ASD that prevent him from integrating into mainstream classes. Despite these difficulties, data suggests that he is content with the nature of his autism and acknowledges a range of strengths associated with having an ASD. For example, when delivering a speech to the class about his autism he explained:

> …when I found out I didn't really mind at all I wasn't really shocked… like it is a good thing coz it makes me better at things like sometimes I can react quickly which gives me sort of an advantage in games like dodge ball by keeping track of all of the balls positions and where they are coming from. (BP: 07/02/13)

School records indicate that he has a history of issues regarding school attendance and refusing to work (SBR: 04/02/13). Pre-study observations suggest that during class time he often appears lethargic, disinterested and lacking motivation. These claims are strengthened by the comments of Jimmy's teacher about his lack of engagement with school tasks:

> The thing with Jimmy is he can do a lot more and he knows a lot more than he lets on… he is actually very capable but has this real "I can't be bothered" sort of attitude and will pretend that doesn't know how to do something. He doesn't put much effort into

things and will always go for a short cut. Sometimes he just shuts down and won't do anything if he doesn't feel like it. (BTI: 25/02/13)

Pre-study interview responses indicate that his interests include cars, food, collecting figurines from his favourite movies, and playing a range strategy-based video games: "I like to play strategy-based games like battle nations where you have to build up an empire and army" (BSI: 25/02/13). Jimmy's interview responses also reveal that he enjoys downloading music from iTunes, playing games, and capture photos and videos of his cat: "I photo or sometimes take videos of interesting things that my cat has done like her antics and stuff" (BSI:25/02/13).

Pre-study interview data indicates that Jimmy prefers using digital technology to produce school work: "I would prefer to type than write things out… and PowerPoints are better than just typing up lots of words" (BSI:25/02/13). Further, his interview responses indicate that he believes that "work is better and more fun" when it allows him the opportunity to "use technology to produce things" (BSI:25/02/13).

1. Jimmy's Digital Media Forms and Skills

The digital media forms that Jimmy created as part of the DMIP and the skills he used to make digital media are examined in this section in response to research question one. Firstly, data are presented to explore the development of his knowledge and experiences regarding the creation of digital media. Secondly, details are presented regarding the digital media assignments that Jimmy was able to create. Finally, data pertaining to his use of digital media-making skills including written, oral, visual and digital literacies are described.

Digital Media-Making Experience and Knowledge

Jimmy's pre and post study interview and survey responses reveal that like Charlie and Riley, since the DMIP he too gained new experiences creating digital media and developed knowledge of digital media forms. His pre-study survey responses indicated he had never created a podcast, digital story, slowmation, or blended digital media prior to the DMIP. Evidence of this can be seen in Table 6.1 as before the study Jimmy ticked the "I have never done this" column to reflect his lack of experience creating each digital media form. In contrast, as shown by the yellow highlights in Table 6.1, in a post-study survey (after having created digital media for the first time throughout the

DMIP), he selected the "I can do this by myself" column alongside each media form thus showing enhanced self-reported ability and experience creating his own podcast, digital story, slowmation, and blended digital media.

Table 6.1

Jimmy's Digital Media-Making Experience Before and After the DMIP

Digital Media-Making	I have never done this	I can't do this	I need some help	I need a lot of help	I can do this myself
Making podcast					√
Making a digital story					√
Making a slowmation					√
Making a blended media					√

Key: .... = Before DMIP; √= After DMIP

Jimmy's increased knowledge of digital media forms since the DMIP is evidenced by his detailed explanation of the forms during a post study interview. His responses consist of statements with greater detail, reference to processes and media-specific terminology than his initial explanation of digital media forms prior to the DMIP. A comparison of his responses from before and after the DMIP is presented by Table 6.2.

The interview responses shown in Table 6.2 indicate that prior to the study Jimmy was familiar with aspects of what a podcast was "…something you would listen to", but that his knowledge of the digital story media form was limited as evidenced by his comment "I don't know that one or how to do that". In contrast, following the DMIP he was able to identify the modes fundamental to a digital story: "It's voice and photos", and describe the process of making one: "digital story is just pictures and you have to say something about them and explain". Interview data similarly reveals that prior to the study Jimmy was unsure about what blended digital media was and confused it with a project he was doing for Art: "I think I am learning to do that in art but just photos". Rather, after the study when asked what blended digital media was his answer demonstrated knowledge of the combination of different modes: "It's everything like movie, video, photos and voice, or slowmation, movies, pictures and voice…" Like Riley, Jimmy's initial interview responses demonstrate that he had a developing knowledge of animation and the processes by which animators engage with to produce

sketches and Claymation, but was unable to describe what a slowmation was. Nevertheless, during his post study interview, after having created his own slowmation, he was able to explain: "Slowmation is just a bunch of images put together to try imitate movement…it has both voice and movement…" His slowmation description also included reference to terminology such as 'frames per second' and drew comparisons with a digital story thus indicating gained awareness of the processes and features of media forms: "Slowmation has faster fps and would take a lot longer to make than a digital story".

It is likely that Jimmy's increased knowledge of digital media forms was a result of his new experiences creating digital media as a part of the DMIP. Evidence of this is demonstrated by his reference to the processes of creating digital media forms in his post-study interviews. It is probable that having created digital media as part of the DMIP Jimmy was able to talk from experience and describe that experience.

Table 6.2

Jimmy's Awareness of Digital Media Before and After the DMIP

Media	Awareness Before DMIP	Awareness After DMIP
Podcast	• "It's pretty much like putting a video and making it pretty much like something you would listen to or watch and putting it on places like iTunes…I have never made one though. I have some on my iPad though with iTunes"	• "It's just voice" • "…the podcast is just talking"
Digital Story	• "I don't know that one or how to do that"	• "It's voice and photos" • "Digital story is just pictures and you have to say something about them and explain"
Slowmation	• "I have zero experience with animation" • "I think you start with a sketch and then improve it by doing another one that makes them do something like move an arm…" • "Claymation is where they have to move slowly"	• "You make it yourself…you need to make the things move" • "Slowmation is just a bunch of images put together to try imitate movement…it has both voice and movement…" • "Stop-motions take ages to do… the images are quicker frames per second" • "Slowmation has faster fps and would take a lot longer to make than a digital story"
Blended media	• "I think I am learning to do that in art but just photos"	• "It's everything like movie, video, photos and voice, or slowmation, movies, pictures and voice…"

Jimmy's Digital Media Assignments

This section addresses data specific to each of the digital media assignments Jimmy created as part of the DMIP including a podcast, a digital story, slowmation, and two blended digital media tasks.

Podcast. Observation and work sample data provide evidence of the podcast that Jimmy was able to create as part of the DMIP. To align with the World War 2 theme of the History unit of work that this task was a part of, like Charlie and Riley, the content of Jimmy's podcast concerned the leadership style of Japanese emperor Hirohito. Field notes show that Jimmy used the internet to gather information and compiled this in a word document prior to recording his podcast. Unlike Charlie who copied and pasted information directly into a word document, and Riley who typed his own notes, Jimmy pasted information from the internet and then modified and added to it using his own words:

> Riley is copying and pasting information from website into word documents. He is rewording the information. He is reading the web page. He begins typing information into his word document… *(Field notes, PL1: 07/05/13)*

Jimmy's podcast notes are shown in Figure 6.1

Emperor Hirohito

Today I am going to talk about Emperor Hirohito born on January 1st 1901 posthumously referred to as Emperor Shōwa in Japan. Hirohito's reign of Japan started in 1926 after the death of his father during this time Japan was already the 9th largest economic superpower and by the end of the war Japan was then the 2nd largest economic superpower and Hirohito did not get punished for his war crimes because of how he helped Japan grow to what it is today.

During WWII Japan joined the axis along with fascist Italy and Nazi Germany. Hirohito's plan suggested by his military advisors was to expand to china and the pacific unaware of the counties that are already defending them.

One of Hirohito's orders was a full scale assault of Hawaii also known as the attack on pearl harbour this battle consisted of co-ordinated attacks on different areas at once and to prevent America from interfering with the Japanese navy with attacking Papua New Guinea, Malaya and U.S held Philippines the action of the Japanese resulted in America charging into the war.

As the war turned against the Japanese, Hirohito personally found the threat of defection of Japanese civilians disturbing because there was a risk that live civilians would be surprised by generous U.S. treatment. Native Japanese sympathizers would hand the Americans a powerful propaganda weapon to subvert the "fighting spirit" of Japan in radio broadcasts. At the end of June 1944 during the Battle of Saipan, Hirohito sent out the first imperial order encouraging all Japanese civilians to commit suicide rather than be taken prisoner

Figure 6.1   Jimmy's Podcast Notes

Field notes reveal that after compiling his notes, like Riley, Jimmy printed them out and read them aloud word-for-word to record his podcast narration:

…he prints out his notes and opens sound recorder on the computer. He presses the record button and reads his notes. He presses stop and saves the file as 'podcast' to his USB. *(Field notes, PL2: 08/05/13)*

The transcript of his podcast is shown in Figure 6.2.

Today I am going to talk about Emperor Hirohito born on January 1st 1901 posthumously referred to as Emperor Shōwa in Japan. Hirohito's reign of Japan started in 1926 after the death of his father… during this and during this…oh during this time… during this time Japan was already the 9th largest economic superpower and by the end of the war Japan was then the 2nd largest economic superpower and Hirohito did not get punished for his war crimes because of how he helped Japan grow to what it is today.

During WWII Japan joined the axis along with fascist Italy and Nazi Germany. Hirohito's plan suggested by his military advisors was to expand to china and the pacific unaware of the counties that are already defending them.

One of Hirohito's orders was a full scale assault of Hawaii also known as the attack on Pearl Harbour this consisted of coordinated attacks on different areas at once and to prevent America from interfering with the Japanese navy with attacking Papua New Guinea, Malaya and U.S held Philippines the action of the Japanese resulted in America charging into the war.

As the war turned against the Japanese, Hirohito ~~personally~~ found the threat of detection of Japanese civilians disturbing because there was a risk that live civilians would be surprised by generous U.S. treatment. The Native Japanese sympathizers would hand the Americans ~~a~~ powerful propaganda weapon to subvert the "fighting spirit" of Japan in radio broadcasts. At the end of June 1944 during the Battle of Saipan, Hirohito sent out the first order to encourage all Japanese civilians to commit suicide rather than be taken prisoner

Figure 6.2   Jimmy's Podcast Transcript

Digital Story. Evidence of the digital story that Jimmy created as part of an English assignment throughout the DMIP was gathered from observation and work sample data. Analysis of data revealed that like Charlie and Riley he created a storyboard to organise his ideas regarding the assigned topic of friendship using written language and images before using software to create his digital story. Jimmy's storyboard is shown in Figure 6.3. Field notes reveal that the processes he followed to produce a storyboard began with typing his ideas into a Word Document and searching for images online to support his written ideas.

Jimmy opens a word document and begins typing his ideas about friendship… he has finished typing his ideas, opens up an internet browser, and types Creative Commons into search tab. He types "friend memes" into Creative Commons search engine and browses images that appear. He selects an image of cats, right clicks and saves the

image to the desktop… he selects "insert" and imports his images from the desktop into his word document. He arranges each image under its appropriate sentence. *(Field notes, DS1: 03/06/13).*

Why is it important to have friends?

[sic]
1. It's important to have friends when your upset about something and they can cheer you up

2. Without friends you could be very lonely and be a "bystander"

3. With friends you can play fun things like video games

4. Friends can help by backing you up in bad situations

Figure 6.3   Jimmy's Digital Story Storyboard

Observations reveal that after having created a storyboard, Jimmy opened Windows Movie Maker software on his computer and began creating his digital story by importing storyboard images and recording an audio narration (DS2: 04/06/13). While he had written sentences about friendship in his storyboard, the transcript of his audio recorded narration as shown by Figure 6.3 does not match his written ideas. Comparing his storyboard notes to this transcript reveals that unlike Charlie and Riley, Jimmy did not read his storyboard but rather improvised a verbal expression of ideas for his digital story narration. This is further supported by field notes that describe him looking at

images on his computer screen while recording a narration for his digital story in Movie Maker:

> …he is arranging his imported images in the Windows Movie Maker program. He drags his cursor across the images to extend their default frame speed. He plays the slideshow of images and practices talking to himself… he presses "record narration" and speaks into the microphone. As he speaks he is looking at the images and explaining what they represent… *(Field notes, DS2: 04/06/13)*

> It's important to have friends…
> It's important to have friends for the reason being it stop you being bored and alone and not be able to interact with other people
> And here is a dinosaur that said his friends are all dead because he managed to survive (laughs)
> By having friends you will be able to do really fun things like play video games online or have your buddies over for pizza.
> Friends will always listen to each other and their problems…and another picture…playing Xbox booo Microsoft.
> Friends can also back each other up with problems like bullies and stand up to them depending on what age they are and who is being bullied.
> For example, a bully could be picking on one of your friends who may not be able to fight back.
> Friends can also help you go through traumatic events like losing family members or something like a house burning down or recovering from a bad injury.
> And there's another photo….yeah

Figure 6.4   Jimmy's Digital Story Transcript

Observations indicate that it took Jimmy four attempts to record his narration as his oral explanation of images was occasionally out of sync with the frame speed of his images. Unlike Charlie and Riley, he recorded his narration in many sections and reviewed and re-recorded where necessary.

> …he stops recording after 10 seconds, selects the dinosaur image and extends the frame speed of the image. He presses "record narration" and begins to speak into the microphone again… *(Field notes, DS2: 04/06/13)*

Slowmation. Observation and work sample data show that Jimmy was able to co-create a slowmation about the novel Oliver Twist with his peer Jack as part of a DMIP English assignment and that unlike Charlie and Riley, he did not experience issues working as a pair, making joint decisions and sharing roles. Evidence indicates that unlike his digital story, when it came to design his slowmation Jimmy did not create a storyboard like Riley did for his slowmation. Rather, observations show that he

and Jack discussed their ideas and began manipulating and photographing Lego models to re-enact the scene where Oliver Twist meets the character Jack Daw. Observations show that Jimmy manipulated the Lego figurines while Jack took photographs using the iPad. Further conversations between the two students reveal that the decisions he made about how to animate the scene occurred informally throughout this process:

Jimmy:	So we'll get this guy to be Oliver and when he's getting chased we'll…
Jack:	Well this guy could be the one that chases him
Jimmy:	Yeah ok then… ok yeah that makes sense…
Jimmy:	So I'll move him here. Okay. Did you take that?
Jack:	Yep. Got it. Go again.
Jimmy:	Let's make him go a bit to this side before we bring in the other guy…
Jack:	Oh dammit I got your hand. Movie it back…that's better.

(Field notes, SL1: 12/08/13)

Evidence of Jimmy's animation decisions and manipulation of Lego characters is provided by the still images captured by Jack in Figure 6.5.
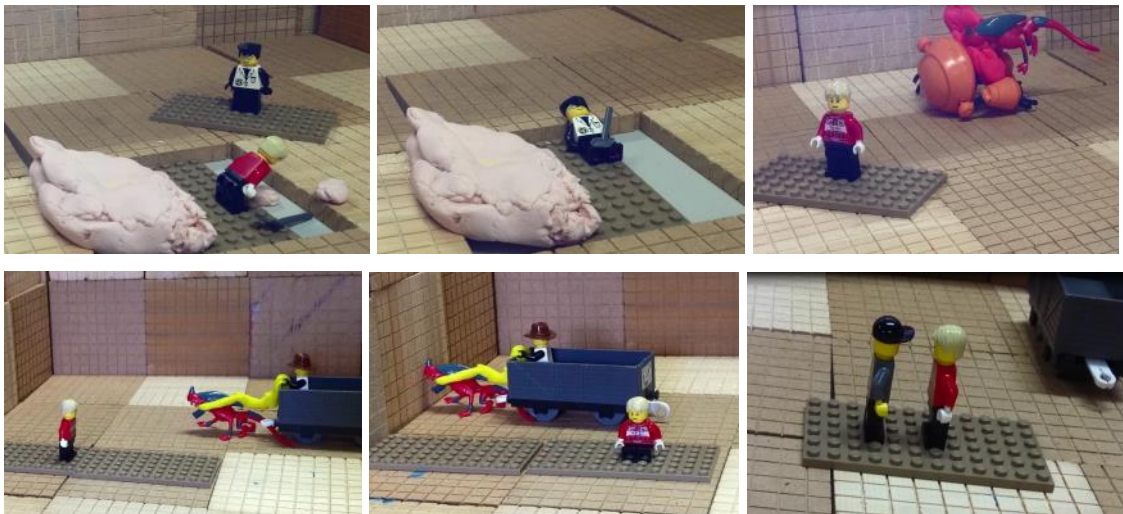
Figure 6.5   Jimmy's Lego Character Manipulation

Analysis of dialogue that occurred throughout Jimmy's making of a slowmation reveals that, unlike Charlie and Riley, he and Jack shared roles and made mutual decisions. There was no indication of a situation where the two disagreed or ignored the suggestions of the other as was the case with Charlie and Riley. Conversely, they both used positive language to acknowledge the ideas of the other. For example, Jimmy was observed to say comments such as: "that's a good idea", "yeah that'll work", "cool oh yes", and "yeah that makes sense" (SL1: 12/08/13). Further, unlike Riley who took on

the sole responsibility of recording narration on behalf of himself and Charlie, Jimmy

and Jack appeared to share responsibility for recording a narration for their slowmation.

Observations show that they took on different character roles and both contributed to

the recording of a narration to support the slow-moving images. Evidence of this is

demonstrated by the transcript of their recorded narration in Figure 6.6.
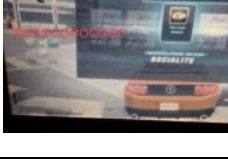
Jimmy:	Your mum is a criminal!
Jack:	No she's not!
Jimmy:	Owwww that hurts so bad…get back here!
Jack:	Never!
Jimmy:	Oh no I'm being chased! Oh god help me somebody help me oh god it hurts so badly!
Jack:	So hungry!
Jimmy:	Potatoes. Fresh potatoes. Get your fresh potatoes only a dollar a kilo…
Jack:	I don't have any money
Jimmy:	Oh sorry mate I wish I could help ya… Hey there what's the matter?
Jack:	It's nothing it's just I'm so hungry I could eat a cow!
Jimmy:	Come with me and I will take you to a place that lets people live by lodging
Jack:	Interesting. Also my name is Oliver Twist what's yours?
Jimmy:	Ok Ollie, my name is Jack Daw. Most people call me the artful dodger
Jack:	Ollie? What do you mean by that?
Jimmy:	It's just a little nickname. Everyone needs one. Now let's get you something to eat…

Figure 6.6   Jimmy's Slowmation Transcript

Blended Digital Media. Observations and work samples reveal that like

Charlie and Riley, Jimmy was able to create two blended digital media tasks throughout

the DMIP. His first blended media task was described his personal interests (English

assignment), and the second was intended to compare and contrast life in Victorian and

present times (History assignment). Table 6.3 and Table 6.4 provide evidence of each of

the blended digital media assignments that he could create. Specifically, each table

features a screenshot of the digital media used to communicate meaning and a

transcription of the narration. As shown by Table 6.3, Jimmy's first blended digital

media task included combining digital story and video (like Charlie and Riley),

whereas, his second task, as shown by Table 6.4, blended the digital media forms of

slowmation, digital story and video (like Riley).

Table 6.3

Transcript of Jimmy's First Blended Digital Media

Digital Media	Narration
Video: Random in-game footage 	I am doing a most-wanted pursuit in my ford mustang boss. I'm holding this up with a tissue. Yeah. And a couple of other things. Just to show I'm me I'm right here (waves). I will move my stuff so you can actually see the screen. But all in all wish me luck. Hopefully I don't stuff this up coz that would just be bad. Nobody likes to see anybody stuff up. Non intelligence. This will basically be a commentary. Ok so let's leave this safe house in my Ford Mustang Boss Rio 2. Okay you know what friends since I am basically laying here I'm just gonna do a race. I just want to get this over and done with. It's open for a race, Oh crap I forgot to ask it…YOLO swag I don't care if it's not prepared yet. Hopefully there aren't rammers. Hopefully I am just racing in the great city of Paulmont… Oh listen to that engine. Eat my dust. Oh sorry mate. Oh he's been using notches Oh no come back here I want to pass you so I can beat you and laugh in your face… well laughing not really since I can't really laugh in your face legitimately, but you possibly know what I mean. It's the first time I have ever done this it's so uncomfortable. I wish you could see me right now and how uncomfortable I look. In fact I will just show you after this race is over. Oh no! Let's at least hit second. Come on. I'm not gonna lose to some other pony car since that's actually what a ford mustang is called, a pony car. And I come second. Let's see, let's see, let' see…. Where's my mouse, oh let's see what do I get? Oh crap…not any of them! Well this is where I was sitting…yeah pretty uncomfortable… and that was my screen all folded down. So yeah I hope you enjoyed
Video 	So this is another game. So I am just gonna possibly do another few battles, harvest some stuff…I don't know Just try to find something worthwhile to attack… ooo so we've got two chemical sprinklers… I won't really use them. I'll put down my trebuchet and big foot, two mg torrents and…yep. I'm gonna fire a chemical and get the bullfrogs so they do not attack me whatsoever because they are annoying to me and I don't want them to me and I don't want any of my guys to be killed. MG spam… yeah good luck with that because my big feet have some of the best armours and explosive resistance. Mmmmhmmmm. Get rid of the….oh nooooo…oh well I was going to kill you quickly but…yep…there's chemicals on you now. Chemicals everywhere. Oh…do not attack me again…not to the face… oh dammit! Spam1 yay! And yeah that's battle nations for ya. It should be a lot more interesting than the other video. Sure dat!
Digital Story 	Ummm here is my cat. My cat is sleeping and before anyone asks, Damian, cats only bite if you make them angry. Alright.
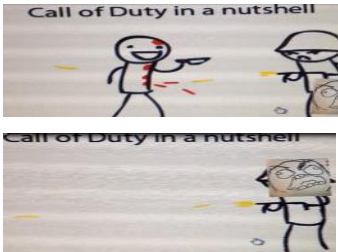
Digital Story 	*(Written caption above image: MMMMMMM ROAST LAMB AND SPAGETTI)*
Video 	*(Written caption above video: Juice…….It doesn't exist in my house since I drank it)*
Digital Story 	*(Written caption above image: Behold a blurry picture of pasta lol)*
Digital Story 	This is a picture of a venerable dreadnaught which is basically a dreadnaught which holds a fallen high ranking space marine like a vanguard veteran or stone card veteran
Digital Story 	*(Written caption on image: HOT WATER BOTTEL LULZ)*
Digital Story 	*(Written caption on image: My psvita :3)*
Digital Story 	This is my back pillow. I just rest on it. Here's my hot water bottle, and a tissue that I randomly left on the bed, a PE uniform and I think that may be a tissue box, I think.
Digital Story 	Behold… the last egg in my house. And there is some random pickle mustard stuff.
Digital Story 	Pizza from my local shop.
Video 	But this is just some delicious pasta
Digital Story 	And here is a photo of my old bed…well with my old pillow since I replaced it with a new pillow. Yay.

Table 6.4

Transcript of Jimmy's Second Blended Digital Media

Digital Media	Narration
Slowmation	Oh boy I love this new PC. Better than the so-called…
Digital Story	Next gen consoles… the PS4 triumphs over the Xbox 1. If only I could get one of those.
Slowmation	Oh well I guess I will just see if there's anyone online or maybe some of these cheap games I just bought…
Video	Rahhhhhh…. Die… oh nooooooo

Unlike Charlie and Riley, data revealed that Jimmy did not create a storyboard prior to gathering digital media for either of his blended digital media assignments. Rather, after having gathered digital media for his first blended digital media task, he was observed to write captions on some of his images and write a script in preparation for recording a narration to explain his images (see Figure 6.7). Field notes provide evidence of this:

> He is using the 'caption' tool in Windows Movie Maker to type "My psvita:3" on the image of his PlayStation …he is looking at the images he imported into Windows Movie Maker and writing a script in a Word document. He is listing each of his interests using numbered bullets that correspond with the type and order of the images he has imported… *(Field notes, BDM12: 12/09/13)*

My interests blended media:
1. Hello this is my movie about my house and what I like to do there :3
2. I really like certain foods and drink like….
3. Eggs,
4. Juice,
5. Cordial
6. And I like making creamy pasta mmmmmmmmmmmm….. :3
7. I also like playing games like need for speed world and other games here is a sorta mini montage lol
8. And here is a commentary sorry that I stuffed up lol it was hard to play
9. This is where I was sitting
10. Thank you random tissue I couldn't have done that video without you
11. This is a random video of my bed
12. Here is a venerable dreadnought from the tabletop game warhammer 40k which is a mechanised suit that is piloted by a space marines mortal remains who is horrifically injured beyond healing and near death to keep the marine alive thy put them in a sarcophagus of a dreadnought so that they may continue fighting for the emperor some dreadnoughts are known to be indestructible until the sarco

Figure 6.7   Jimmy's Script for First Blended Digital Media Assignment

Data analysis reveals that the language of the script that Jimmy produced in Figure 6.7 does not match the transcript of his recorded narration in Table 6.3. One reason for this may be that this script was a guide. Further, unlike Charlie and Riley, he mostly narrated his videos as he recorded them and therefore only needed to audio record a narration for images. Further, he included written captions on many of his images and may have not seen the need to record an oral narration for them: "I don't need to say anything. It's obvious… it says it there" (BDM1SI:17/09/13). Despite having created a script of what to record for his narration, field notes reveal that he did not read that script. Rather, he spoke into the microphone while viewing his digital media on the screen:

> …he is describing the image of his cat. He isn't describing his picture of pasta. This image has a caption that reads: "MMMMMMM ROAST LAMB AND SPAGETTI"….he is recording a narration to explain his dreadnaught image. This image does not have a written caption… *(Field notes, BDM12: 12/09/13)*

Comparing the content of Table 6.3 and Table 6.4 indicates that Jimmy's first blended digital media task was more comprehensive than his second. Further, according to his teacher, unlike his first task where he met the criteria of the assignment to use digital media to describe his interests, he did not meet the requirement of the second task to use digital media to represent Victorian times as Charlie and Riley did. As explained by his teacher, it is possible that Jimmy did not fully understand the requirements of the task:

> He didn't seem to quite get it. He seemed to just focus on present times without comparing anything and no mention at all about Victorian times. Maybe he thought that was all he had to do… it's a shame coz his first one was so great. It was eight minutes long too. But this one was very short and it didn't really relate to what he was supposed to do for it (BDM1TI: 17/09/13)

Jimmy's difficulty meeting the requirements of the second blended digital media assignment may also be explained by his observed lack of interest during the task. For example, data indicates that unlike his first assignment, he had to be prompted to stay on task, and did not combine or narrate as much digital media for his second blended digital media.

> He is listening to music on his computer and not doing the task. The teacher redirects him to the task... he opens Windows Movie Maker and looks blankly at the screen… he swings on his chair and stares out the window… the teacher gives him another reminder to stay on task... he complains that he is tired and pretends to work on the assignment but listens to music instead… *(Field notes, BDM23: 17/10/13)*

Jimmy's Digital Media-Making Skills

This section identifies the written, oral, visual and digital technology skills that Jimmy employed across the DMIP to create digital media assignments.

Writing Skills. Data indicates that like Charlie and Riley, Jimmy's writing skills guided his organisation and expression of ideas when creating digital media throughout the DMIP. Data also suggests that writing may have supported his oral and visual skills with specific regards to his use of images and audio recorded narration.

Evidence of Jimmy's writing skills assisting him in the organisation of ideas throughout the planning phase of digital media construction is demonstrated by work samples of storyboards and scripts that he produced prior to making digital media. For example, he typed a script for his podcast (Figure 6.1), a storyboard for his digital story (Figure 6.3), and a script for narrating images in his first blended digital media (Figure 6.7). Nevertheless, transcripts of each of these digital media assignments reveal that only the podcast script was read aloud as a guide for narration. Further, while Jimmy demonstrated that his writing was a means of organising and planning his ideas for digital media construction, the fact that he did not produce a script or storyboard for his slowmation or second blended digital media task suggests that such a process was not essential for planning as it was for other case studies.

Observation records show that writing was a significant component of the narration for each of Jimmy's digital media assignments (with the exception of his slowmation). For example, the fact that he was observed to read aloud his podcast script word-for-word when recording his narration shows that this script acted as a guide for his oral explanation. Further, the inclusion of captions on images and videos throughout his digital story and blended digital media assignments (like Charlie and Riley) indicate that in some instances writing was used to supplement and in some instances, replace an oral narration.

Evidence that Jimmy's writing skills may have influenced his use of visual media, as was the case with both Charlie and Riley, is demonstrated by observations of him creating a digital story. Field notes reveal that he initially wrote his ideas into a word document and then searched for and imported images alongside each written sentence to produce a storyboard. Consequently, it is possible that, like Charlie and Riley, Jimmy's written ideas guided his image choice and use.

Jimmy's use of written captions in both blended digital media assignments demonstrates his intention to use various functions of written language to communicate meaning. For example, the written title of a video "Random in-game footage" is seen to act as a label, like that used by Charlie and Riley, with the function of categorising and describing his video footage. Whereas, his use of captions throughout video footage of racing car games such as "There is my hand lol" appears to act as commentary and offer additional insights that are not pictorially or orally expressed. Charlie and Riley did not appear to use written language for this function. While Jimmy used written language to

caption his visual media in ways that were similar to the basic labelling functions of Charlie and Riley's use of written text, his additional use of written commentary and inclusion of memes (images with text) makes him unique among the case studies.

Like Riley, it appears that Jimmy also used written language to achieve humour. For example, it is possible that Jimmy's use of abbreviations, smiley faces and sarcasm in written captions may have had the intent of making the viewer laugh.

Visual Literacy Skills. Data suggests that Jimmy's use of visual media including images and videos may have facilitated his organisation of ideas and oral narration for digital media assignments. Unlike Charlie and Riley, it appears that visual media was more fundamental to Jimmy's planning and design than the use of written notes, storyboards or scripts. For instance, his use of images and video also appeared to assist him in his design of a slowmation and two blended digital media tasks. Unlike the common practices of Charlie and Riley, rather than create a written script for each of his tasks, Jimmy gathered visual media (images and videos) and made decisions through the process of including, discarding or combining this media with other modes of communication: "I didn't need to write it down it was in my head... I just took the pictures… I just went through the pictures… I deleted stuff and picked the right ones out… didn't storyboard" (BDM1SI:17/09/13).

Analysis of Jimmy's digital media assignment transcripts reveals that his visual literacy skills may have supported his oral skills, and that this support may have been more significant than that experienced by the other case studies. Field notes show that unlike Charlie and Riley who occasionally looked at their visual media when recording a narration for their assignments, when recording his narration for all digital media (except his podcast) Jimmy held his gaze at his pictures and videos and improvised a narration as opposed to reading word-for-word from a written script as many of his peers did.

Further evidence of visual literacy skills supporting Jimmy's oral language is demonstrated by a comparison between his digital story storyboard and transcript. This comparison shows that he was able to describe more reasons for friendship being important after having gathered and imported images than he could beforehand. This is shown by Table 6.5. As can be seen in this table, Jimmy's justification of friendships after gathering images is articulated with greater detail than his storyboard and uses examples such as: "For example, a bully could be picking on one of your friends who

may not be able to fight back" and "traumatic events like losing family members or something like a house burning down or recovering from a bad injury". Table 6.5 also demonstrates that he directly referred to his images when narrating his digital story: "And here is a dinosaur" and "And there's another photo", thus supporting the claim that images helped shape his oral narration.

Table 6.5

Jimmy's Digital Story Ideas Before and After Gathering Images

Ideas Before Images	Ideas After Images
- It's important to have friends when your [sic] upset about something and they can cheer you up - Without friends you could be very lonely and be a "bystander" - With friends you can play fun things like video games - Friends can help by backing you up in bad situations	- It's important to have friends… It's important to have friends for the reason being it stop you being bored and alone and not be able to interact with other people - And here is a dinosaur that said his friends are all dead because he managed to survive (laughs) - By having friends you will be able to do really fun things like play video games online or have your buddies over for pizza. - Friends will always listen to each other and their problems…and another picture…playing Xbox booo Microsoft. - Friends can also back each other up with problems like bullies and stand up to them depending on what age they are and who is being bullied. - For example, a bully could be picking on one of your friends who may not be able to fight back. - Friends can also help you go through traumatic events like losing family members or something like a house burning down or recovering from a bad injury. - And there's another photo….yeah

Evidence from Jimmy's blended digital media work samples show there were instances where his use of visual media substituted oral narration. This is demonstrated by the fact that for four images and one video in his first blended digital media assignment he did not record an oral narration (see Table 6.3). Evidence of his preference to communicate meaning visually is supported by his interview response: "There was no need to say anything about it coz the pictures… say enough" (BDM1SI: 17/09/13). It is worth noting that for some of these images he included captions thus reinforcing his preference for visually communicating meaning.

Oral skills. Analysis of Jimmy's digital media assignment transcripts, field notes, and interview data support that he has strong oral skills. For example, unlike Charlie and Riley, he was observed to orally narrate his digital story, slowmation and blended digital media tasks without having to read from a script. These observations are

supported by the absence of scripts or storyboards for these tasks. Further, in the one instance where he had a storyboard (digital story) he did not read from it as demonstrated by field notes and the stark contrast between the language of his transcript (Figure 6.4) and storyboard (Figure 6.3). Evidence of Jimmy's skills regarding speaking without a script are also demonstrated by his ability to narrate video footage as it was being captured for his first blended digital media assignment. Other case studies did not do this but rather recorded a narration after they had captured video footage. Further, Table 6.3 shows that unlike Charlie and Riley, Jimmy's narration of videos acted as a commentary that described events visually taking place. As he demonstrated how to play a car racing and battle game he explained: "This will basically be a commentary".

Analysis of the language used by Jimmy throughout his oral narration of digital media assignments reflects an awareness of audience. This is demonstrated by his use of language, like that of Riley, that directly addresses the viewer of his digital media as "you". Moreover, Jimmy's use of oral language reflects his awareness and ability to communicate with a range of audiences. For example, unlike his peers, in the case of his first blended digital media assignment the audience that Jimmy addresses in his oral narration appears to alternate between a general viewer audience, to characters in his video game, a specific student, and himself. Table 6.6 identifies language from the transcript of his oral narration that addresses each of these audiences.

Table 6.6

Audiences Addressed by the Oral Narration of Jimmy's First Blended Digital Media

General audience	Specific student	Video Game Characters	Self
"I will move my stuff so you can actually see the screen" "…wish me luck" "Okay you know what friends…" "I wish you could see me right now and how uncomfortable I look. In fact I will just show you after this race is over" "I hope you enjoyed" "…that's battle nations for ya"	"Ummm here is my cat. My cat is sleeping and before anyone asks, Damien, cats only bite if you make them angry. Alright."	"Oh sorry mate." "Eat my dust" "Oh no come back here I want to pass you so I can beat you and laugh in your face… well laughing not really since I can't really laugh in your face legitimately, but you possibly know what I mean" "Get rid of the….oh nooooo…oh well I was going to kill you quickly but…yep…there's chemicals on you now. Chemicals everywhere" "Oh…do not attack me again…not to the face… oh dammit!"	"Oh crap I forgot to ask it…" "Hopefully I don't stuff this up coz that would just be bad. Nobody likes to see anybody stuff up"

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As shown by Table 6.6, when speaking Jimmy intended to address the viewer of his blended digital media, referring to them as "friends", and the characters in his video game: "Oh no come back here I want to pass you so I can beat you and laugh in your face". The table also demonstrates that he verbalised his thoughts "Hopefully I don't stuff this up…" and more directly he addressed one of his peers: "…before anyone asks, Damian, cats only bite if you make them angry". These comments suggest that Jimmy's use of oral skills were used to provide a commentary, create character role play, and express his thoughts and reactions during the playing of video games. Most significantly, the comment addressed to Damien suggests that his oral language was employed to pre-empt a potential comment from his peer. Such a response reflects forethought and an ability to consider the perspectives and reactions of others (theory of mind skills). Jimmy's comments to a variety of audiences is unique when compared with other case studies who on occasion addressed only the general viewer.

      Digital Technology Skills. Survey and interview data revealed that, like Charlie and Riley, Jimmy demonstrated a self-reported increase in technology skills for making digital media after the DMIP. Table 6.7 compares pre and post survey data regarding his reported skill acquisition/level and shows that he identified as having gained seven new skills after the DMIP. Specifically, prior to the study he identified with never having edited, saved, downloaded or imported videos, recorded or imported sound files, or combined photos and videos in Movie Maker. This is evidenced by his selection of the "I have never done this" column for these skills as shown in Table 6.7. Nevertheless, when surveyed after the DMIP he identified being able to apply these skills on his own as evidenced by his selection of the column "I can do this myself". Table 6.7 also shows that prior to the study he felt that he needed "some help" to be able to create a storyboard/script, and save and import photos to a computer. However, following the study he expressed "I can do this myself" thus indicating a growth in his perceived ability to employ these skills independently. Analysis of these figures reveals that prior to the study he reported that he could apply 43.75 % of digital media-making skills by himself (less than that of Charlie and Riley), 12.5% with some assistance, and lacked experience regarding 43.75% of skills. In contrast, following the DMIP he reported 100% capability with regards to the employment of all 16 digital technology skills, thus reflecting a 56.25% self-reported skill increase.

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Work sample data supports that Jimmy was able to employ the skills he had previously identified as not possessing. For example, his podcast and blended digital media can attest to his capacity to create, manipulate and combine photos, audio and video files. As was also the case with Charlie and Riley, it is likely that the digital media assignments Jimmy created as part of the DMIP gave him the opportunity to apply a range of digital technology skills and thus shaped his reported perception of his capabilities during his post-study survey.

Table 6.7

Jimmy's Digital Technology Skills Before and After the DMIP

Digital Technology skills	I have never done this	I can't do this	I need some help	I need a lot of help	I can do this myself
Internet research					√ (yellow)
Storyboarding/script writing			(yellow)		√
Taking photos					√ (yellow)
Saving/importing photos to computer			(yellow)		√
Downloading photos from internet					√ (yellow)
Editing photos					√ (yellow)
Adding photos to slideshow					√ (yellow)
Taking videos					√ (yellow)
Editing videos	(yellow)				√
Saving videos to computer	(yellow)				√
Importing videos into movie making program	(yellow)				√
Downloading/saving videos from internet	(yellow)				√
Recording voice					√ (yellow)
Saving voice recording to computer	(yellow)				√
Import sound into movie making program	(yellow)				√
Combine photos & videos using Movie Maker	(yellow)				√

Key: [yellow] = Before DMIP; √ = After DMIP

In summary, data presented answers research question one with respect to the case of Jimmy. Data provide evidence that he could create a suite of digital media independent

of teacher instruction (podcast, digital story, and two blended digital media) as part of the DMIP, but that his second digital media assignment did not meet content task requirements, suggesting that he may have been distracted by, or was unaware or disinterested in the task. Data also show that he was able to work alongside his peer Jack to co-construct a slowmation, and that unlike Charlie or Riley, he did not experience difficulties collaborating. Rather data demonstrate that he equally contributed to the decision-making, design and production of the slowmation. In creating digital media assignments Jimmy demonstrated a range of writing, visual literacy and oral skills, and similarly displayed and gained digital technology skills. Jimmy was unique in that unlike his peers, visual media guided his planning and oral narration more than written notes or scripts. Moreover, when compared with his peers he demonstrated stronger oral skills with regards to recording a narration for his digital media, as evidenced by his capacity to improvise speech, provide commentary and address a variety of audiences in his narration. He also appeared to use written language in different ways to the other case studies in that apart from labelling images he used written text to comment on visual media and in some instances supplement oral narration (e.g. use of memes). The following section considers research question two and thus examines Jimmy's multimodal awareness and design of two blended digital media assignments.

2. Jimmy's Multimodal Awareness

Data concerning Jimmy's multimodal awareness across his experiences creating and combining a range of digital media throughout the DMIP are examined in this section to address research question two. Data are presented in two parts. Firstly, evidence of his awareness of modal affordance throughout the DMIP is examined. This is followed by an analysis of data pertaining to his capacity to design and justify his use of digital media in the creation of two blended digital media assignments.

Jimmy's Awareness of Modal Affordances

Data revealed that like Charlie and Riley, Jimmy demonstrated a developing awareness of the affordances of modes of communication that are fundamental to digital media forms. Evidence of this awareness is apparent in his interview responses throughout the DMIP. Table 6.8 provides an overview of his explanation of the use of various modes

and thus reinforces the claim that he could identify affordances through describing unique features and reasoning about the potential of modes achieving specific communication purposes.

Table 6.8

Jimmy's Awareness of Modal Affordances Throughout and After the DMIP

Modes	Explanation of Modal Affordances
Oral narration	• "…you have to say something about the pictures and explain" (PSI: 11/11/13) • "I'm basically just doing commentary with my voice and talking to the other cars" (BDM1SI: 17/09/13) • "I'm explaining the game and the different moves you can do so when you watch it you feel like you are playing it too" (BDM1SI: 17/09/13) • "It's a voice commentary keeping you updated with how the game progresses" (BDM1SI: 17/09/13) • "I said 'here is my cat' because otherwise you might just think it is a random cat" (BDM1SI: 17/09/13) • "I explained his story in case you didn't know it" (BDM1SI: 17/09/13) • "I talked about the different things in the picture" (BDM1SI: 17/09/13) • "I said 'it's from my local shop' because how else would you know?" • "I spoke for this so I could say it was delicious and you can't really see that from the video so it has to be said" (BDM1SI: 17/09/13) • "It's about telling the story so that's why I explained what he was thinking about doing… how else do you know what he's thinking unless I say it" (BDM2SI: 21/10/13) • "This is a bit funny especially the sound effects rahhhhh" (BDM2SI: 21/10/13)
Still images	• "Photos are for still detail or something that is not moving or doing anything" (PSI: 11/11/13) • "You make it yourself…you need to make the things move" (PSI: 11/11/13) • "This guy only moves when I move him so I took a picture instead of a video" (BDM1SI: 17/09/13) • "There was no need to say anything about it coz the pictures… say enough" (BDM1SI: 17/09/13) • "Nothing really interesting to video here so a photo was enough" (BDM1SI: 17/09/13) • "I kept that picture frozen so you can see his face" (BDM2SI: 21/10/13)
slow moving images	• "If you didn't do slowmation and you did a video there would be hands and it won't look good whatsoever it would look like a video made my two kids playing with action figures" • "…slowmation is just a bunch of images put together to try and imitate movement" • "Stop-motions take ages to do….the images are quicker frames per second" (PSI: 11/11/13) • "Slowmation has faster fps and would take a lot longer to make than a digital story" (SSI: 15/08/13) • "It's me on my computer and of course I can't really make a video of it so this way I can create an animation scene and everything" (BDM2SI: 21/10/13) • "It's to make it about the character" (BDM2SI: 21/10/13)

Video (fast moving images)	• "Video is for something that is moving" (PSI: 11/11/13) • "The video is of the game itself so you can see the actual footage and know how to play it" (BDM1SI: 17/09/13) • "I took a video of so you could see me playing it and what to do with it" (BDM1SI: 17/09/13) • "…see lots is happening. It's action packed so video is better to really understand it all" (BDM1SI: 17/09/13) • "I didn't need video coz it was switched off but I guess I could've taken one playing it" (BDM1SI: 17/09/13)
Written language (scripts & captions)	• "…it's the title of the video" (BDM1SI: 17/09/13) • "The words say what's happening in a funny way" (BDM1SI: 17/09/13) • "well you can't really see where I was sitting so I typed small little space because it was so small" (BDM1SI: 17/09/13) • "I typed what it is…" (BDM1SI: 17/09/13) • "I wrote 'blurry picture of pasta' coz I know its blurry and thought it'd be funny" (BDM1SI: 17/09/13) • "I put 'LULZ' coz it's a funny picture to take and it basically means laugh out loud" (BDM1SI: 17/09/13) • "I typed the kind of unit it was" (BDM1SI: 17/09/13) • "I put a picture of the word 'versus' to be like a competition of the PS4 and Xbox like I said" (BDM1SI: 17/09/13) • "I put that up the top because it's pretty much saying what the video is about in a nutshell basically its call of duty so yeah" (BDM2SI: 21/10/13)
Symbols	• "…they make it funny and not too serious" (BDM1SI: 17/09/13) • "The red light helped me show what I was talking about" (BDM1SI: 17/09/13) • "The red light points to it" (BDM1SI: 17/09/13)

Jimmy's comments about oral narration indicate that he was aware of the affordance of oral language to: (i) explain images ("…you have to say something about the pictures and explain"); (ii) add a commentary ("It's a voice commentary keeping you updated…"); (iii) provide additional information that isn't presented visually ("I said 'it's from my local shop' because how else would you know?"); (iv) add humour ("This is a bit funny especially the sound effects…"); and (v) provide a narrative ("It's about telling the story"). While Charlie and Riley were able to provide a basic explanation of some of these affordances, Jimmy was unique in his capacity to identify the role of voice in providing commentary and/or telling a story.

Interview responses made by Jimmy about images also provide evidence of his awareness of modal affordances in that he, like Charlie and Riley, identified the potential of still images to capture still life ("Photos are for still detail or something that is not moving") and communicate meaning visually ("the pictures… say enough"). He also acknowledged the affordance of slow-moving images to animate inanimate objects and create movement ("…a bunch of images put together to try and imitate

movement"). Jimmy similarly reasoned that video is used "for something that is moving" and demonstrates real actions ("The video is of the game itself so you can see the actual footage and know how to play it").

Like Charlie and Riley, Jimmy's interview comments show awareness of the affordances of written language to categorise ideas through use of titles ("the title of the video") and labels ("…it's pretty much saying what the video is about in a nutshell…"). He also explained that written language can be used to clarify visual media ("I typed what it is…"), and add humour ("…in a funny way… thought it'd be funny…"). On a similar note he acknowledged that the use of a cursor icon (symbol) also clarifies visual media and supports oral narration ("The red light helped me show what I was talking about"). Further, unlike Charlie and Riley, Jimmy reasoned that the use of a cursor icon afforded him the opportunity to emphasise aspects of visual media ("The red light points to it"), and create a humorous tone ("…they make it funny and not too serious").

Jimmy's awareness of modal affordances is further supported by his ability to compare and contrast the use of different modes to communicate meaning. For example, unlike Charlie or Riley, when comparing the use of slow-moving images with video Jimmy identified the unique affordance of slow-moving images to make still objects appear as though they are moving without capturing hands in each frame (as would be the case with video): "If you didn't do slowmation and you did a video there would be hands and it won't look good whatsoever it would look like a video made my two kids playing with action figures".

Unlike Charlie or Riley, despite Jimmy's articulation of various modal affordances during interviews, his digital media assignments reveal instances where his use of modes did not appear to align with his communicative intentions. For example, even though he showed awareness that images capture still life and video capture movement, in his first blended digital media assignment he included a video of a bottle of juice that did not move which could have similarly been represented by an image. In recognition of this after having created his blended digital media he explained "I don't really know why I did a video of the juice I just did… I guess I should have taken a photo". Such a comment shows evidence of his developing modal awareness as when making his blended digital media assignment he appeared unaware of this.

Jimmy's Multimodal Design

Data pertaining to Jimmy's experiences creating two blended digital media assignments constitute the focus of an investigation into the application of his multimodal awareness in this study. Specifically, consideration is given to data that demonstrates the intentions underpinning his digital media-making choices so as to identify purposeful and deliberate decisions. Field notes and work samples show that like Charlie and Riley, Jimmy could combine the media forms of digital story, slowmation and video in his creation of blended digital media assignments. Further, interview data indicate that the modal choices he made in doing so were strategic (as opposed to random) and informed by awareness of modal affordances. Evidence to support his purposeful design of blended digital media is presented in Table 6.9 and 7.10. These tables provide a breakdown of the media forms used in each assignment (e.g. video, slowmation and digital story) and the corresponding modes that they consist of (e.g. written language, voice, image etc.). Each table also provides excerpts from interviews in which Jimmy justified his digital media-making decisions (Explanation of Design column), and interprets his comments so as to categorise the motivations underpinning his decisions (Intention and Purpose column).

As can be seen in Table 6.9, Jimmy's use of video appears to be informed by his awareness that representations afforded by fast-moving image can capture movement and demonstrate actions as a model. The interview comments made by Jimmy consequently support that such a decision was executed with purpose:

> The video is of the game itself so you can see the actual footage and know how to play it… I took a video of so you could see me playing it and what to do with it… see lots is happening. Its action packed so video is better to really understand it all.

Similarly, Jimmy's ability to justify his use of written language throughout the blended digital media assignment reflect his awareness of how such a mode works together with other modes to communicate and enhance meaning. Specifically, his comments indicate intent for written language to clarify and elaborate on meaning communicated by visual media, and add humour:

> "The words say what's happening in a funny way… I just wrote what it was instead… I typed what it is… I wrote 'blurry picture of pasta' coz I know it's blurry and thought it'd be funny… I put ''LULZ' coz it's a funny picture to take and it basically means laugh out loud"
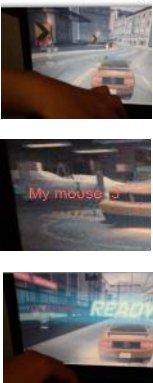
His mention of using an oral narration to elaborate on meaning communicated by the video of him eating pasta reflects his awareness that fast-moving-images alone were insufficient to describe the taste of the pasta, and an intent to rectify this: "I spoke for this so I could say it was delicious and you can't really see that from the video so it has to be said". Likewise, he reasoned that the oral narration of his video game footage was included so as to explain and add a commentary for each of the games:
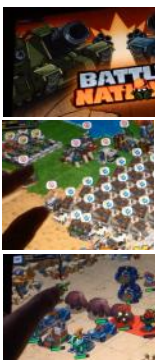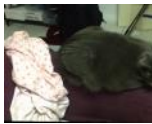
> I'm basically just doing commentary with my voice…I'm explaining the game and the different moves you can do so when you watch it you feel like you are playing it too…It's a voice commentary keeping you updated with how the game progresses

Despite being able to justify his use and combination of modes in his first blended digital media assignment, interview comments reflect that unlike Charlie and Riley, his choices were not always purposeful or informed by modal awareness. For example, evidence that his decision-making was sometimes random as opposed to being underpinned by strategic modal intent is proposed by his comments: "I just took a photo of it to be random…"; "It's just a picture of an egg… I don't know why but yeah I love eggs"; and "I don't really know why I did a video of the juice I just did… I guess I should have taken a photo…"

Table 6.9

The Multimodal Design of Jimmy's First Blended Digital Media Assignment

Media	Modes	Explanation of Design	Intention & Purpose
Video	• Video (fast-moving image) • Voice narration • Writing: - Random in-game footage - There is my hand lol - My mouse :3 - I wish it was the 1969 version :S - YOLO!!1!!one! - NITROS - fail count: 1 - fail count: 2 - fail count: 3 - fail count: 4 - fail count: 5 - And the Camaro zl1 - NOOOOOOOO - In a small little space	"The video is of the game itself so you can see the actual footage and know how to play it" "I'm basically just doing commentary with my voice and talking to the other cars" "Random in-game footage is there coz it's the title of the video" "they are different faces and they make it funny and not too serious" "The words say what's happening in a funny way" "well you can't really see where I was sitting so I typed small little space because it was so small"	• Video shows footage of game • Writing clarifiying video • Writing adds label/title to explain/categorise video • Voice provides commentary • Writing adds humour • Smiley faces add humour and maintain light-hearted tone

Video	• Video (fast-moving image) • Voice narration	"I took a <mark>video of it so you could see me playing it</mark> and what to do with it" "…see lots is happening. It's <mark>action packed</mark> so video is better to really understand it all" "I'm <mark>explaining the game</mark> and the different moves you can do so when you watch it you feel like you are playing it too" "It's a <mark>voice commentary keeping you updated</mark> with how the game progresses"	• Video visually demonstrates how to play game • Video captures action/movement • Oral narration provides commentary • Narration addresses viewer to included them in game
Digital Story	• Still image • Voice narration	"<mark>I said 'here is my cat'</mark> because otherwise you might just think it is a random cat" "<mark>I said that to Damian so he wouldn't say 'do they bite'</mark> because that's what he would say"	• Oral narration to explain context of image • Narration used to address student
Digital Story	• Still image • Writing: MMMMMMM ROAST LAMB AND SPAGETTI	"It <mark>shows my dinner</mark>" "I didn't really want to say anything for this because <mark>I was eating when I videoed it</mark>. I just w<mark>rote what it was instead</mark>"	• Video visually represents dinner • Writing describes image (instead of oral narration)
Video	• Video (fast-moving image) • Writing: Juice…It doesn't exist in my house since I drank it	"<mark>I don't really know why</mark> I did a video of the juice I just did" "<mark>I typed what it is</mark> and that it isn't in my house anymore because since I took this video I drank it" "I guess I should have taken a photo but…"	• Writing used to describe the object in video
Digital Story	• Still image • Writing: Behold a blurry picture of pasta lol	"The <mark>picture shows pasta</mark> because this is my favourite one…it's a bit blurry but you get the idea and you can still read that its continental so it will do" "I wrote 'blurry picture of pasta' coz I know its blurry and thought it'd be funny"	• Image represents favourite pasta • Writing acknowledges image and adds humour
Digital Story	• Still image • Voice narration	"This guy only moves when I move him so I took a picture instead of a video" "I explained his story in case you didn't know it"	• Image used to show object • Narration explain image

Digital Story	• Still image • Writing: HOT WATER BOTTEL LULZ	"I just took a photo of it to be random" "I put ''LULZ' coz it's a funny picture to take and it basically means laugh out loud" "There was no need to say anything about it coz the pictures and words say enough"	• Writing used to add humour • No need for narration as voice and image is self-explanatory
Digital Story	• Still image • Writing: My psvita :3	"I didn't need video coz it was switched off but I guess I could've taken one playing it" "I typed the kind of unit it was"	• Image to capture still object • Writing used to identify type of game console
Digital Story	• Still image • Voice narration • Cursor icon	"I talked about the different things in the picture" "The red light helped me show what I was talking about"	• Narration identified objects in photograph • Cursor icon supported narration
Digital Story	• Still image • Voice narration • Cursor icon	"It's just a picture of an egg… I don't know why but yeah I love eggs so that what I was trying to show I guess"	• Visual representation of love of eggs
Digital Story	• Still image • Voice narration • Cursor icon	"I took a picture of the box because I already ate the pizza but there is a cartoon-like picture of it on the box sort of" "I said 'it's from my local shop' because how else would you know?"	• Image to represent previously eaten pizza
Video	• Video (fast-moving image) • Voice narration • Cursor icon	"Another video of food coz I love eating pasta and wanted to show favourite pasta I like and how it looks" "I spoke for this so I could say it was delicious and you can't really see that from the video so it has to be said"	• Video to visually represent favourite pasta • Oral narration used to describe taste of pasta in photograph
Digital Story	• Still image • Voice narration • Cursor icon	"As I explained it's my old pillow not my current one" "Nothing really interesting to video here so a photo was enough" "The red light points to it"	• Narration clarifies context of image • Cursor icon identified /points to object in photograph

As shown by Table 6.10 Jimmy's second blended digital media is more concise and uses less media forms when compared with his first blended digital media task. Nevertheless, the explanation offered by Jimmy regarding his use and combination of different modes reflects that as was the case with his first assignment, the design of his second blended digital media reflects elements of the application of multimodal awareness and purposeful decision-making. For example, Jimmy reasoned that he

deliberately used slow-moving images because alternative media forms such as video would not represent or communicate the intended meaning sufficiently: "It's me on my computer and of course I can't really make a video of it so this way I can create an animation scene and everything…It's to make it about the character." He also justified his use of a still image, explaining that his intent was to emphasise the character's face: "I kept that picture frozen so you can see his face". He similarly justified his use of written and oral language. For example, he explained that he included written language to label his video: "I put that up the top because it's pretty much saying what the video is about in a nutshell." Further he reasoned that he used an oral narration to verbalise his character's thoughts and provide additional information not represented by the modes of image and voice: "It's about telling the story so that's why I explained what he was thinking about doing… how else do you know what he's thinking unless I say it?".

Unlike his first assignment, the storyline of his second blended digital media remains unclear after an examination of work samples, field notes and interview data. Further, data analysis suggests that they may have been instances where his use of digital media was random as opposed to purposeful. For example, he did not justify his use of video or explain its relevance to the task but rather stated: "This just shows a video… and I put a picture over the other guys face… basically its call of duty so yeah". While Jimmy demonstrated an ability to combine media forms appropriately, the nature of the content of this assignment did not meet the tasks' criteria. Hence, unlike Charlie or Riley, Jimmy was unsuccessful in designing and producing digital media that met the assignment standards from a context perspective.

Table 6.10

The Multimodal Design of Jimmy's Second Blended Digital Media Assignment

Media	Modes	Explanation of Design	Intention & Purpose
Slowmation	• Slow-moving image • Voice narration	"It's me on my computer and of course I can't really make a video of it so this way I can create an animation scene and everything" "It's to make it about the character"	• More feasible than video • Animate character & create setting
Digital Story	• 2 still images • Voice narration	"I put a picture of the word 'versus' to be like a competition of the ps4 and Xbox like I said" "I was explaining that the PS4 is way better" "I kept that picture frozen so you can see his face"	• Writing reinforces oral narration • Photo draws attention to character's face • Narration tells story
Slowmation	• Slow-moving image • Voice narration	"He's about to go online so it shows him going to the computer" "It's about telling the story so that's why I explained what he was thinking about doing… how else do you know what he's thinking unless I say it?"	• Oral narration to tell a story & verbalise character's thoughts • Images support oral explanation
Video	• Video (fast-moving image) • Voice narration • Writing: Call of Duty in a nutshell	"This is a bit funny especially the sound effects rahhhhh" "This just shows a video and I put a picture over the other guys face… the same as the one on my character's face before" "I put that up the top because it's pretty much saying what the video is about in a nutshell basically its call of duty so yeah"	• Voice adds humourous sound effects • Writing labels video

In summary, data revealed that Jimmy demonstrated multimodal awareness in the making of two blended digital media assignments, thus answering research question two. His developing knowledge of modal affordances and his capacity to apply this awareness in using and combining various media forms and modes to represent and communicate meaning evidences this. Like Charlie and Riley, Jimmy was able to differentiate between the affordances of still, slow-moving and fast-moving image (video), but unlike his peers he offered more of an explanation of the affordances of voice in providing a commentary and telling a story that supports and supplements meaning communicated visually. Unlike Charlie and Riley, Jimmy was unsuccessful in meeting assignment outcomes for his second blended digital media as his digital content

did not align with the purpose of the task. Moreover, unlike his peers, irrespective of his capacity to justify and differentiate between the use of different modes in interviews, work samples showed that on occasion his design and inclusion of certain media was random and not reflective of his communicative intentions, thus evidencing his developing multimodal awareness and blended digital media-making skills. The following section explores the influence of Jimmy's digital media-making experiences across the DMIP on his communication skills so as to respond to research question three. His social interaction, digital communication and peer interest and feedback will be examined.

3. Jimmy's Communication

Data concerning Jimmy's communication is presented in this section to address research question three. Evidence presented indicates that since the DMIP his social interactions, digital communication and interest in peers may have been positively influenced. Details regarding Jimmy's multifaceted communicative behaviours are provided as follows.

Jimmy's Social Interaction

Baseline data shows that prior to the study Jimmy rarely engaged with his peers with the exception of his best friend Jack whom he would converse with regularly throughout free-time and food breaks. For example, like Charlie, classroom observations show that across a two-week period (before the DMIP) he did not approach other students or initiate conversations during class. Nevertheless, unlike Charlie or Riley, as shown by field notes he would leave his chair during class time on a daily basis to speak with his friend Jack:

> Jimmy is working on his maths sheet. He finishes his work, leaves his chair and approaches Jack to ask him if he is done. Jack stops working and Jimmy sits on his desk. Jimmy starts to talk about his PlayStation game. *(Field notes, PCO: 04/02/13)*

Observations of Riley during free-time similarly show that he would sit with Jack and talk about video games and computers. In the same two-week period he was observed to converse with Jack during 34 out of 40 free-time sessions (PCO: 04/02/13-18/02/13). Further, he was the one to initiate communication for 28 of the times. For the 6 times he did not sit with Jack across two weeks, Jimmy was observed to play computer games on his own. On one of these occasions Jack was absent from school, and on the other 5

occasions despite attempts to initiate interaction, Jack had not finished his school work and was thus unable to converse:

> Jimmy looks over at Jack who is still doing his work. He leaves his desk and approaches the classroom teacher with his work. The teacher looks at his worksheet and gives him permission to have 10 minutes free-time (until recess). He walks to the classroom computer, puts earphones on and starts playing a car racing game on his own. Jack remains at his desk completing his work. *(Field notes, PCO: 17/02/13)*

Analysis of data suggests that the DMIP may have positively impacted Jimmy's social interaction as it did for Charlie and Riley in that it may have facilitated unique opportunities for him to interact with students that he would not normally speak to. Baseline data indicate that the only occasion that Jimmy would address other students (throughout two-week observations) was when delivering news to the class as part of Social Club (a lunch-time news-sharing social group for classroom peers). Nevertheless, observations throughout the study indicate that this changed after the implementation of the DMIP. For example, Jimmy was unique among the case studies in that he was observed to directly address one of his peers in his first blended digital media: "Ummm here is my cat. My cat is sleeping and before anyone asks, Damian, cats only bite if you make them angry. Alright" (BDM13: 16/09/13). Interestingly this was the only student that Jimmy directly addressed in his digital media assignments. Despite frequently talking with his best friend Jack, he did not make reference to him in the oral narration of his digital media.

Data shows that after presenting his digital media assignments to the class and viewing the digital media of his peers, Jimmy initiated conversations with students other than Jack, thus indicating that the DMIP may have influenced the nature of his social interactions. An example of this is demonstrated by the questions he posed to a student called Mario after viewing his blended digital media assignment:

Jimmy:	So do you have games that you play on the PlayStation?
Mario:	I mainly play basketball ones and other sports ones sometimes…
Jimmy:	Have you seen…do you like have strategy-based ones like racing and battle games?
Mario:	Not really. I am not really into that much. (BDM2V: 21/10/13)

Another change regarding Jimmy's social interaction since the DMIP can be mapped by looking at his increased participation in chess games. Prior to the study he was not observed to play chess with his peers like Charlie and Riley were. However, after he

viewed the blended digital media of his peers and was approached by Riley, he agreed for the first time to play a game. His teacher explained: "I'd never seen him play chess before so that was surprising really. Like he can obviously play but I guess maybe because Jack doesn't play it's not something he had done in class with anyone before" (PTI: 18/11/13). Observations indicate that throughout the DMIP Jimmy played 6 games of chess with Riley, and that of these games he initiated two. One of these instances is illustrated by the following dialogue:

Jimmy: So Riley do you want to have a round?

Riley: Why certainly I just have to put this away. Well alright then…

Jimmy: Should I set up?

Riley: Well you see… no that's ok I can do it just give me a second…

It is possible that the DMIP may have contributed to Riley's decision to approach Jimmy, and Jimmy to accept a game as sharing blended digital media with each other appeared to expose the class more to the interests and personalities of their peers. This is demonstrated by the questions and interactions generated after media viewing.

Jimmy's Digital Communication

Jimmy's communication of interests in the form of a blended digital media assignment shows his capacity to clearly and comprehensively communicate meaning in a digital way.

Specifically, his blended digital media identified and described 14 interests, which is more than any of his peers. Due to the digital nature of the task, like Charlie and Riley he was able to represent these interests using a range of modes including an oral narration, images and videos.

An analysis of Jimmy talking to the class about his interests in the context of Social Club reveals that when relying on an improvised verbal explanation, like the other case studies, Jimmy experienced a number or communication challenges. Figure 6.8 provides an account of three instances in which Jimmy was required to talk about his interests to the class as part of Social Club. As shown by each transcription, each occasion presented a range of challenges that impeded his capacity to provide a clear and detailed response. For example, as shown by Figure 6.8, Jimmy's Social Club presentations were concise, lacked detail, and concerned singular interests/ideas such as playing the PlayStation or an iPad application. Further they reflect a reluctance to share and elaborate on personal information.

Social club observation 1:
"Ok well on the weekend I stayed home mostly. I played PlayStation and enjoyed the fact that I didn't have to go to school. Woohoo! And that's all I have to say." (PCO: 07/02/13).

Social club observation 2:
"So something new is that I downloaded a new app on my iPad and I can't really remember what it's called but it's a strategy-based game and you have to like build things but it's not Minecraft… its better and different coz you well it doesn't really matter anyway. Yay!" (PCO: 14/02/13).

Social club observation 3:
"I am interested in sleeping and not talking and so I am going to sleep now. Goodnight!" (PCO: 18/02/13).

Figure 6.8   Jimmy's Explanation of Interests during Social Club

Data revealed that Jimmy's use of digital communication in his blended digital media assignment enabled him to represent and express meaning using a range of modes of communication (e.g. images, written language and video). In contrast, observations (Figure 6.8) revealed that Jimmy's Social Club presentations consisted only of him speaking to the class and thus merely relied on an oral description of interests or retelling of events. As shown by his blended digital media assignment, while he recorded an oral narration to explain most of his interests, on occasion he communicated ideas with written language instead. Moreover, he explained that his use of video and image were a means of visually communicating meaning without the need for an oral narration: "There was no need to say anything about it coz the pictures… say enough" (BDM1SI: 17/09/13). It is possible that Jimmy's blended digital media assignment communicated more information about his interests due to the affordances of using a range of digital communication forms, rather than solely rely on an oral narration (as was the case with his Social Club presentations). Also, his blended digital media assignment enabled him to record, edit and re-record his oral narration, whereas Social club presentations were delivered in real-time.

　　　　Just as it is possible that having to rely on an oral narration during Social Club may have limited Jimmy's communication of interests, it may have similarly influenced his attitude regarding sharing information about himself with his peers. For example, observations from prior to and throughout the DMIP indicate that on occasion Jimmy had to be prompted to share his interests during Social Club, and to elaborate on information. Further, data indicate that even when prompted, there were instances where

he refused to deliver presentations during Social club, as evidenced by the following dialogue that occurred between Jimmy and his teacher:

Teacher:	Ok Jimmy, it's your turn. What's something you would like to share with the class
Jimmy:	I don't want to today sir.
Teacher:	Come on Jimmy, we are all having a go. We want to hear from you. What is something you would like to tell us about
Jimmy:	No I don't feel like it sir
Teacher:	What about something you did on the weekend?
Jimmy:	No thank you (buries head in hands) (PCO: 15/02/13)

In contrast to Jimmy's Social Club presentations, data shows that he was not prompted by the teacher during the creation of his blended digital media assignment (BDM11: 09/09/13, BDM12: 12/09/13). Further, he never refused to complete his first blended digital media task despite school behaviour records indicating a history or work-refusal (SBR: 04/02/13). These findings suggest that perhaps a digital means of communicating his interests such as the blended digital media assignment may minimise communicative challenges and better meet Jimmy's learning preferences and social communication needs.

Jimmy's Peer Interest and Feedback

Jimmy's observed responses to viewing the digital media of his peers indicates that he, like all case studies, was attentive and receptive to information that was communicated digitally. This is in contrast to his experience during the Social Club presentations of his peers when he was often observed to be playing with his computer or pretending to sleep, and would rarely clap or ask questions:

> Jimmy is resting his head in his hands. He is tapping the keys on his laptop and looking out the window. Charlie has finished giving his presentation and Jimmy is not clapping or asking questions *(Field notes, PCO: 08/02/13).*

In contrast, observation data suggests that he appeared engaged when viewing the blended digital media assignments of his peers. This claim is evidenced by field notes that show that his eyes remained focussed on the interactive whiteboard (where media was displayed), and he laughed and clapped accordingly:

> Jimmy is watching the IWB as Charlie's blended digital media assignment is playing. He is smiling at the image of the dog. He is laughing at the video of his Charlie's

dancing brother. The blended media has finished playing and he is clapping *(Field notes, BDM1V: 17/09/13).*

It is possible that the range of modes used by his peers in the creation of blended digital media may have appealed to his visual learning preferences. Such a visual multimodal and digital form of communication contrasts with the oral monomodal nature of Social Club presentations. For example, listening to his peers speak about their interests may not have been as engaging as viewing a digital product that visually communicates information.

Jimmy's peers also appeared to be more interested in viewing his blended digital media than his Social Club presentations. This is evidenced by field notes that describe student body language that indicates that they were focussed and attentive (e.g. gaze, stillness, facial expressions etc.). Further, such a claim is supported by comments offered by students following the class viewing of his first blended digital media assignment. Data shows that he was asked a variety of questions which created a unique opportunity for him to interact with peers:

Mario:	So do you collect those alien things?
Jimmy:	The alien thing? Oh you mean the venerable dreadnaught?
Mario:	Yeah I think that's the one…you had a picture of it
Jimmy:	Well yeah I have a few but not like a heaps big collection or anything like that
Nathan:	Do eat any other food except Italian food?
Jimmy:	Well ummm… yes of course but I do love Italian food
Damian:	How many cats do you have?
Jimmy:	Just the one (BDM1V: 17/09/13)

The peer engagement evidenced by the dialogue above is juxtaposed to observations of student responses to Jimmy's Social Club presentations, where students' body language and lack of questions or comments demonstrated disinterest and distraction. Analysis of such data suggests that the DMIP may have cultivated a personal interest in Jimmy's peers, and facilitated unique opportunities for peer feedback. Similarly, Jimmy's peers may have been more receptive to Jimmy's digital communication of information as it utilised a range of modes (with the addition of visuals) and media forms.

While Jimmy clapped after viewing his peers' digital media, observations indicate that he did not ask other students questions related to their media. The only

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questions he posed were directed to Mario, and they had no relevance to the content of his digital media assignment (basketball and clothes). Rather the questions were more aligned with Jimmy's interest in strategy-based games:

Jimmy: So do you have games that you play on the PlayStation?

Mario: I mainly play basketball ones and other sports ones sometimes…

Jimmy: Have you seen…do you like have strategy-based ones like racing and battle games?

Mario: Not really. I am not really into that much.   (BDM2V: 21/10/13)

Data indicate that Jimmy was more likely to offer verbal praise to his peers after viewing their digital media than he was in response to Social Club presentations of his peers. For example, during Social Club his teacher explained: "he never asks questions or shows that he really cares or wants to know anything about what other students share" (PTI: 18/11/13). However, observations show that after viewing Jack's blended digital media assignment he provided the following positive feedback:

Jimmy: I really like how you lined up all the pictures and explained each one in order of your favourite. It was kind of like you were counting down to the best ones

Jack: Yeah that was what I was trying to do

Jimmy: Yeah I thought it was cool

Jack: Thanks

Jimmy: And your video of EB games was cool too and really funny. You had people laughing, including me   (BDM1V: 17/09/13)

Even though Jack is Jimmy's best friend, his teacher explained that this was a rare occurrence as with the exception of the slowmation task, they do not work on assignments together, let alone review one another's work:

…it was great that Jimmy said such positive things about Jack's blended assignment because he really needs a confidence boost… and well they never look at each other's written assignments… and even when they do speeches they usually just clap but don't have feedback to give the students… (PTI: 18/11/13)

It is possible that Jimmy only provided feedback to Jack as he felt comfortable speaking in such a manner to a friend. Nevertheless, as he was not observed to provide this type of feedback prior to this occasion, such an experience supports that the DMIP may have facilitated unique opportunities for peer feedback.

In summary, research question three has been answered with respect to the case of Jimmy in that evidence has presented that his social communication during class and free time changed since the DMIP. Data indicates that since the study Jimmy experienced different opportunities for peer interaction and feedback, and was able to digitally express more personal interests than his peers in a clear and comprehensive way through the creation of a blended digital media assignment. He initiated conversations with his peers and was observed to personally address one of his students in his blended digital media assignment. He also watched the digital media of others with interest, applauded his peers and offered feedback to his friend Jack about his work. Unlike other tasks that have required Jimmy to communicate to the whole class, he did not refuse or experience difficulty or disinterest communicating his interests in a digital media form.

Summary

A summary of the primary findings pertaining to each of the study's three research questions for the case of Jimmy are provided in Table 6.11. The data highlighted by this table reveals that as a consequence of the DMIP Jimmy could create a suite of digital media assignments using a range of written, visual, oral and digital literacy skills. Further, he demonstrated awareness of multimodality (with regards to purposeful design of blended digital media informed by knowledge of modal affordances), and showed examples of communication throughout creating and responding to digital media assignments.

Table 6.11

Summary of Findings for the Case of Jimmy

Digital Media Forms & Skills (RQ1)	Multimodal Awareness (RQ2)	Communication (RQ3)

• **Gained awareness of digital media**
 • **Gained digital media-making experience** since DMIP: Created own podcast, digital story, slowmation and blended digital media for first time
 • **Developed and applied a range of skills** to create digital media:
   1. *Writing skills:* used storyboard and script to organise ideas; labeled images; written captions
   2. *Visual literacies:* used images to organise ideas (e.g. storyboard) and guide narration;
   3. *Oral skills:* Strong oral skills (narrated media without script); verbally addressed different audiences; provided oral commentary
   4. *Digital technology skills:* Gained 7 and improved 2 digital technology skills (56.25% increase since DMIP); self-reported increase in skill level since DMIP
	• **Gained modal awareness:** Could identify modal affordances and articulate relationships between different modes and media combinations after DMIP
	 • **Created multimodal digital media:** Combined a range of media and modes to create two blended digital media assignments.
	 • **Demonstrated purposeful multimodal decision-making:** Justified use of modes and combination of digital media to communicate meaning in blended digital media assignments
		• **Interacted with different students since DMIP:** Addressed Damien in digital media, asked Mario questions about PlayStation, played chess with Riley
		 • **Digitally communicated 14 interests** in a clear way through the creation of a blended digital media assignment
		 • **Initiated and received peer feedback:** Showed interest in others
		 • **More attentive and receptive to digital information** communicated by peers

The following chapter addresses the study's research questions with respect to the case of Damien.

Chapter 7: The Case of Damien

This chapter addresses each of the study's research questions for the case of Damien. After presenting background information about Damien, the chapter explores his application of written, oral, visual and digital literacies in the creation of digital media assignments as part of the DMIP (research question one). It then examines his multimodal awareness throughout the DMIP (research question two) including his knowledge of the affordances of various modes of communication in digital media-making, and his ability to combine media forms to create blended digital media assignments. The case study subsequently explores the communication implications of the DMIP for Damien during and following digital media creation (research question three) with regards to his social interaction, group work, peer feedback, and digital communication experiences.

Damien's Background

Damien is a 13-year-old boy in year 7 who was diagnosed at the start of the year (2013) with high functioning autism (level 1). He spent his entire first year of high school in the autism support unit. Damien is the youngest student in his class and is described by his teacher as being energetic, playful and having a strong sense of humour:

> He is a happy kid with a lot of energy and a strong sense of humour. He's always
> wanting attention from me, other students, even if it isn't good attention. He's cheeky
> and always joking around and some of the students get annoyed because it gets on their
> nerves. But he enjoys annoying them... especially Riley (BTI: 25/02/13).

School records indicate that as a result of his autism he experiences significant social and communicative challenges that make it impossible for him to cope with the demands of class routines and peer interaction in mainstream high school settings (BTI: 25/02/13). Behaviour records show that he has experienced these difficulties in the autism support unit. Recorded observations and incidents reveal that as a result of his difficulties socially interacting with others, he has been involved in ongoing conflict with his class peers, and in particular with his year 8 peer Riley:

> Their personalities clash… it has to do with Riley not liking Damien's sense of humour.
> Damien is always egging him on because he enjoys seeing him get upset. He will annoy
> Riley until he is losing his temper and yelling, growling and sometimes he will even

throw objects across the room. Damien just laughs and makes things worse (BTI: 25/02/13).

Damien is Chinese Australian, and English is not the primary language spoken at home. Despite this, his expressive language skills as evidenced by his written and spoken English at school comply with the average of those of his native English-speaking peers (BTI: 25/02/13). Nevertheless, it appears that his receptive language skills are not as strong. Behaviour records (SBR: 04/02/13) demonstrate his difficulty listening to, interpreting and following instructions. Observations (PCO: 04/02/13) and teacher interview data (BTI: 25/02/13) also show his challenge maintaining attention, concentration and focus during class tasks. These receptive language and concentration difficulties are likely attributes of his autism, but may also relate to English being his second language.

School records showed that Damien excels at Maths and Creative Arts more than English and History subjects at school and will often respond to comprehension tasks with short, succinct sentences and drawings (SBR: 04/02/13). He always raises his hand to contribute to class discussions (PCO: 18/02/13), although "he almost always takes this opportunity to comment on something not related to the task at hand, tell a joke or ask a random question" (BTI: 25/02/13). Baseline interview data shows that Damien has a range of interests including watching "television and movies", using the computer to "play combat games and use Google Earth", and being "crazy for trains" (BSI: 25/02/13). Further, pre-study survey results (BSS: 25/02/16) and interview data (BSI: 25/02/13) reflect his passion for using digital technologies despite his limited access to them at home when compared with that of his peers.

1. Damien's Digital Media Forms and Skills

This section addresses research question one through an examination of the digital media forms that Damien created as part of the DMIP and the skills he used to do so. Data regarding the development of his digital media-making knowledge and experience is presented first. This is followed by a detailed account of his experience creating digital media assignments for the DMIP, and an analysis of the written, oral, visual and digital literacies he used to create digital media.

Damien's Digital Media-Making Experience and Knowledge

A comparison of Damien's pre and post-study survey and interview responses reveal that, like all case studies, as a result of the DMIP, his digital media-making experiences increased. Specifically, data show that it was only after having participated in the DMIP that he experienced making a podcast, digital story, slowmation and blended digital media for the first time. Table 7.1 demonstrates this increase in digital media-making experience in its representation of data from pre and post-study surveys regarding his experience and self-reported confidence making four different digital media forms before and after the DMIP. As shown by this table, in a pre-study survey Damien reported "I have never done this before" for each of the digital media forms (BSS: 25/02/13). Whereas, after having participated in the DMIP, in a post-study survey he rated himself as capable of creating digital media as represented by his selection of the columns "I can do this myself" for a podcast, digital story and slowmation, and the "I need some help" column for blended digital media (BSS: 25/02/13). Damien was the only case study to select this column after the study.

Table 7.1

Damien's Digital Media-Making Experience Before and After the DMIP

Digital Media-Making	I have never done this	I can't do this	I need a lot of help	I need some help	I can do this myself
Making podcast	🟨				√
Making a digital story	🟨				√
Making a slowmation	🟨				√
Making a blended digital media	🟨			√	

Damien's pre and post- study interview responses further demonstrate his growth in digital media-making experience, and suggest a simultaneous increase in his knowledge of digital media forms since his involvement in the DMIP. His enhanced awareness of media forms is represented by Table 7.2 which categorises comments made by Damien before and after the DMIP relating to each of the four digital media forms. As shown by Table 7.2, like his peers, Damien's pre-study interview responses indicate that not only did he lack experience making a podcast, digital story, slowmation, or blended digital

media before the DMIP, but he also had limited knowledge of what each of these digital media forms are and the process of creating them. For example, when asked if he had made a podcast, digital story or blended digital media before he responded "No" (BSI: 25/02/13). When asked about his experience making a podcast he said: "I haven't done a podcast before" and when asked about his knowledge of digital stories and blended digital media, on both occasions he expressed: "I don't know what is that" (BSI: 25/02/13). His pre-study interview responses also indicate that prior to the DMIP he lacked knowledge of what a slowmation is. Nevertheless, he expressed awareness of the broad term animation, and in particular Claymation as shown by his comments "Claymation I have heard of but I'm not too sure" and "I like animations like The Incredibles" (BSI: 25/02/13).

In contrast to pre-study interview data, Damien's post-study interview responses reflected a basic awareness of each of the four digital media forms explored by the DMIP. Despite not being able to comment on what a podcast is prior to the DMIP, after having made one, when interviewed he explained "recording voice is a podcast" (PSI: 11/11/13). Similarly, after the DMIP he was able to explain that a digital story "has voice and photos", a slowmation has "lots of photos and you can make up story with your voice and different sounds", and a "blended digital media is from like photos, videos and slowmation all combined" (PSI: 11/11/13).

Damien's knowledge of media forms is also shown by comments about the process of creating them, thus suggesting that the DMIP was a key component of his increased knowledge of media forms as it provided him with experiences and examples to describe and explain. For example, when talking about making his own digital story he explained "you get to pick the pictures online" (PSI: 11/11/13). Further, when describing the process of making his own slowmation he explained: "you have to move things a little bit but not too much so it moves better" (PSI: 11/11/13). While Damien's comments indicate basic awareness of each of the media forms, which is an increase in knowledge when compared to his initial lack of awareness prior to the study, the lack of elaboration and detail in his interview responses (which was otherwise demonstrated by the other case studies) could indicate that his knowledge about digital media forms was still limited (when compared with his peers) after the DMIP.

Table 7.2

Damien's Knowledge of Digital Media Before and After the DMIP

Media	Knowledge Before DMIP	Knowledge After DMIP
Podcast	• "No I haven't done a podcast before."	• "Recording voice is a podcast" • "I think it is an audio that you hear on the radio" • "It is like a radio"
Digital Story	• "No. What is digital story? I don't know what's that."	• "It has voice and photos" • "It's in movie maker – it has images" • "Digital story is different to podcast because it has pictures" • "It is good coz you get to pick the pictures online and use them instead of just talking"
Slowmation	• "Claymation I have heard of but I'm not too sure. I've never made it before. I like animations like The Incredibles."	• "umm it's hard to explain… lots of photos and you can make up story with your voice and different sounds" • "You have to move things a little bit but not too much so it moves better" • "Slowmation has movement" • "I think digital story and animation are like the same because they use the same things like voice and photos"
Blended digital media	• "I don't know what is that."	• "Blended digital media is from like photos, videos and slowmation all combined" • "It's all of them. Voice, photos and video" • Photos use what you take of an object… videos are for something that is movement"

Damien's Digital Media Assignments

This section presents data from work samples, interviews and field notes to examine Damien's experience creating digital media assignments in the form of a podcast, digital story, slowmation and blended digital media.

Podcast. Video recorded observations, field notes and work samples demonstrate that like the other case studies, Damien participated in the making of a podcast as part of a History assignment about World War 2 leader Hirohito. However, data show that unlike his peers, Damien was unable to independently create his own podcast, rather it was co-created (a joint construction between Damien and his teachers). Data revealed that while Damien made some contributions to the planning and

production of his podcast, he relied on significant support from his classroom teacher and a teacher's aide to stay focussed and perform a range of tasks.

Table 7.3 draws on observation data and field notes to compare the tasks that Damien was able to achieve on his own, the tasks he could do with the support of the teacher, and the tasks his teachers carried out without his input.

Table 7.3

Damien's Contribution to Podcast Creation

Steps	Student-created (independent of teacher support)	Co-created (Teacher-guided)	Teacher-created
Internet search	Selected websites to open and information to copy	Teacher helped guide Damien's internet search for information	
Gathering information	Selected information from websites and copied and pasted notes into a document		
Writing script	Pasted information into document	Teacher encouraged Damien to write notes in his own words	
Recording voice	Read notes aloud into microphone to record podcast (software operated by teacher)		Teacher operated recording program and saved file audio file to computer

As shown in Table 7.3, Damien required teacher guidance to select search words for gathering information online, but then was able to (on his own) browse a range of webpages and copy and paste information accordingly from these pages into a document. This information is demonstrated by field notes:

> The teacher suggests that Damien use the search terms "Hirohito leadership style". He types these words into Google browser. He selects a website from the search results. He reads information on this webpage. He highlights information from this page, right clicks and selects 'copy'. He opens a word document, right clicks on the document page and selects 'paste'. He returns to the web search results and opens another website *(Field notes, PL1: 07/05/13)*

Observations show that when the teacher noticed that Damien was copying and pasting information from the internet, he made a verbal attempt to encourage him to write new notes using his own words:

Teacher: You shouldn't be just copying from the internet. I want you to write using your own words. Read it first and then describe what you understand don't just copy and paste. (PL1: 07/05/13)

After this request Damien deleted a paragraph of information from his document but did not change the text in his documents into his own words (Field notes, PL1: 07/05/13). A Google search performed after the study further confirms that the information written in his finished script as shown in Figure 7.1 was copied directly from a range of webpages as was the case regarding Charlie's podcast script also.

Emperor Hirohito – Japan (Emperor)

- What was the leadership style of the leader? (Authoritarian; Paternalistic leadership; Democratic; Laissez-faire).

- He was an Emperor. The title emperor generally refers to a ruler of wide territories and peoples, whereas the title king applies to the ruler of a single territory and people. No, Hirohito was not in the military but he was an absolute ruler of the people. Many people were killed under his time of ruling. Future Emperor's in Japan don't have the same amount of power.

- What were some of the goals and ideas of the leader? (What did the leaders want to achieve?) Hirohito wanted to rule all of Asia with absolute power. Many people were killed under his rule. He was also an Emperor and people trusted his every word.

Road to War

The country nevertheless continued its drift toward war. In July 1937 hostilities with China broke out. During the late 1930s Hirohito's advisers in the palace bureaucracy had urged him to remain aloof from direct intervention in politics lest he compromise the position of the imperial family. The Emperor followed this advice, giving his consent to whatever policies the increasingly belligerent governments decided upon.

There is every evidence that the Emperor felt uneasy about the unfolding of events, particularly after 1940. He did not favor the alliance with Nazi Germany and Fascist Italy, but he made no effort to oppose it. Similarly, he had grown distrustful of the judgments of the military leaders who kept assuring him of a quick end to the war in China. But when the final decision on war with the United States was made on September 6, 1941, his opposition was confined to an oblique reference to one of his grandfather's poems, which expressed hope for peace.

During the war Hirohito refused to leave the imperial palace at Tokyo, even after air raids began to demolish the city and fires destroyed many buildings on the palace grounds. He wished to share the hardships of his subjects.

http://www.encyclopedia.com/topic/Hirohito.aspx

Figure 7.1   Damien's Podcast Script

Data show that Damien's script guided the recording of his podcast. Observations indicate that when recording his podcast, he read the first three dot points of his script (in Figure 7.1) aloud word-for-word, but did not record the last three paragraphs. This is evident upon comparison of his podcast script (Figure 7.1) with his podcast transcript (Figure 7.2).

Emperor Hirohito – Japan (Emperor)

What was the leadership style of the leader? (Authoritarian; Paternalistic leadership; Democratic; Laissez-faire). He was an Emperor. The title emperor generally refers to a ruler of wide territories and peoples, whereas the title king applies to the ruler of a single territory and people. No, Hirohito was not in the military but he was an absolute ruler of the people. Many people were killed under his time of ruling. Future Emperor's in Japan don't have the same amount of power.

What were some of the goals and ideas of the leader? (What did the leaders want to achieve?) Hirohito wanted to rule all of Asia with absolute power. Many people were killed under his rule. He was also an Emperor and people trusted his every word.

Figure 7.2   Damien's Podcast Transcript

Field notes indicate that Damien's teacher sat beside him as he read from his script and that it was the teacher who operated computer software (Audacity) to record and save the podcast file on Damien's behalf.

> The teacher selects "Record". Damien reads his script aloud word-for-word while the teacher sits beside him. When he finishes reading Damien looks at the teacher and nods. The teacher presses "stop" and saves the file to the computer Desktop *(Field notes, PL2: 08/05/13)*

Digital Story. Data from observations and work samples reveal that with the support of his teachers, during the DMIP Damien was able to co-create a Digital Story about the importance of friendship as part of an English assignment. Unlike his peers, he required significant support to be able to make a Digital Story and was only able to perform minimal aspects of the task independent of teacher support. This is shown by observational data presented in Table 7.4.

Table 7.4

Damien's Contribution to Digital Story Creation

Steps	Student-created (independent of teacher support)	Co-created (Teacher-guided)	Teacher-created
Image search	Performed Google Image searches	Teacher had to model how to search using Creative Commons	
Saving images	Saved images to computer desktop		
Importing images to Movie Maker		Teacher read instructions to Damien and guided him in importing images	
Writing script		Teacher asked Damien to describe each image and typed his description in script	Teacher imported images into document and typed script
Recording narration	Read script aloud into microphone to record digital story audio (software operated by teacher)		Teacher operated recording program and saved file audio file to computer

Table 7.4 reveals that after being prompted and shown how to use the Creative

Commons search tool, Damien could perform an image search and save images to the

computer by himself. This is supported by field notes:

> The teacher is showing him how to search for an image of a frog using the Creative
>
> Commons search tool. He demonstrates to the teacher that he can search for an image
>
> by typing the word "cat" into the search bar and selecting the "Google Image" check
>
> box. He browses cat image results and clicks on an image of two cats hugging each
>
> other. He right clicks on the image and selects "Save as" and "Desktop" to save the
>
> image to his computer. *(Field notes, DS1: 03/06/13)*

Data show that unlike Charlie, Riley and Jimmy, Damien did not use search terms

related to friendship to gather images. Rather, he searched for images of things that he

was interested in using search terms such as "Peppa Pig" "funny" and "trains" (DS1:

03/06/13), despite frequent reminders from his teacher to stay on task:

> Teacher: Remember you should be looking at pictures about friendship to tell
>
> your story, not just any pictures you feel like. Does that picture relate to
>
> friendship being important Damien? (DS1: 03/06/13)

Field notes reveal that after gathering his Digital Story images, Damien imported them

into the MovieMaker computer program under the guidance of his teacher:

> The teacher is reading instructions to direct Damien how to open Windows
>
> MovieMaker and import images. Following the teacher's instruction he clicks on the
>
> MovieMaker icon, clicks "add videos and photos" and selects the pictures he saved to
>
> the desktop. *(Field notes, DS1: 03/06/13)*

To prepare for narrating his digital story, Damien's teacher sat beside him and offered to scribe his script based on his verbal description of images because he refused to create a storyboard or script on his own.

Damien: I don't want to do that bit I like just the pictures

Teacher: Well how about if you tell me what you want to say about the pictures and I will type it for you

Teacher imports images into a word document, asks Damien questions about each image and writes his description under each one. (DS1: 03/06/13)

The storyboard produced by Damien's teacher is seen in Figure 7.3.

Friends can make you feel happy when you are upset. For example; Shmuel uses physical contact on me or somebody teases me like hurting feelings.

Explain images in your own words:

Top left: A picture of both cats making a dialogue conversation between each other cat families.

Top right: Cupcakes are decorated in sad face and happy face food colouring and blue and yellow icing of a design. Coated with a white paper on the outside of the cupcake.

Friends can protect you when you are in trouble. Most of my friends will cheer me up whenever I'm alone.

Explain images in your own words:

Centre:

I like people who share the same interests as me. Some of the things I like are trains, computer games, rat traps.

Explain images in your own words:

Left: An S Set Cityrail train terminating at Springfield Elementary Railway Station.

Right: A Rat was scared of the Rat Trap, trying to achieve for the Rat Cheese.

Friends can encourage me when I feel like giving up. Morsalian helps tells me to keep trying when I feel like giving up or when I say random statements. (E.g. Allawah)

Figure 7.3   Damien's Digital Story Storyboard

Before writing under each image in the storyboard, the teacher asked Damien how each image related to friendship. Often Damien did not respond and so the teacher asked a series of leading questions that helped connect the images to the concept of friendship.

Teacher:	So why did you choose this picture? What is it saying about friendship?
Damien:	Not sure
Teacher:	Well they are smiling so what about a friend makes you smile
Damien:	(silent)
Teacher:	Well maybe you're upset or get teased. Can a friend help?
Damien:	Yeah like Shimuel uses physical contact on me and teases me like hurting feelings
Teacher:	Ok so friends can make you happy when you are upset?
Damien:	(nods head).

Teacher writes "Friends can make you feel happy when you are upset. For example; Shmuel uses physical contact on me or somebody teases me like hurting feelings" (DS2: 04/06/13)

As shown in the storyboard, the teacher typed an "explain images in your own words" section under each image to encourage Damien to express his personal response to images in his narration. A comparison of the script in Damien's storyboard with the transcript of his Digital Story narration (as shown in Figure 7.4) shows that he ignored the teacher's direction to "explain images in his own words". Further he primarily read the script that the teacher had written for him aloud word-for word, with the exception of the last section where he described the images of the unicorn, duck and baby.

Friends can make you feel happy when you are upset. For example; Shmuel uses physical contact on me or somebody teases me like hurting feelings.
A picture of both cats making a dialogue conversation between each other cat families.
Cupcakes are decorated in sad face and happy face food colouring and blue and yellow icing of a design. Coated with a white paper on the outside of the cupcake.
Friends can protect you when you are in trouble. Most of my friends will cheer me up whenever I'm alone.
I like people who share the same interests as me. Some of the things I like are trains, computer games, rat traps.
An S Set Cityrail train terminating at Springfield Elementary Railway Station.
A Rat was scared of the Rat Trap, trying to achieve for the Rat Cheese.
Friends can encourage me when I feel like giving up. Martin helps tells me to keep trying when I feel like giving up or when I say random statements. (E.g. Allawah)
You know the unicorn is determined to learn how to ride the unicycle. The frog is trying hard and not to be eaten. The bird is hungry and is trying to eat the frog. The baby is determined-has just learned how to walk

Figure 7.4 Damien's Digital Story Transcript

With the exception of sections written by the teacher, the narration of Damien's Digital Story (as shown in Figure 7.4) does not communicate a clear story about the importance of friendship, as did the digital stories of the other case studies, and as was the nature of the English assignment. His narration, as well as his image search terms and image selection reflect that he may not have understood the purpose of his digital story task and/or he was unable to maintain his focus on this purpose.

When played back, it is evident that Damien's Digital Story narration did not fit the frame speed of his images. This is because neither he nor his teacher edited the image order or frame speed. Further, Damien's teacher operated the record and save functions of Movie Maker and saved his first narration attempt as the final product (DS2: 04/06/13).

Slowmation. Observation and work sample data show that Damien was able to co-create a slowmation with his peer Mario, about a scene from the novel Oliver Twist (as part of a DMIP English assignment). Unlike his other digital assignments, Damien did not rely on teacher support to create his slowmation, but rather worked alongside Mario to complete the task. Data revealed that like Jimmy and Jack, Damien and Mario appeared to cooperate and contribute equally to the task and that unlike previous digital assignments, they did not write a script or storyboard to plan their ideas or guide their narration.

Observations showed that Mario selected the scene to animate and that Damien expressed contentment with this decision. Further, following Mario's suggestion they agreed to make changes to the novel scene to make their slowmation humorous.

Mario: I think we should do the scene with the guy that dies in a bath and the poison but maybe add different characters to it and change it so it is funny.

Damien: Ok. I like it to be funny   (SL2: 13/08/13)

When interviewed after making a slowmation with Mario, Damien expressed that he and Mario contributed equally: "We both helped the same" (DTSI: 06/06/13). He explained that Mario chose the scene and sonic characters, whereas he chose the Lego

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figures and playdoh: "Mario chose the scene where (INAUDIBLE) dies in a bath... he chose the sonic characters and I got to choose the Lego and the playdoh…" (DTSI: 06/06/13). Damien commented positively about working with a partner and stated that he enjoyed the process and was grateful for Mario's help: "It was good to work with Mario because it's hard to do it by myself because he can help me" (DTSI: 06/06/13).

Observational data supports Damien's claim that both he and Mario contributed equally to the creation of their slowmation. For example, observations show that Damien took on both the role of photographer and character manipulator when creating the slowmation. When Mario moved characters, Damien took photographs on the iPad, and similarly, when Mario took photographs on the iPad, Damien moved characters and set up scenes (SL2: 13/08/13). Figure 7.5 shows evidence of these contributions. It displays of a selection of Damien's photographs and depicts the scenes and characters that he took responsibility for manipulating (while Mario to photographs).

Damien explained that he especially enjoyed taking photographs on the iPad and that he enjoyed creating a Slowmation more than a Digital Story because of the ease of using the iPad animation application MyCreate: "The photos were easy and it was easy to use MyCreate and that was my first time using it" (DTSI: 06/06/13).

Photography by Damien	Character Manipulation by Damien
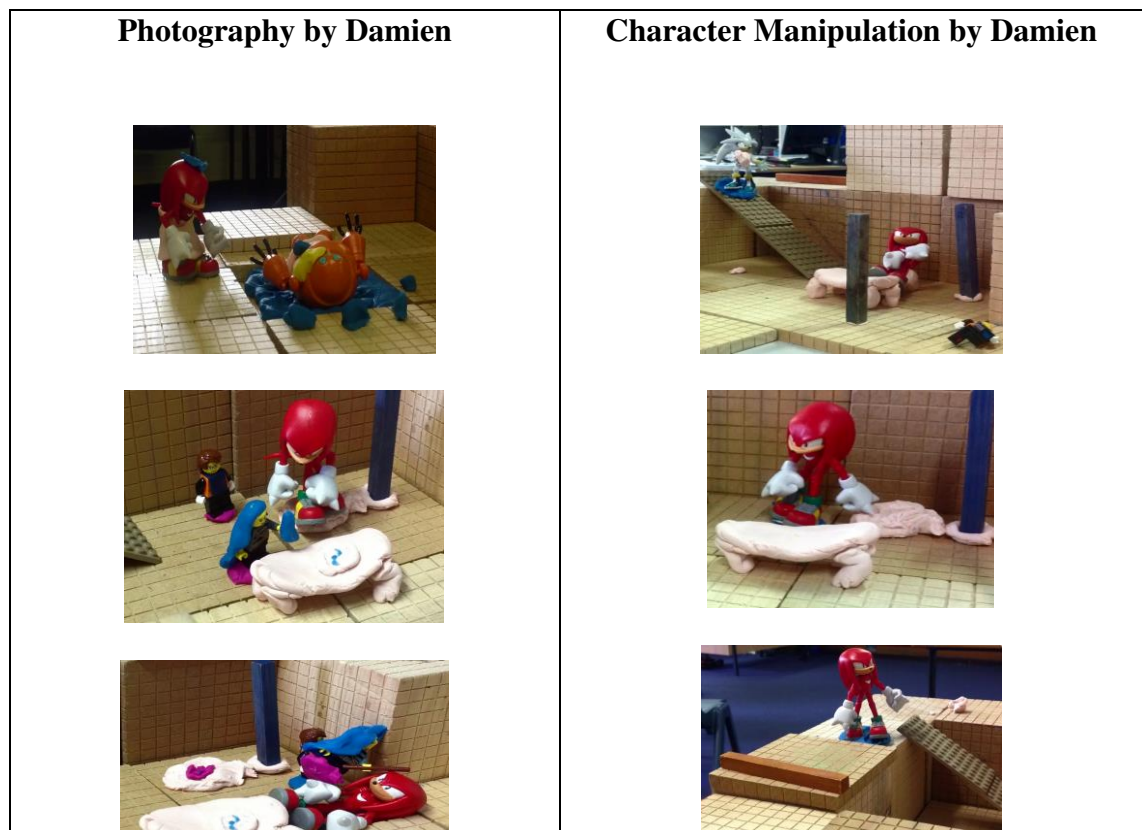
Figure 7.5   Damien's Slowmation Photographs and Character Manipulation

Figure 7.6 shows the transcript of Damien and Mario's slowmation. As can be seen, both students took on the role of multiple characters and contributed equally to recording a voice narration. It is also evident that the narration consisted primarily of sound effects and conversational speech.

Mario:	Oooo
Damien:	Oh no!
Mario:	Somebody help… anybody! Please! That qualifies anybody! Come on! Can you please take him away?
Damien:	Ok we are going to take him away now.
Mario:	Ok. Keep going, keep going. Could you sign this contract for me sir?
Damien:	Alright. Sure I will.
Mario:	Ok thank you for signing the contract. I do appreciate it.
Damien:	Yay yay yay! I am climbing up the staircase and celebrate myself by jumping off the villa!
Mario:	Here have some drink would you like some?
Damien:	Ok but I hope it's not poison
Mario:	It's not. Here!
Damien:	Ah it's poison!
Mario:	Time to murder him.
Damien:	AHHHHHHHHHHHHHHH!

Figure 7.6   Damien and Mario's Slowmation Transcript

Observations show that Damien and Mario's narration was recorded on their first attempt, and that like the other case studies it was improvised rather than rehearsed as there was no script to read from. Also, Damien was the one who pressed start and stop on the record icon in the iPad application MyCreate.

> Damien says "Go" and presses the record icon. He is looking at the moving images on the iPad as the application is recording and speaking with character voices and sound effects in response to the moving images and comments of Mario. He is not reading from anything and his narration is improvised… He presses stop. Damien and Mario are satisfied with their recorded narration and Mario saves the file as a movie. *(Field notes, SL2: 13/08/13)*

When interviewed after having co-created a slowmation Damien was able to explain his animation decisions regarding character movement and use of props to create each scene and setting. Such comments reflect his engagement and involvement in the task, as well as his understanding of the story he was trying to tell through animation:

This is when he drags Oliver's uncle out of the water. See the yellow playdoh is his cancer and this is the villa. These are pillars and this is the staircase. I put the playdoh on it so it didn't fall and then I was doing an animation of turning his face because then Oliver's wife stabbed Oliver's dad coz Oliver's wife gave the wine to Oliver's dad and didn't realise it was poison (DTSI: 06/06/13)

Blended Digital Media. As part of the DMIP, Damien participated in the creation of his own blended digital media English assignment about his interests with varying levels of teacher support. Unlike Charlie, Riley and Jimmy who also produced a second blended digital media assignment about life in Victorian times, this was the only blended digital media assignment that Damien completed. This was because the other task was for year 8 and 9 students in the class and Damien was not present during these lessons.

Table 7.5 differentiates between the tasks that Damien was able to achieve independent of teacher instruction for his blended digital media assignment, and those that he required teacher guidance to complete and/or was unable to achieve and thus relied on the teacher to act on his behalf.

Table 7.5

Damien's Contribution to Blended Digital Media Creation

Step	Student-created (independent of teacher support)	Co-created (Teacher-guided)	Teacher-created
Gathering media	Gathered a large amount of media (315 photos and 2 hours of video)	Teacher helped Damien choose from his favourite images and videos	
Writing a storyboard/ script	Selected from range of images and videos Described media to teacher for the writing of a script		Teacher scribed his verbal explanation/ description of media/interests to create a script on his behalf
Importing and organising media	Made decisions about which images and videos to use and their order and appearance	Teacher helped Damien use application to import and arrange media	
Recording narration	Read from script to record a narration. Operated recording function in software independently.		

As shown by Table 7.5, Damien was able to gather a range of media by himself like the other case studies. Nevertheless, observational data suggest that he gathered a large amount of media on the iPad was and thus experienced difficulty deciding what to include in his assignment. Data show that he captured 315 photographs of various objects and places, and filmed two hours of video footage (with more than an hour's worth of footage following his cat around the house). It appeared that his gathering of media was random as opposed to structured like that of the other case studies, as in an interview, Damien explained that he did not create a storyboard/plan to inform his decisions about what media to capture: "I just took lots of pictures and video of what I thought was good" (BDM1SI: 17/09/13).

To support Damien in choosing which images and videos to include in his assignment the teacher typed the image name and number of the first 14 images and three videos that Damien identified as his favourites in a word document.

Teacher: Ok so what photos of your cat are the best ones that you want to use

Damien: It is hard because I like all of them. Maybe that one with him lying down… or maybe that one coz his face is cute. But I think I should include a video as well because it's of him eating

Teacher types the image number of the photos and videos Damien selects from the list (BDM11: 09/09/13)

As was the case in the writing of his Digital Story script, the teacher similarly asked Damien about each image and video and transcribed his response into a document as a script for his narration. Consequently, the narration was planned by Damien but prompted and recorded in a written way by the teacher. The script of Damien's narration is shown in Figure 7.7.

My name is ████████ and I am going to talk to you about my interest

305 Train Track Collections.

I haven't started building those tracks because I don't have enough tracks to build a different track shape circuits.

400 Tank Engine with lidded wagon.

You can put water in that wagon. It won't spill on the track and it is very protective.

503 My Ramen Noodles.

Yes, the food tastes great because of the flavouring put inside the bowl and the seasoning sauce.

506 Toy Helicopter.

514 Train Track Controller with plug in-wall transformer.

115 Teacher.

The teacher looks like Mr Alexander.

143 Student.

The student's name is Ali El-Salah.

287 Sloped Room.

I took a photo of my room which is sloped.

552 Taxi Trip to Lugarno.

We were travelling to India's house and then we waited for India.

170 Cat eating and cleaning.

 My cat was eating fish and cleaned by himself after.

297 Train set Filming.

I have a white train with 3 carriages running in an ellipse shape.

Figure 7.7   Damien's Blended Digital Media Script

Observations show that unlike was the case with Damien not operating Windows Movie Maker software to produce a digital story, Damien was active in importing and arranging media for his blended digital media assignment using the iPad application Explain Everything. Field notes show that while the teacher had to occasionally remind Damien about functions of the application or answer questions about media editing, he was able to select, organise and display media.

> He selects five images of his cat from the iPad camera roll and arranges them on the screen. He changes the size and position of the images… he arranges the five images in the same frame and asks the teacher if he can add a video to appear beside the images. The teacher agrees and he selects the video and positions it to appear in the centre of the images. *(Field notes, BDM12: 12/09/13)*

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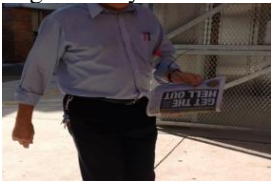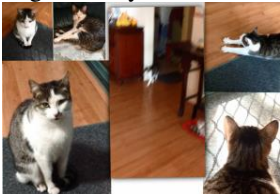
Damien's inclusion of multiple and images appearing in the same frame show that he was able to group his interests. For example, all images and the video represented his interest in his cat. Nevertheless, he was not able to similarly group media to represent his interest in trains. Damien made three separate references to his interest in trains throughout his blended media at different stages, rather than collating the media to represent together. This continual reference to trains suggests that he may have found it difficult to categorise his interests.

Table 7.6 provides a break down and screen capture of the digital media used in this assignment, alongside a transcription of his recorded narration. As can be seen, Damien's blended digital media assignment included a combination of digital story and video to represent 10 aspects of his interests (three related to trains). Specifically, the images featured represented his interest in model trains and train tracks, noodles, model helicopters, teachers, students, video games and his cat. Further, videos were used to represent his morning taxi ride to school, his train set and his cat.

Table 7.6

Transcript of Damien's English Blended Digital Media Assignment

Digital Media	Narration
Digital Story 	This is my train tracks collections. Ummm… I haven't started building those tracks because I don't have enough tracks to build a different track shape circuit
Digital Story 	This is my tank engine with little wagon. You can put water in that wagon. It won't spill on the track and its very protective.
Digital Story 	This is my ramen noodles that I had in the morning. Yes the food tastes great because of the flavouring put inside the bowl and the seasoning sauce
Digital Story 	This is my toy helicopter. It hasn't been ummm… used yet. Ummm…. I'm gonna go buy the batteries for the controller. I don't have enough batteries.

Digital Story	This is the school teacher. He looks like my Alex. He teachers in a mainstream classroom
Digital Story	This is the student that I met in the morning. His name is Alan.
Digital Story	This is a photo of my ummm games and bedroom. I took this photo on the weekend.
Video	This is me in the taxi on the way to school
Digital Story and Video	This is my cat. My pet cat's name is Minnie. I always feed her in the morning, in the afternoon and at night time. And his behabiour is sleeping.
Video	Ummm… this my… umm… another toy train but it runs with battery inside the care and my train is also a high speed train which is called an Ice.
Digital Story	I hope you enjoyed my presentation. Thank you.

Observations show that Damien was able to press record on the iPad application to record his narration. Video footage shows that Damien occasionally read from the script that the teacher had typed on his behalf, but that he also improvised narration when recording. As can be seen by comparing Damien's recorded narration (Table 7.6) with his script (Figure 7.5), his recorded narration followed a more conversational storytelling approach and included additional information than was written in his script.

Field notes show that when Damien looked at his media he was able to improvise his narration and thus explain his story in a clearer and more detailed way.

> He reads from the script about his train tracks and noodles. He looks up at the image of his toy helicopter and begins explaining his interests instead of reading from his script *(Field notes, BDM12:12/09/13)*

It is possible that Damien's ability to control the frame speed of his media while recording his narration (using the iPad application) gave him more of an opportunity to explain his interests.

Damien's Digital Media-Making Skills

The skills that Damien demonstrated in the creation of a range of digital media assignments throughout the DMIP are reported in this section. To respond to research question one, his written, oral, visual literacy and digital technology skills are described as follows.

Writing Skills. When compared with his peers, data revealed that Damien applied limited writing skills throughout the DMIP. This is evidenced by the fact that unlike Charlie, Riley and Jimmy, Damien did not use written language in any of his media to label or categorise information. Further, with the exception of his podcast assignment, he refused to write his own scripts for digital media tasks. With reference to writing he expressed "I don't want to do that bit I like just the pictures" (DS1: 03/06/13). This comment demonstrates his reluctance to write and indicates a preference to alternatively communicate using visual modes. Despite his teachers' efforts to encourage him to write a narration for his digital media assignments in his own words, data show that he resisted and primarily relied on the written support of teachers. For example, his teacher scribed a narration for his digital story (Figure 7.3) and blended digital media scripts (Figure 7.7). Further research is needed to establish whether or not Damien's reluctance to record an oral explanation in a written way was a result of poor writing skills or a reflection of a lack of interest or teacher reliance.

Damien's reluctance to write is also evidenced by the fact that like Charlie, his podcast script consisted entirely of information he had copied and pasted directly from the Internet (PL1: 07/05/13). Further, when working with Mario to plan and produce a

slowmation, he did not create a script, but rather, like Jimmy, it appeared that photos guided his planning and improvised narration recording (SL2: 13/08/13).

It is possible that Damien's use of written scripts (even though mostly teacher-created) supported his oral communication skills throughout the DMIP as data show that like Charlie and on occasion Riley, he relied on scripts to record a narration for most of his digital media assignments. Evidence of this is gathered through comparing the written scripts and transcripts of each of his digital media assignments. In particular, comparing his podcast script (Figure 7.1) with the transcript of his recorded podcast (Figure 7.2) shows that the language communicated is identical. Further, the written language of his digital story storyboard (Figure 7.3) and the transcript of his digital story (Figure 7.4) is also the same. Observations further show that when recording a narration, he read his entire podcast (PL2: 08/05/13) and digital story scripts (DS2: 04/06/13) aloud word-for-word.

While it is feasible that his reliance on reading written scripts supported his oral skills, it is similarly possible that the scripts may have hindered his oral expression. In support of this, data show that his narration was much clearer when he verbally presented it in a conversational way without having to read from a script, as evidenced by the transcripts of his slowmation (Figure 7.6) and blended digital media (Table 7.6) assignments.

Visual Literacy Skills. An analysis of data from observations, work samples and interviews indicate that Damien preferred to communicate meaning in his DMIP assignments using visual representations such as images and video. Further, as was the case with Charlie, Riley and Jimmy, his visual literacy skills appeared to support him in the organisation of his ideas and may have enhanced his oral expression (narration).

Damien's preference for visually presenting information in the form of drawings was identified by his school records (SBR: 04/02/13) and reaffirmed by his teacher in a pre-study interview (BTI: 25/02/13). Similarly, Damien's involvement in creating digital media assignments reflects his preference for communicating in a visual mode. For example, his preference to communicate through images is seen in his comments "the pictures are easier", "I like just the pictures" and "its better to just see it there" (PSS: 11/11/13). Further, the only task that didn't use images was his podcast assignment, and it was for this reason, that he explained he enjoyed it the least of his

digital assignments: "the worst was the podcast because it didn't have the pictures" (PSS: 11/11/13). Such a response similarly reflects his preference for visual communication across tasks.

It is possible that Damien felt that he could more easily and successfully visually communicate meaning than he could in written or oral ways as a result of English being his second language. It is also feasible that he found visual modes more engaging and that they aligned with his autistic learning preferences.

Data analysis suggests that like his peers, Damien's visual literacy skills likely informed the planning and organisation of his ideas across digital media tasks. For example, like Jimmy, gathering images was one of the first steps that he applied in the creation of his digital story (DS1: 03/06/13), slowmation (SL1: 12/08/13) and blended digital media (BDM11: 09/09/13) assignments. Rather than create a storyboard or script, Damien began media planning and production through gathering and capturing visual media. Evidence that visual media used by Damien reflects planning and purposeful design is demonstrated by his slowmation interview responses. When explaining the inclusion and use of slow-moving images in his slowmation, Damien revealed that he put thought into the way that he photographed and manipulated characters and scenes so as to visually communicate meaning:

> That's the water it's blue and there are the splashes… see how it splashes? It is the bath scene so it's blue water there… that's why I put the PlayDoh around of it for water because it's the bath scene (SSI: 15/08/13).

An analysis of observation data revealed that Damien's interaction with images, especially in the creation of his digital story, may have distracted him from the purpose of the task (even more so than the case of Charlie), thus hindering his story design and production. For example, field notes show that his image search terms such as "Peppa Pig", "funny" and "trains" (DS1: 03/06/13) did not reflect an association with the concept of friendship as was required for the task. Further, as demonstrated by his storyboard (Figure 7.3) and narration (Figure 7.4) it appeared that Damien included pictures in his digital story that did not relate to the topic of friendship. In support of this, Damien's interview responses show that his use of images were not related to the task: "…no idea but I liked to choose that one… it's not really friends… no reason I just like the picture… I don't know a reason" (DSSI: 06/06/13).

In a post- digital story interview Damien expressed that he found the digital story task the most challenging of assignments that used visual media: "it was hard a bit… I didn't like so much" (DSSI:06/06/13). Damien's negative feeling about creating a digital story could be attributed to its reliance on existing images. In contrast his slowmation and blended digital media assignments enabled him to create and capture his own photographs and his interview responses indicate he enjoyed both tasks: "It was fun… I like to do the photo and videos" (PSI: 11/11/13). Further, the slowmation task required Damien to manipulate characters and design images before capturing photographs of them. It is possible that the manipulation and photography of scenes for his slowmation helped him to better visualise and represent the story he intended to communicate.

Data suggests that Damien's visual skills may have supported his application of oral skills throughout media-making in the DMIP. For example, observations show that when recording a narration for his slowmation (SL2:13/08/13) and blended digital media (BDM12: 12/09/13) assignments, like Jimmy, he looked at his visual media (instead of a written script) as a guide for delivering an impromptu explanation. A comparison of Damien's blended digital media script (Figure 7.7) and transcript (Table 7.6) show two different narrations, thus reinforcing that he did not read the script written by his teacher word-for word. Further, unlike was the case when recording his digital story narration by reading from a script, his blended digital media narration suited the frame speed of visual media presented. Consequently, his oral explanation complemented the meaning communicated visually through images and videos, unlike was the case with the mismatched recording of his digital story narration. Moreover, in the case of his slowmation he did not have a script to read from and similarly viewed his slow-moving images as a guide for recording his narration in the form of improvised sound effects and character speech (Figure 7.6).

Oral skills. An analysis of data regarding Damien's application of oral skills throughout the DMIP shows that he was able to verbally explain and narrate each of his digital media assignments even though, unlike his peers, he did not write his own scripts. His verbal explanations were recorded by his teacher in a written form (scripts), and his narrations were either guided by reading scripts aloud, or improvised in response to visual media.

Evidence that written scripts guided Damien's oral narration of digital media assignments can be seen by comparing the identical language used in both the scripts and transcripts of his podcast and digital story assignments. Observations further show that this was a result of Damien reading each script aloud word-for word when recording an oral narration.

Damien's oral skills could potentially support his writing skills as they guided the teacher's writing of scripts on his behalf. Nevertheless, more research is needed to substantiate this claim, as Damien was not observed throughout the study to document a written oral explanation. Observations show that for his slowmation he did not do this (SL1: 12/08/13) and for his digital story (DSL1: 03/06/13) and blended digital media (BDM11: 09/09/13) assignment he did not attempt to do this, but rather the teacher wrote on his behalf. Further, when encouraged to write a narration for his podcast in his own words, observations show that he copied and pasted information from the Internet (like Charlie) instead (PL1: 07/05/13).

Evidence that Damien's oral skills were often guided by his visual literacy skills is demonstrated by his capacity to be able to verbally narrate his slowmation (SL2: 13/08/13) and blended digital media assignments (BDM12: 12/09/13) without having to read from a script. Observations show that in each of these instances, he used visual media as a guide for expressing an oral explanation/narration.

Damien's oral skills were demonstrated by his capacity to explain his use of visual media to his teacher. Even though Damien's teacher wrote scripts on his behalf it is important to note that when prompted he was able to explain verbally what he wanted to say, and that it was this explanation that the teacher used to scribe and write each script on his behalf.

Teacher:	So why did you choose this picture? What is it saying about friendship?
Damien:	Not sure
Teacher:	Well they are smiling so what about a friend makes you smile
Damien:	(silent)
Teacher:	Well maybe you're upset or get teased. Can a friend help?
Damien:	Yeah like Shimuel uses physical contact on me and teases me like hurting feelings

Teacher: Ok so friends can make you happy when you are upset?

Damien: (nods head).

Teacher writes "Friends can make you feel happy when you are upset. For example; Shmuel uses physical contact on me or somebody teases me like hurting feelings" (DS2: 04/06/13)

Digital Technology Skills. A comparison of pre and post-study survey data revealed that like the other case studies, Damien's digital technology skills increased since the DMIP, but that he required the most support from teachers to create digital media. Table 7.7 shows this comparison in its identification of his self-reported digital technology skills prior to (yellow highlighted boxes) and after the DMIP (red tick boxes).

In a pre-study interview, Damien reported: "I can do this myself" for eight skills, "I need some help" for eight skills, and "I have never done this" for 11 skills. Unlike his peers, Damien was the only student to record multiple ratings for each skill. For example, he reported for six skills with which he had no experience that he could apply these on his own. Further, for six skills with which he reported no prior experience, he reported that he could apply them with "some help". Further, he reported for five skills that he lacked experience with, that he could apply them by himself. This self-report as represented by Table 7.7 shows that while Damien lacked experience with regards to a range of technology skills, he may have had a basic understanding or was able to predict what may have been involved and thus expressed his level of confidence to apply such skills independently or with teacher support.

A comparison of Damien's self-reported technology skills prior to the DMIP with those reported after the DMIP shows an increase in his perceived capacity to apply such skills. For example, prior to the study Damien reported that with the exception of basic experience using the Internet, taking photographs and creating a storyboard, he had no prior experience with 68.75% of the technology skills listed in Table 7.7. Nevertheless, after the DMIP he reported that he possessed a capacity to apply all of the skills. Specifically, he reported that he could apply 81.25% of the skills on his own (a 31.25% increase from his pre-study report) and 18.75% with teacher support (a 31.75% increase from his pre-study report).

A comparison of Damien's pre and post-study reports suggest an increase in his confidence applying digital technology since the DMIP. For example, even though he lacked experience, prior to the DMIP he reported that he anticipated he would need "some help" to apply six of these skills. Nevertheless, after the DMIP, of these six skills he reported that he would only need "some help" for three of them, and that he felt that he could apply three of them on his own. The three skills that Damien reported that he still needed "some help" with after the DMIP concerned the use of MovieMaker software. His interview responses similarly reflect that he found it difficult to navigate this software and required teacher support to do so in order to create a digital story: "It was a bit hard to press the things for it so the teacher did it for me" (DSSI: 06/06/13)

Table 7.7

Damien's Digital Technology Skills Before and After the DMIP

Digital Technology skills	I have never done this	I can't do this	I need some help	I need a lot of help	I can do this myself
Internet research					▨ √
Storyboarding/script writing					▨ √
Taking photos			▨		√
Saving/importing photos to computer	▨				▨ √
Downloading photos from internet					▨ √
Editing photos			▨		√
Adding photos to slideshow	▨				▨ √
Taking videos	▨				▨ √
Editing videos	▨		▨		√
Saving videos to computer	▨				√
Importing videos into movie making program	▨		√		
Downloading/saving videos from internet	▨				√
Recording voice	▨				▨ √
Saving voice recording to computer	▨				▨ √
Import sound into movie making program	▨		√		
Combine photos & videos using Movie Maker	▨		√		

Key: ▨ = Before DMIP; √ = After DMIP

Damien's post-study responses suggest that, like Charlie, Riley and Jimmy, it is likely that his experiences creating digital media as part of the DMIP contributed to his increased perception of his capacity to apply digital technology skills. Post study

interview data further supports this claim. For example, after the DMIP when referring to his blended digital media assignment Damien expressed "I am a good photographer" and "I took good videos of my cat so I can do video good I think" (PSI: 11/11/13). Considering that prior to the study he reported that he had never captured video before or combined video and image, it is likely that his positive post-study reporting and interview responses about these skills are a result of his media-making experiences throughout the DMIP.

In summary, data presented in this section addresses research question one with respect to Damien. Data shows evidence that unlike his peers who could create digital media independent of direct teacher instruction, with varying levels of teacher support Damien was able to co-create a podcast, digital story, and a blended digital media assignment. Like Jimmy (and unlike Charlie and Riley) he also demonstrated that he was capable of working with a peer to co-create a slowmation and that he could communicate and collaborate effectively with a partner to equally contribute to the design and production of the slowmation. In creating digital media, data revealed that Damien relied on the writing skills of his teacher (as he refused to write his own scripts), coupled with his application of visual literacy, oral and digital technology skills. In particular, capturing and gathering visual media informed his planning. Data also indicates an increase in his self-reported digital technology skills since the DMIP, enhanced digital media-making experience and improved belief in his capacity to apply digital technology skills. The next section addresses research question two concerning Damien's awareness of modal affordances and combination and use of media forms in the design and creation of his blended digital media assignment.

2. Damien's Multimodal Awareness

Data related to Damien's experience using a range of modes and media forms to create digital media assignments were analysed to examine his multimodal awareness and thus respond to research question two. Evidence of his multimodal awareness is presented in this section in two parts. The first part presents an analysis of data that demonstrates his awareness of modal affordances. The data presented in the second part examines his modal choices and the extent by which he purposefully combined media forms to communicate meaning in the design of a blended digital media assignment.

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Damien's Awareness of Modal Affordances

Dialogue from observations of Damien creating a suite of digital media as part of the DMIP, and his interview responses about the process indicate a basic and developing awareness of modal affordances when compared with data pertaining to the other case studies. Table 7.8 tracks Damien's development of modal awareness throughout the DMIP in its presentation of the modes used in his digital media assignments alongside corresponding interview excerpts and dialogue from lessons in which he attempted to explain and express an awareness of modal affordances. As shown by Table 7.8, Damien was able to identify and describe modes used in his digital media assignments. Further his responses demonstrate that he could provide a basic, though limited explanation of the unique features and differentiated communicative potential of oral narration, images (still and slow-moving), video, and written language in his assignments.

Table 7.8

Damien's Awareness of Modal Affordances Throughout and After the DMIP

Modes	Explanation of Modal Affordances
Oral narration	• "Recording voice is a podcast" (PSI: 11/11/13) • "I think it is an audio that you hear on the radio" (PSI: 11/11/13) • "…you can make up a story with your voice and different sounds" (PSI: 11/11/13) • "I said that because I had to catch everybody's attention" (BDM1SI: 17/09/13)
Still images	• "It is good coz you get to pick the pictures online and use them instead of just talking" (PSI: 11/11/13) • "Photos use what you take of an object" (PSI: 11/11/13) • "I think an image is like a photo, I think photos is what you take but video is when you are recording it" (BDM1SI: 17/09/13) • "I took photo because it's not moving" (BDM1SI: 17/09/13) • "I took photo because it doesn't move" (BDM1SI: 17/09/13) • "I took photo because it is not moving. It is stable. Because those batteries were not working for videoing it" (BDM1SI: 17/09/13) • "It shows all of my games and I like it because it is a sloped photo"
slow moving images	• "You have to move things a little bit but not too much so it moves better" (PSI: 11/11/13) • "Slowmation has movement" (SSI: 15/08/13) • "I think digital story and animation are like the same because they use the same things like voice and photos" (SSI: 15/08/13)

Video (fast moving images)	"video it goes all around" (BDM1SI: 17/09/13) "… videos are for something that is movement" (PSI: 11/11/13) "… video is when you are recording it" (BDM1SI: 17/09/13) "A video is quicker than writing it" (BDM1SI: 17/09/13) "The taxi has movement for video and shows friends and the driver" (BDM1SI: 17/09/13) "This train is moving so its video" (BDM1SI: 17/09/13)
Written language (scripts)	"A storyboard is when you draw pictures and you write something that describes the pictures" (PSI: 11/11/13) "A video is quicker than writing it" (BDM1SI: 17/09/13)

Damien's responses show that he was able to identify oral narration as the primary mode in a podcast ("Recording voice is a podcast") and radio broadcast ("I think it is an audio that you hear on the radio"). Nevertheless, his comments are primarily descriptive and thus demonstrate a basic awareness of the purpose of recording an oral narration rather than an awareness of the specific affordances of oral narration in communicating meaning, like Jimmy was able to articulate. For example, Damien identified that the purpose of recording an oral narration is to communicate a story ("…you can make up a story with your voice and different sounds") and was able to justify his use of a verbal explanation to "catch everybody's attention". However, these simple explanations reflect limited knowledge about the more unique and complex features and affordances of oral narration.

Interview responses made by Damien about the use of images in his digital media assignments provide evidence of his awareness of basic affordances of image as a mode for communicating meaning. For example, he identified that images can visually communicate information in place of an oral narration ("It is good coz you get to pick the pictures online and use them instead of just talking"), that images can capture still life ("I took photo because it is not moving. It is stable."), and/or provide the illusion of movement when used as part of a slowmation ("Slowmation has movement…You have to move things a little bit but not too much so it moves better"). Like the other case studies, he also identified that an image can be used to categorise and represent a range of ideas ("It shows all of my games"), but was the only student to comment on the potential for images to visually distort and/or present something in a unique way ("I like it because it is a sloped photo").

Damien's justification of the use of video in his blended digital media assignment reflects a basic awareness of two fundamental modal affordances of video.

Firstly, his comment "… videos are for something that is movement" demonstrates an awareness of the affordance of video to capture movement. He was even able to provide specific examples of how video was used to capture the movement of a taxi ("The taxi has movement for video…") and train ("This train is moving so its video") in his blended digital media assignment. Secondly, like Jimmy who explained the time efficiency of digital media, Damien similarly identified the immediacy of video ("A video is quicker than writing it") thus identifying its affordance to communicate information instantly.

Although data shows that Damien's use of writing throughout the DMIP was limited when compared with his peers, his comments reflect a developing awareness of an affordance of written language in digital media planning and production. For example, he identified that the writing in a storyboard can explain images ("A storyboard is when you draw pictures and you write something that describes the pictures"). Nevertheless, he did not explain the benefit of this for planning suggesting that his awareness of the potential benefit of this affordance may have been limited. This is likely because unlike the other case studies, he relied on the written scripts of his teacher rather than produce his own written work throughout the DMIP. Consequently, he may not have realised the role of such a written mode in guiding his narration and planning.

Damien's awareness of modal affordances is further demonstrated by his ability to compare and contrast the use of different modes to communicate meaning. For example, when comparing the use of images with writing he explained "It is good coz you get to pick the pictures online and use them instead of just talking", thus indicating that images can communicate meaning in ways that are limited by an oral narration used on its own. Further when comparing video with writing he explained "A video is quicker than writing it", thus identifying the immediacy of video in capturing and representing information in ways that would prove more time consuming and limited if represented in a written form. Like Charlie, Riley and Jimmy, Damien's awareness of the affordances of images and video were further supported by his capacity to articulate that image could capture still life whereas video was better suited to representing movement ("I took photo because it's not moving… videos are for something that is movement").

Damien's comment that a slowmation and digital story are "likely the same…"

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show that he was able to identify that they both use the modes of oral narration and images. Nevertheless, while he was able to articulate that slowmation "has movement", unlike the other case studies he was unable to explain the differences between the modes used in the digital story and slowmation, and how the affordances of the modes communicated meaning in different ways. Additional comments made by Damien throughout the study regarding his uncertain use of media in his assignments further reinforce that his awareness of modal affordances was limited: "I am not sure… no idea but I liked to choose that one… no reason I just like the picture… I don't know a reason" (DSSI: 06/06/13). While Jimmy similarly made random choices, he was able to acknowledge this and upon review of his assignment he suggested ways that he could have improved his digital media design, thus indicating his developing modal awareness. In contrast, Damien was not able to articulate suggestions for improving his digital media design based on an awareness of modal affordance, thus suggesting limited and lacking awareness and knowledge.

Like Jimmy's second blended digital media assignment, Damien's digital media assignments similarly reveal instances where his use of modes did not appear to align with his communicative intentions. For example, even though his interview comments indicate that he was aware that images capture still life and video captures movement, the video footage that he gathered for his blended digital media assignment included over an hour of footage of his cat sitting and sleeping. Further, when asked to justify the use of photos in his blended digital media his explanation reflected that his decision-making was random as opposed to purposeful and informed by an awareness of modal affordance. Evidence of this is further examined in the following section.

Damien's Multimodal Design

An analysis of observation, work sample and interview data related to Damien's experience creating a blended digital media assignment demonstrates his application of multimodal awareness throughout the DMIP. An examination of this data shows that he was able to combine digital story and video media forms to create a blended digital media assignment about his interests and thus communicate meaning using the modes of oral narration, still (photographs) and fast-moving (video) images. Evidence shows that unlike his peers he did not include slowmation in his blended digital media assignment and he received teacher support to combine his media. Further, this

assignment was the only blended digital media task that he attempted as he was absent when the class created a second blended digital media assignment.

Work sample and interview data revealed that the decisions he made to capture and communicate meaning using a range of modes in his blended digital media assignment were occasionally purposeful and informed by his multimodal awareness. Nevertheless, data similarly showed that, like Jimmy, many of the decisions he made to include and combine various media forms and modes were random as opposed to purposeful or deliberately informed by multimodal awareness. Evidence of both the purposeful and random design of his blended digital media assignment is presented in Table 7.9. This table provides a breakdown of the media forms he used in his assignment (e.g. digital story and video) and the corresponding modes each form consisted of (e.g. voice, image, video etc.). Alongside the breakdown of Damien's use of media and modes is an explanation of his design, which is made up of interview excerpts in which he justified his digital media-making decisions (Explanation of Design column), and an interpretation of his comments and motivations underpinning decisions (Intention and Purpose column).

Table 7.9

The Multimodal Design of Damien's English Blended Digital Media Assignment

Digital Media	Modes	Explanation of Design	Intention & Purpose
Digital Story	• 1 image • Voice narration	"It's a photo of my train tracks" "I took photo because it's not moving"	• To show the train tracks • No need for video are tracks are still
Digital Story	• 2 images • Voice narration	"That one is of the wagon on a moving table and this one is on a timber floor" "Well both of them are the same with that one but the others are not" "I just wanted to take photo"	• To show relationship between two images • To show wagon on its own and on tracks • Personal preference for photo
Digital Story	• 1 image • Voice narration	"That's my ramen noodles that I have" "I took photo because it doesn't move"	• To show food he eats • Used photo because food is still

Digital Story	• 1 image • Voice narration	"I took photo because it is not moving. It is stable. Because those batteries were not working for videoing it"	• Photo used to capture still image • Couldn't use video of helicopter moving as batteries were not working
Digital Story	• 1 image • Voice narration	"I always see him in the morning" "I don't know why I took a photo. I can't really explain it"	• To show teacher he regularly sees • Unable to justify/explain the use of photo
Digital Story	• 1 image • Voice narration	"He is a year 7 student" "I just took it for no reason"	• To show a student • Unable to justify/explain the use of photo
Digital Story	• 1 image • Voice narration	"It shows all of my games and I like it because I could do it as a sloped photo"	• To show games • To experiment with camera angles
Video	• 1 video • Voice narration	"The taxi has movement for video and shows friends and the driver"	• To capture aspects of his daily taxi journey to school • Used video to capture movement of taxi
Digital Story and Video	• 5 images • 1 video • Voice narration	"I used a lot because I had so many photos and I had video –it was hard to choose it"	• Used multiple images because he had taken many • Put photos and video together because he couldn't decide which would be most suitable individually
Video	• 1 video • Voice narration	"This train is moving so its video"	Used video to demonstrate movement of train
Digital Story	• 1 image • Voice narration	"I said that because I had to catch everybody's attention and say thanks"	Voice used to address, attract and thank audience

An examination of Damien's blended digital media work sample data revealed that like his peers, his use of modes reflects his awareness of the basic affordance of image to

visually represent meaning and capture still life ("I took photo because it's not moving…), and the affordance of video to represent movement ("…videos are for something that is movement"). For example, his blended digital media assignment included 14 images of still objects (e.g. train tracks, video games and food) and two videos that show movement (e.g. taxi ride to school and a walking cat). Further, interview responses as displayed in the "explanation of design" column of Table 7.9, also demonstrate his deliberate use of modes to represent meaning based on an understanding of these basic affordances. For example, when Damien was asked why he included specific images in his assignment he responded by explaining the meaning depicted by each image, thus reflecting his awareness of the affordance of an image to visually communicate meaning ("That one is of the wagon on a moving table and this one is on a timber floor"). His responses, like that of his peers, also reflect an awareness of the affordance of an image to uniquely represent and categorise multiple ideas ("It shows all of my games and I like it because I could do it as a sloped photo").

Damien's interview responses support work sample data in that they indicate his decision to represent some of his interests in the form of images was informed by his awareness of the affordance of a photograph to capture still life ("I took photo because it's not moving… It is stable"). He similarly justified that he used video to represent his taxi ride to school and toy train because of his awareness that video represents movement ("The taxi has movement for video and shows friends and the driver… This train is moving so its video").

Damien's application of multimodal awareness is further reinforced by his capacity to distinguish between the affordances of image and video in his justification of why he chose to represent his interest in toy helicopters with an image. He explained that it was his intention to take a video of the helicopter to show movement but that because it had no batteries and couldn't move he felt that the affordance of image to capture still life was better suited to represent it: "I took photo because it is not moving. It is stable. Because those batteries were not working for videoing it".

Damien's justification of why he included an oral narration at the end of his assignment that said: "I hope you enjoyed my presentation. Thank you" (Table 7.6), demonstrates his awareness of the affordance of a verbal narration to address the audience directly and communicate meaning in a way that is not possible by way of

image or video. For example, he reasoned that he used an oral narration because of its potential "to catch everybody's attention and say thanks".

Not all of Damien's interview responses reflect purposeful media-making decisions that are informed by an awareness of modal affordances. Rather, he admitted that he included of a photograph of his train wagon simply because he wanted to ("I just wanted to take photo") thus showing that on occasion, like Charlie and Jimmy, his use of media was influenced by personal preference. Also, his responses indicate that his inclusion of an image of a teacher and student was random. For example, when justifying his use of these images he expressed: "I don't know why I took a photo. I can't really explain it" and "I just took it for no reason".

In summary, data shows that Damien's blended digital media assignment was designed by way of a series of purposeful and random decisions regarding the use and combination of media forms and modes, thus addressing research question two. In some instances, his assignment reflected a basic awareness of the modal affordances of image and video. Like Jimmy, he identified the immediacy of video, and unlike his peers he identified the affordance of adding effects and distortions to still images. In other cases, his use of modes reflected personal preference and/or appeared to lack specific purpose or intention (like Jimmy's second blended digital media assignment). When compared with his peers, it seems that Damien's awareness of modes was the most basic and limited. Also, he was the only case study that only produced one blended digital media assignment and did not blend slowmation with digital story and video. Further, unlike Charlie, Riley and Jimmy, Damien did not write his own narration and required the support of the teacher to design and produce all of his digital media assignments. The following section examines the influence that the DMIP may have had on Damien's communication skills so as to respond to research question three. It explores his social interaction and digital communication, as well as his capacity to show interest in his peers and provide peer feedback throughout the DMIP.

3. Damien's Communication

Data regarding Damien's communication before and during the DMIP is examined in this section to address research question three. An analysis of data revealed that since the DMIP he had many positive social experiences. Each of these experiences is

explored in the context of his social interaction and digital communication, as well as his interest in peers, and capacity to provide peer feedback.

Damien's Social Interaction

Observation data and student records show that, like all of the case studies, prior to the DMIP Damien rarely interacted socially with his peers during class time. Observations show that when given free time, like Charlie and Riley, he preferred to spend it silently on his own at the computer playing games instead. Evidence recorded by pre-study observations shows that prior to the DMIP across a two-week period, when given free time Damien opted for playing computer games 23 times (PCO 04/02/13-18/02/13). Similarly, observations of Damien in Social Club during this time demonstrate his reluctance to interact with peers. For example, he refused to share his interests with others or ask his peers questions about their interests during Social Club (PCO 04/02/13-18/02/13).

When it came to interacting with his peers prior to the DMIP, Damien's teacher explained that he was too shy to initiate conversation but instead told jokes to get the attention of his peers and provoke interaction:

> He is shy but he is a happy kid with a lot of energy and a strong sense of humour. He's always wanting attention from me, other students, even if it isn't good attention. He's cheeky and always joking around and some of the students get annoyed because it gets on their nerves. But he enjoys annoying them... especially Riley (BTI: 25/02/13).

In support of this comment made by Damien's teacher, observations prior to the DMIP show that he would frequently raise his hand during class to make unrelated and random comments and jokes for the class to hear (PCO 04/02/13-18/02/13). While these comments were often directed at the teacher, his teacher was of the opinion that "he deliberately announced these things in front of the class to get the attention of other students" (BTI: 25/02/13). If this was his intention it could be seen that Damien's hand raising and comments were a means of potentially eliciting a response from and/or initiating interaction with others.

Baseline observations, student records and pre-study teacher interview data revealed that prior to the study Damien had never successfully worked with another peer to produce a school assignment. Rather, as was the case with most tasks, he

required the support of his teacher or teacher's aide and thus, unlike his peers, he frequently worked alongside a teacher and/or under teacher guidance:

> No he hasn't worked on an assignment with another student before. It's because I am usually needing to help him... me or the teacher's aide. I don't know how partner work would go with him or many of the students for assignments really because of their social difficulties and how they get distracted easily. (BTI: 25/02/13)

Considering that Damien spent much of his class time with the teacher or teacher's aide, unlike the other case studies, much of his social interaction occurred with them, rather than his peers. Observations show that this type of interaction was characterised by conversation about different class tasks and expectations (PCO 04/02/13-18/02/13). In contrast, during the DMIP, Damien was given the opportunity to create a slowmation assignment with his peer Mario, thus affording him the opportunity to interact with another student instead of a teacher about class tasks. Observations of the social interaction that occurred between Damien and Mario, indicates that conversation was occasionally social and concerned personal topics thus exceeding work-related talk/topics. For example, when planning their slowmation tasks Damien and Mario had a conversation about their figurine and Lego collections:

> Mario: So like how many of those guys do you have?
>
> Damien: Just these ones but I used to have more. Do you have?
>
> Mario: Lego?
>
> Damien: Yeah, or just the sonic ones?
>
> Mario: I have Lego but not the people. Where did you get them?
>
> Damien: I don't remember. I think the shops somewhere
>
> Mario: But do you know the shop?
>
> Damien: I don't remember but I can ask   (SL1: 12/08/13)

Damien's behaviour records reveal that as a result of his ASD, he experiences social interaction difficulties (SBR: 04/02/13). These difficulties were evident in observations and interview data. For example, recorded observations and incident records show that as a result of his difficulties socially interacting with others, prior to the DMIP Damien was involved in ongoing conflict with his class peers, and in particular with Riley:

> Their personalities clash… it has to do with Riley not liking Damien's sense of humour. Damien is always egging him on because he enjoys seeing him get upset. He will annoy Riley until he is losing his temper and yelling, growling and sometimes he will even throw objects across the room. Damien just laughs and makes things worse (BTI: 25/02/13).

Despite ongoing incidents during class time that involved negative interaction between Damien and Riley, observation and teacher interview data suggest that since the DMIP there may have been fewer and/or less severe problems between the two: "We haven't had any real serious problems like we had before" (PTI: 18/11/13). Data also reveal that during the DMIP Damien played a game of chess with Riley:

> *Riley sets up the chessboard on the table next to Damien's desk and begins to explain the Rules. Damien sits at the table and listens to Riley's instructions. They begin playing chess. Riley starts the game by moving a pawn and Damien follows (BDM3: 17/10/13).*

His teacher explained that this marked "the very first time they have played a game of chess together", and further reasoned that this "would never have happened before" (PTI: 18/11/13). While it is not possible to attribute Damien's decrease in negative social interaction and increase in positive social experiences with Riley to the DMIP, his teacher explained:

> …maybe it has something to do with the fact that they have been sitting in on a lot of things together lately and they have been seeing what each other has been learning … maybe that has made him more tolerant and open? (PTI: 18/11/13)

It is not possible to prove that Damien's relationship with Riley was improved as a result of the DMIP, or that it had improved significantly as a range of other factors may have influenced their dynamic during the study. Further research is needed to explore reasons for the changing dynamic and ascertain whether or not these positive interactions were sustainable after the DMIP.

Damien's Digital Communication

An analysis of data related to Damien's experience creating a blended digital media assignment reveals that when given the opportunity to digitally communicate meaning he was able to express many interests in a clear and interesting way, but unlike his peers, he required the support of the teacher to do so. Specifically, as shown in Table 7.6, Damien was able to represent 10 different interests using the modes of image, video and oral narration. It is possible that the support offered by his teacher with regards to selecting and combining media helped him to organise his ideas. Moreover, it is likely that the opportunity to represent his interests in a visual way supported his communication of meaning as the use of images and videos may have aligned with his visual literacy skills and learning preference.

Prior to the study Damien's participation in Social Club was observed over a two-week period. Observations of him presenting news and sharing interests with his peers through such a platform revealed that he experienced many communication difficulties. The biggest challenge was dealing with his nerves and feelings of shyness. Field notes show that he when asked to speak to the class about his interests, because of his nervousness, Damien would stand at the front of the room, stare at the ground and avoid speaking. When prompted he would verbally respond to questions and/or speak very slowly and pause for long periods of time in between spoken words.

> Damien is asked to talk to the class as part of the day's social club news sharing session. He stands in front of the class and looks at the floor. He swings his body side to side and remains silent. The teacher prompts him to speak by asking questions about his weekend. He responds with "yes" and "no" answers. The teacher asks him to talk about his favourite part of the weekend. He responds "It was… well… it was good" *(Field notes, PCO: 04/02/13).*

Additional examples of Damien's contribution to Social Club presentations are shown by Figure 7.8. The transcripts of these observations support field notes as they further demonstrate that he found it a challenge to speak in front of the class and provide a detailed presentation about his interests, even when prompted by the teacher. For example, observation 1 reveals that his verbal explanation was brief and lacking in detail. Words appear to be omitted in his verbal response and his speech consisted of pauses that disrupted meaning and made it difficult for listeners to follow. Further, as made evident by the transcript of observation 2 (Figure 7.8), even when the teacher posed questions to encourage Damien to speak and elaborate on his ideas, he responded with succinct responses such as "I don't know" or body language (e.g. shrugs), and/or refused to respond and share news with the class.

Social club observation 1:
"Well I have a train set at home and I like it… it is good and you can well… that's it and I have a lot of tracks…for it… I am going to get some…more… maybe to add them with lots of them… they are good"

Social club observation 2:

Damien:	I don't really have anything to say
Teacher:	Maybe you can start by telling everyone what you did on the weekend
Damien:	Not much… ummm I don't really remember…
Teacher:	Did you go anywhere?
Damien:	(shrugs shoulders)
Teacher:	They tell us what you enjoy doing on the weekend. Is there somewhere you want to go?
Damien:	I don't know
Teacher:	Ok well you have a think then and if we get time we will come back to you. Nathan do you want to go next?

Figure 7.8   Damien's Explanation of Interests during Social Club

Damien's experiences delivering a presentation to the class about his interests during Social club differs to his experience digitally communicating his interests in the form of a blended digital media assignment. Unlike his experience during Social Club, Damien was observed to record an oral narration for his blended digital media without pausing and did not appear too shy to do so. Further, like Riley and Jimmy he was excited to share his blended digital media with the class and did not need require teacher prompting when narrating his digital media to explain or elaborate on his interests.

Unlike was the case with Social Club presentations, Damien's blended digital media was planned and pre-recorded before it was shared with the class. Further, he was given the opportunity to represent meaning in a visual way thus add multimodal layers to the monomodal requirement of verbal delivery. An analysis of the challenges that Damien's experienced communicating in Social Club and an analysis of his digital communication of interests in the form of a blended digital media assignment, show how digital multimodal communication can address many issues such as shyness. Further it suggests that digital communication in the form of a blended digital media may provide alternative means of communicating meaning that could help overcome and/or avoid communicative difficulties and challenges.

Damien's Peer Interest and Feedback

Damien's behaviour and comments in response to the viewing of his peers' digital media assignments reveal that, like Charlie, Riley and Jimmy, he expressed an interest

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in others and was able to provide peer feedback. Observations of Damien viewing the digital media of his peers indicate that he listened to and appeared engaged by the meaning communicated in his peers' assignments. For example, field notes indicate that his body language and behaviour when viewing the digital media of his peers appeared to be conducive to that of an interested and engaged viewer:

> Jack's digital story plays on the Interactive Whiteboard. The gaze of Damien's eyes remains directed toward the whiteboard. He smiles when he sees an image of Jack's cat. The digital story finishes playing and Damien claps. Damien immediately raises his hand to comment (*Field notes, BDM1V: 17/09/13*).

Additional evidence that Damien was engaged and listened to the explanation of interests offered by the blended digital media of his peers, is demonstrated by his acknowledgement that he learned that "Jimmy has a cat and also trains…" and "some of the people in the class like my trains and have cool things too toys and games". These comments reveal that, like Charlie and Riley, Damien learned new things about his peers a result of viewing their blended digital media assignments. It also appears that he enjoyed watching the digital media of others as in a post-study interview he explained: "everyone's was good... even better than mine…it was fun to see… like going to the movies" (PSS: 11/11/13).

Damien's interest in his peers throughout the DMIP is further demonstrated by the feedback he offered to them upon viewing their digital media assignments. For example, after viewing Charlie's slowmation, Damien raised his hand and commended him by saying "I liked it" (SV: 15/08/13). He similarly commended Jimmy for his blended digital media assignment: "That was really great" (BDM1V: 17/09/13). Further, observations revealed that Damien expressed an interest in the blended digital media assignment of his peer Jack. Data show that following the viewing of Jack's blended digital media Damien initiated a discussion about cats through posing a series of questions that reflect his interest:

Damien:	Um how old is your cat?
Jack:	He is about… well he is old so I think 17
Damien:	Oh that is old… does she have a name?
Jack:	He does. It is a he. His name is Aradak
Damien:	Does he bite sometimes?
Jack:	No he is a friendly old thing really
Damien:	Because sometimes they are biting (BDM1V: 17/09/13)

Damien's use of questions to elicit information from Jack about his cat contrasts with his silence and lack of interest in the Social Club presentations of Jack and other peers. Perhaps a visual representation of interests appealed to Damien's visual learning preferences and communication style. Further, it is possible that the photograph of Jack's cat enabled Damien to readily recognise and identify a common interest, thus provoking and initiating his questions and comments.

Unlike Social Club experiences where Damien was observed to refuse presenting his interests to the class in the form of a verbal presentation (PCO 04/02/13-18/02/13), observations show that Damien, like Riley and Jimmy, was eager to show his digital media assignments to the class. His willingness to share his blended digital media with his peers is demonstrated by his comment: "Can I show mine please sir?" (BDM1V: 17/09/13). It is possible that Damien's eagerness to share his work reflects a feeling of confidence and pride in his achievements. This is further reinforced by his interview comment: "I liked showing the people what I did… and they liked it I think" (PSS: 11/11/13)

In summary, research question three has been addressed concerning Damien's communication throughout the DMIP. Analysis of data shows that during the DMIP he worked productively with a partner to produce a slowmation and that such an experience afforded unique social interaction opportunities. Data also show that Damien experienced positive interactions with his peer Riley throughout the DMIP despite a history of conflict. Work samples show he was able to communicate his interests in the form of a blended digital media assignment, but that unlike his peers he required significant teacher support to do so. Data also indicate that he appeared interested in viewing the digital media of his peers, and was able to demonstrate this through the provision of peer feedback in the form of questioning and commendation. The next section summarised these findings alongside findings pertaining to the other two research questions addressed in this chapter for the case of Damien.

Summary

Table 7.10 provides a summary of key findings in response to each research question for the case of Damien. As shown by Table 7.10, through participation in the DMIP and with varying degrees of teacher support, Damien was able to co-create podcast, digital story, slowmation and blended digital media assignments. In doing so was able to apply

a range of visual, oral and digital literacy skills that supported his representation of meaning. He demonstrated limited multimodal awareness and could apply a basic knowledge of modal affordances to the design of his blended digital media assignment, though many of his media-making decisions reflected a lack of forethought and purposeful planning. His expression of interests in the form of a blended digital media assignment facilitated his social interaction and digital communication. Further, his viewing and response to the digital media assignments of peers demonstrated an interest in his peers and the capacity to provide feedback in the form of posing questions to and/or commending the efforts of his peers.

Table 7.10

Summary of Findings for the Case of Damien

Digital Media Forms & Skills (RQ1)	Multimodal Awareness (RQ2)	Communication (RQ3)
Gained awareness of forms of digital media **Gained experience making digital media** (first time attempting to create a podcast, digital story, slowmation and blended digital media) **Required teacher support to co-create digital media assignments** **Relied on a range of skills** to create digital media assignments: *Writing skills:* relied on teacher's written scripts *Visual literacies:* use of images and videos supported oral narration *Oral skills:* recorded a scripted and improvised oral narration *Digital technology skills:* Gained new experience applying and improving digital skills (self-reported 31.25% increase in digital skills since DMIP)	**Demonstrated limited modal awareness:** identified and described basic modal affordances and media combinations **Created multimodal digital media:** Combined digital media and modes to create a blended digital media assignment **Demonstrated limited purposeful multimodal decision-making:** Provided limited explanation of the modes and digital media combinations used to communicate meaning in his blended digital media assignment	**Participated in social interaction** throughout DMIP and interacted more positively with Riley (despite history of conflict) **Worked with peer for** the first time to co-create a slowmation **Digitally communicated 10 interests** in form of a blended digital media assignment **Initiated peer feedback** after viewing the peer digital media assignments **Expressed interest in others:** appeared to be engaged and listen, discovered common interests and showed interest through questioning and commendation

The following chapter will discuss the study's findings and recommendations by comparing data among the four case studies in relation to research questions and literature on autism, multimodality and communication interventions.

Chapter 8: Discussions and Recommendations

Introduction

This chapter summarises and discusses the findings of the study. Firstly, it reviews key findings across each of the student case studies. It then discusses emerging themes from the study in relation to literature pertaining to multimodal communication possibilities for students with ASD as well as theoretical and pedagogical implications. Finally, the chapter concludes with recommendations for further research and the implementation of Digital Media Intervention Programs in the future.

Overview of Case Study Findings

As part of the DMIP Charlie, Riley, Jimmy and Damien created a suite of digital media assignments in the form of podcasts, digital stories, slowmations and blended digital media. Table 8.1 provides a general overview of findings pertaining to each cases study in relation to the study's three research questions. As shown by Table 8.1, the modes that students used to communicate their experiences for each task differed across each case study, as did the range and level of written, visual literacy, oral and digital technology skills employed. Nevertheless, while some students required more peer and teacher support than others and/or experienced difficulties working in pairs and communicating using different modes, each student appeared to gain new skills and self-reported an improved capacity to apply these skills in the future.

Data also show that to varying levels all students demonstrated awareness of modal affordances and were able to explain and apply this knowledge to different extents in the design and production of their digital media assignments. Further, the DMIP afforded each student unique opportunities for social interaction and for sharing their work and interests with peers. Each student appeared to be engaged by the digital communication and experiences/interests of others throughout the DMIP and in some instances, were observed to pose questions and/or offer feedback and commendation to each other regarding their digital media assignments and interests.

Table 8.1
Summary of Case Study Responses to Research Questions

Students	Media Forms & Skills	Multimodal Awareness	Communication
Charlie *(Year 8; Aged 14; Level 1 ASD)*	• Self-reported 62.5% increase in technology skills • Disliked recording and listening to his own voice (refused to listen to or review digital media assignments) • Copied & pasted text from internet • Written scripts guided planning • Distracted by images • Used writing to label images • Re-enacted script to class • Demonstrated transfer of skills outside of DMIP (created own stop-motion animation and attached podcast to PowerPoint presentation)	• Combined digital story, video and slowmation for blended digital media assignments • Compared affordances of image and video • Used symbols and text to label and emphasise ideas	• Digitally communicated seven interests in blended digital media assignment • Identified common interests & used social cues to participate in conversations • Difficulty working with Riley: refused to communicate, let Riley take control. Refused to help Riley upon request
Riley *(Year 8; Aged 14; Level 1 ASD)*	• Self-reported 25% increase in technology skills • Produced own written notes from internet research • Use of visual media guided by written plans • Recorded improvised narration without script • Used written and typed text for different purposes (e.g. formal and informal comments) • Reviewed and re-recorded narration	• Identified time efficiency as an affordance of using visual media to communicate ideas • Aware of the demands of viewer • Articulated affordances of different types of image (e.g. still, slow and fast moving)	• Digitally communicated eight interests in blended digital media assignment • Interacted more positively with Damien despite history of conflict • Difficulty working with Charlie: would not compromise and took control of all the tasks (doing most of the assignment on his own) • Discovered common interests, engaged by digital communication of peer digital assignments)
Jimmy *(Year 9; Aged 15; Level 1 ASD)*	• Self-reported 56.25% increase in technology skills • Didn't meet content requirements for 2nd blended digital media assignment • Narrated videos while recording • Recorded impromptu narrations without scripts • Added written captions as commentary • Addressed different audiences, used humour and provided commentary with oral narration • Planning guided by images instead of written scripts	• Comprehensive awareness of the affordances of oral narration and its role providing commentary and telling a story • Media inclusion was occasionally random and did not always match narration Acknowledgement of developing modal awareness	• Digitally communicated 14 interests in blended digital media assignment • Addressed Damien in blended digital media, asked Mario questions about PlayStation, & played chess with Riley • Worked well with peer Jack: appeared to share roles equally • Appeared to listen and clapped when viewing digital media of peers • Offered Jack commendation about his blended assignment
Damien *(Year 7; Aged 13; Level 1 ASD)*	• Self-reported 31.25% increase in technology skills • Unlike his peers Damien required teacher support to co-create his digital media assignments and only created one blended digital media assignment. • Refused to write script (teacher wrote for him) • Distracted by images • Copied and pasted information from internet • Planning guided by visual media	• Basic knowledge of modal affordance • Identified immediacy of video and compared image & video • Mismatched visual media and oral narration • Random inclusion of visual media without purpose • Didn't use slowmation in blended digital media assignment	• Digitally communicated 10 interests in blended digital media assignment • Interacted more positively with Riley (despite history of conflict) • Worked well with peer Mario. Appeared to share roles equally. • Appeared to be engaged and listen, discovered common interests and showed interest through questioning and commendation)

Multimodal Communication through Media-Making

This study demonstrated ways in which the implementation of a DMIP encouraged students to create their own digital media and enhanced their communication in the classroom setting in a range of ways. This section compares the study's findings with research literature to discuss potential implications for communication opportunities for students with ASD now and in the future.

The design of the DMIP responded to a call for school literacy practices to align with 21st century multimodal literacy practices (Cercone, 2017; Miller & Bruce, 2017; Mills, 2010; Walsh, 2008; 2009; 2010) and for schools to adopt "less prescriptive curriculum and a means of assessment which allows teachers to credit students for their accomplishments" (Faux, 2005, p. 180) in multimodal literacies. More specifically, this study responded to the need for research in the area of autism and multimodal communication as literature reports on a lack of research in the field of Special Education that examines students' multiliteracies through digital media creation (Bruce et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016). In spite of the contributions of a handful of studies that have explored multimodal communication experiences for students with ASD creating digital media (Diener et al., 2016; Holmgaard et al., 2013; Oakely et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016; Sarachan, 2012), Pandya, Hansuvadha and Pagdilao (2016) explain that there is "very little extant research" (p. 415) that explores the ways in which students with ASD specifically engage with multimodal representations through digital media-making (the focus of the current study). Consequently, it can be said that overall "there is so much we don't know – in language arts, literacy, special education and autism research" (Pandya, Hansuvadha & Pagdilao, 2016, p. 415) about the multimodal literacies of students with ASD, let alone the communicative potential of digital composition for these students in the school setting.

Similar to the current study, the research of Pandya, Hansuvadha and Pagdilao (2016) implemented a teaching program that involved students (in this case children in an elementary school) with ASD using iMovie on an iPad to create their own multimodal digital autobiographies in the form of videos. Findings from this study indicate that students with ASD can participate in the making of their own digital media compositions and that in doing so they can leverage the affordances of multimodal composing to communicate meaning in new ways. The current study, however,

explored the implementation of a DMIP with students in a high school setting instead of an elementary school classroom and examined the potential of students creating additional digital media forms such as podcast, digital stories, animations and blended digital media. With the exception of the current study and the research of Pandya, Hansuvadha and Pagdilao (2016), while a handful of studies have reported student involvement in digital media-making (Diener et al., 2016; Holmgaard et al., 2013; Oakely et al., 2013; Sarachan, 2012), it appears that there is an absence of research that specifically focuses on the multimodal affordances and communicative potential of digital media composing for students with ASD. The ways in which this study's findings compare with results from existing research concerning the multimodal communication of students with ASD creating digital media are discussed as follows.

Findings from the current study revealed the different ways in which four students with ASD used a range of modes to communicate meaning in the creation of their digital media assignments. Results indicate that written language played a key role in the digital media-making experiences of all student case studies. In particular, students especially showed reliance on written language in the planning of their digital media assignments. For example, with the exception of Damien, each student mostly began digital media planning and design by brainstorming ideas, and producing a list, storyboard or script to inform their use of other modes. While Damien did not write his own plan, he dictated a narration to his teacher and he, like the other three students involved in the study were observed to rely on the written language of their plans/scripts when recording their narration, especially for podcast and digital story assignments. Riley and Charlie were also observed to label images with written captions, and Jimmy further added written commentary to the photographs and videos of his blended digital media assignment.

The literature shows that students with ASD have been observed to experience difficulties communicating meaning through the mode of written language as a result of delayed phonological language development (Diehl et al., 2006), limited vocabulary (Carnahan et al., 2011; Oakely et al., 2013), and impaired and/or literal comprehension (Gately, 2008; Oakely et al., 2013), thus making many conventional forms of written school assessments challenging (Ricketts et al., 2013). Similarly, data from the current study show that on occasions, students also experienced challenges organising and presenting their ideas in a written mode. For example, both Riley and Jimmy were

observed to express ideas verbally more readily than they could in a written form when designing and making their digital media. Further, analysis of their work samples shows limited and/or an absence of written text in storyboards and other plans, and Jimmy recorded multiple impromptu narrations for his assignments without using written guides. For example, Damien refused to record his ideas in a written form throughout digital media-making experiences and thus recruited the support of his teacher who on his behalf scribed the ideas that he verbally dictated. Findings suggest that students' writing experiences were shaped by ASD communication differences but making the digital media particularly encouraged the students to communicate in different modes. Further research would be required to identify the variables that may have influenced students' use of written language and their application/development of written language skills. Moreover, increasing baseline data (e.g. including observations, written work samples, teacher reports and evaluations) would allow for comparison of students' application of written skills before and during the DMIP.

While written language played a significant role in students' digital media assignments, results indicated that the ways in which students used the mode of written language to interpret and communicate meaning differed among students. Results from this study revealed that most students expressed a preference for making a media product such as a digital story, animation or blended media rather than a podcast or essay that primarily and/or solely relies on written language. Further, when asked to justify this preference, students attributed it to the affordance of these media forms related to the use of images and video, thus aligning with preferences for communicating through visual modes. Nevertheless, not all students expressed a preference for communicating through visual modes over written language. For example, Jimmy's digital media assignments were informed by detailed written plans and inclusive of written language (e.g. his blended digital media included captions of written text that acted as a commentary). While findings pertaining to the cases of Charlie, Jimmy and Damien support a wealth of research that reports favorably on the engagement of students with ASD with visual modes and a preference for visual mediums over written language (Dakin & Frith, 2005; Kaldy et al., 2016; Simmons et al., 2009; Simpson et al., 2008), findings pertaining to Jimmy revealed that such communication/learning experiences and preferences cannot be generalised to all students with ASD. The fact that unlike the other three case studies Jimmy preferred

using written language as a means of organising and representing his ideas in digital media design and creation, provides evidence that not all students with ASD use written language in the same ways and/or prefer to communicate through visual modes instead. However, it is clear from this study that creating digital media gives students with ASD options for communicating in different ways by using different modes.

Students' recording of their own voice to narrate digital media assignments in this study is consistent with other research that reports on the successful involvement of students with ASD recording a voice narration for digital stories (Oakely et al., 2013), videos (Pandya, Hansuvadha & Pagdilao, 2016) and animations (Holmgaard et al., 2013). Nevertheless, it is more common in ASD literature for students with ASD to record voice narrations to support digital media created by a teacher or expert in the form of video models and digital Social Stories^{TM} (Chaplin et al., 2013; Sani-Bozkurt et al., 2017). One reason for this may be because literature reveals that students with ASD experience difficulties communicating in traditional ways using the mode of voice/speech (Simpson et al., 2008) and thus may experience unease speaking in front of others or recording their own voice. Results from the current study provide support for these findings. For example, Charlie especially did not like the sound of his voice and expressed that he did not wish to record a podcast. While other students didn't experience the same degree of discomfort with recording a voice narration for their podcasts as Charlie did, all students expressed that the podcast was their least favourite of all of the assignments they produced throughout the DMIP. This may have had something to do with the nature of the task, but it is also likely that the sole mode of voice may have limited students' communication potential and may not have aligned with their communication preferences.

Like the research of Pandya, Hansuvadha and Pagdilao (2016), the current study similarly reveals the need for teacher support (and/or peer assistance) as a means of scaffolding students to create digital media. This was the case with Damien, who had trouble writing a script for his digital story to guide his narration, and who preferred to explain visual images and have the teacher scribe verbal explanatory responses he provided in a conversational context in place of his script for voice recording. Nevertheless, both the experiences of Charlie and Damien demonstrate that it is possible that the addition of modes to support written language and voice in the other assignments may have enhanced their communication experiences during digital media-

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making. For example, findings show that Charlie did not express the same level of dissatisfaction with recording and listening to his voice as he did for his podcast when making his digital story, animation and blended digital media assignments. Further, each of the students expressed that the blended digital media or animation assignments were their favourite and attributed their preference to being able to capture and use photographs and/or videos.

This study indicated that the opportunity to communicate meaning using alternative modes, and the potential of other modes to support communication in the written mode appeared to enhance the communication potential and experiences of students with ASD creating digital media. These findings lend support to the findings of Bruce et al. (2013) and Pandya, Hansuvadha and Pagdilao (2016) whose research shows that multimodal communication can enhance written language skills. Nevertheless, this study did not set out to examine ways that a multimodal approach can enhance the written communication of students with ASD. While this study provides descriptive insights, and proposes suggestions about how digital media-making may support communication in specific modes, further research is needed to substantiate these findings. Specifically, further research is needed to explore the role of written language, voice and image in digital media creation, how this differs depending on the student and task, and how modes may be used and combined to replace and/or support written language and/or other modes of communication for students with ASD. Consistent with a multimodal approach, further research is also needed to examine students' use of the semiotic logic of space and time that the written language mode affords. Similarly, research is needed to better understand students' use of written language resources (e.g. syntax, grammar, lexis, graphical resources, and sequence and directionality) and their communicative potential/impacts on meaning-making and representation when making digital media.

The study's findings regarding students' multimodal communication experiences have many theoretical and practical implications. The following section will discuss how findings contribute to and challenge existing theories regarding the cognitive functioning of students with ASD. The chapter will then discuss how the study's findings could guide pedagogy to support multimodal literacies and communication for students with ASD in the school setting.

Theoretical Implications

This study's literature review identified that two of the most prominent theories in the field of Special Education concerning the communication of individuals with ASD are Executive Function Theory (McCloskey et al., 2009; Ozonoff et al., 1991) and Theory of Mind (Baron-Cohen et al., 1985). While this study confirmed that students did experience challenges communicating using certain modes (thus aligning with aspects of these theories), findings regarding alternative and multimodal communication strengths run counter to research underpinned by such theories and suggest that a broader understanding of ability may be needed to more realistically reflect and represent the cognitive and communicative strengths and capabilities of individuals with ASD in the 21st century. The ways in which findings are consistent, yet at other times at odds with ASD theory and research literature, are now discussed.

In accordance with Executive Function Theory (Hill, 2004; McCloskey et al., 2009; Ozonoff et al., 1991), findings from this study show that during the DMIP, on occasions some of the students appeared to become distracted from their tasks. For example, observations revealed that Charlie and Damien were distracted by looking at images when creating their digital stories; Riley was distracted when talking about trains in the making of his digital story and Jimmy experienced difficulty sustaining attention and interest in his second blended digital media task. Executive Function Theory would attribute these distractions to limited cognitive skills regarding sustaining attention and poor executive functions such as self-regulation and problem solving. Through the same theoretical lens, it could be argued that on occasions students were unable to set goals, initiate tasks and /or organise ideas independently and thus required teacher support to create storyboards and scripts (to scaffold organisation of ideas) in the planning phases of digital media creation. This was especially the case for Damien. Further, Executive Function theory would assume that Charlie and Riley's inability to successfully negotiate conflicting ideas throughout the planning phase of their slowmation indicates poor cognitive skills regarding flexibility of thought and action. Nevertheless, in contrast to the assumption that students with ASD experience difficulties with regards to the cognitive skills of sustaining attention and organising and planning information (Hill, 2004; Ozonoff et al., 1991), evidence reveals that each student also showed evidence of success in applying these strategies for designing and

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creating their own blended digital media, thus challenging theoretical generalisations about the cognitive capacities of students with ASD in the following ways.

Evidence of efficient self-regulated planning was demonstrated by each student in their employment of a variety of written, visual, verbal and digital literacy skills to make digital media. For example, Charlie, Riley, and Jimmy demonstrated that they were capable of creating a storyboard for their digital story, which guided their selection of images and oral narration. Further, Charlie and Riley were able to write scripts for their slowmation and blended digital media tasks, which appeared to guide the organisation of their ideas and support their production of digital media. Similarly, Damien used images to guide his organisation of ideas, and although he experienced the most difficulty planning for each of his digital media tasks, his ability to use visual modes to represent and communicate meaning, and his capacity to articulate reasons for purposefully manipulating modes to communicate meaning show evidence of executive function strengths. The ability to plan and design each digital media assignment showed capacities in the areas of self-regulation, goal-direction and problem solving for students. Further it suggests that when given the option to make meaning using a range of modes students with ASD in this study were able to demonstrate that they could organise and plan their ideas, and demonstrate flexibility of thought.

Evidence of students applying high-order thinking skills, problem solving, and self-regulation in the planning and organisation of ideas were demonstrated by their multimodal awareness throughout this study. As identified from students' justification of modal use and their capacity to purposefully combine modes to communicate meaning in the form of blended digital media assignments, students showed cognitive skills and capacities that challenge deficit criteria proposed by Executive Function Theory in the following ways. Student interviews showed that to varying levels each case study demonstrated awareness of modal affordances and was able to explain their use and combination of modes to communicate meaning in the making of digital media assignments. Some students' multimodal awareness appeared to be more advanced than others. For example, Charlie, Riley and Jimmy were able to articulate several detailed reasons for using specific modes in their digital media assignments, whereas Damien's responses and random design decisions indicated a more limited awareness of the communicative potential of modes. Nevertheless, regardless of the extent to which each student was able to articulate and apply modal awareness to the design of digital media,

each student demonstrated a capacity to make modal decisions for communicating meaning and demonstrated ability to organise and express their ideas using a range of modes.

Problem solving was a key part of students' digital media-making throughout the DMIP and was especially critical to the design and creation of blended digital media. Blended digital media assignments relied on students' knowledge of the modal complexities of a range of media forms and the affordances of modes to represent and communicate meaning. Specifically, this task required students to think about the ideas they wanted to communicate and then make decisions about how to best communicate this meaning through the design and creation of media in specific ways. Findings show that each student demonstrated an ability to purposefully combine media forms to create blended digital media and that this required the employment of high-level planning and organisation executive function skills. In contrast to Executive Function Theory definitions of student abilities, students' decision-making regarding the design and creation of blended digital media with the freedom to choose modes for communicating meaning reflects an ability to apply a range of higher-order thinking skills. In addition to problem solving students were required to make decisions about how to design, plan, organise, set goals, represent and communicate their ideas. They were also required to apply technology skills, sustain attention, and utilise the higher-order cognitive skills for synthesis, evaluation and media creation. According to EFT, students in this study should have experienced significant difficulty and/or demonstrated inability to apply these skills. However, the results from this study indicate the opposite.

Students' capacity to sustain attention to plan and organise their ideas throughout the DMIP is especially surprising given the flexibility they had when designing and creating their digital media about their own stories. Research aligning with Executive Function Theory reports that individuals with ASD find it particularly challenging to receptively process and focus on specific information as they have a tendency to experience overselectivity when a task is too open or flexible (e.g. Lovaas Koegel, 1979; Rincover & Ducharme, 1987) and thus may not be able to complete that task as a result of becoming distracted by a range of stimulus (Grynszpan et al., 2008, Hill, 2004). While students in this study were on occasion observed to experience behaviours associated with "overselectivity" (in that they became distracted by images and occasionally made design decisions that appeared to reflect a lack of purpose or

awareness of modal affordances), findings show that this did not significantly hinder their momentum or ultimate capacity to represent and communicate meaning in the completion of each digital media assignment. Rather, findings show that students continued to work on their digital media assignments in spite of minimal distractions, continued to make choices about their use of modes for communicating meaning, and regained focus to complete their digital media assignments, thus challenging the legitimacy of deficit claims.

Apart from the aid of teacher support, the unique affordances of technology to align with learner preferences and provide structure may have impacted upon students' planning and organisation of ideas in the making of digital media assignments. For example, research suggests that students with ASD have a disposition for using digital technology, and are likely to favour visual stimulus and interactivity facilitated through digital media (Diener et al., 2016; Kaldy et al., 2016; Simmons et al., 2009). In addition, Baron-Cohen (2006) reasons that technology can facilitate predictability and minimal variance in learning contexts and thus create environments that are conducive to the attention skills and communication preferences of students with ASD. For example, digital technology is often used in interventions to create controlled environments that restrict sensory stimulus and minimise specific cues, thus supporting the gradual and systematic development of specific skills, including communication (Chaplin et al., 2013). While this study offered students a larger degree of freedom and choice than the controlled confines of virtual reality (Chaplin et al., 2013) or dedicated application interventions (Aresti-Bartolome & Garcia-Zapirain, 2014) reported by the literature, in many ways it can be seen that the provision of technology and the opportunity to create digital media as a means of communicating, may have minimised anxiety and created a platform for students to feel comfortable to take risks (Chaplin et al., 2013; Faux, 2005). Furthermore, the task of creating digital media may complement the learning preferences or disposition that ASD students have for using visual modes of communication.

Findings regarding students' attention to the interests of others and their awareness of audience as evidenced by their digital media assignments appear to be at odds with Theory of Mind literature which suggests that students with ASD experience great difficulty considering the perspectives of others (Baron-Cohen et al., 1985). While this study did not set out to critique Theory of Mind or Executive Function Deficit

Theory, findings suggest that perhaps there are ways in which these theories could benefit from reconsidering the role of digital technology and use of multiple modes in supporting cognitive skills and social communication.

Pedagogical Implications

The study provides useful insights into ways in which to facilitate literary success for students with ASD, and perhaps for other students of different abilities and educational levels. The study revealed that the application of a gradual release of responsibility pedagogical model (Pearson & Gallagher, 1983) that creates modelled, guided and independent learning phases across a staged approach to digital media-making, gradually scaffolded students towards the creation of digital media assignments that increased in modal complexity. This section will discuss the role that guidance played to position students for success in the creation of their digital media assignments. It considers the role of students as designers, the facilitative role of the teacher, and the staged approach of the DMIP, and how each of these factors enabled students' scaffolded exploration, use and combination of multiple modes. It will then discuss a number of practical implications for enhancing student engagement, experiential relevance, and peer collaboration and dialogue.

Students as Designers.

One of the biggest differences between the study's DMIP and the majority of communication interventions for students with ASD reported by the literature is that it positions students as designers and creators as opposed to mere consumers or recipients of direct instruction. The study investigated the potential of students using technology to create their own digital media and using their own content so as to address a gap in technology-based ASD communication literature that reports on a wealth of interventions that are primarily expert/teacher-directed as opposed to student-centred. For example, the most renown interventions used with students with ASD such as video modeling and Social Stories^{TM}, are predominantly teacher or expert generated, and involve adults creating digital media as models for students with ASD to view as a means of developing social and communication skills (Chaplin et al., 2013; Gray, 2010). In contrast to these interventions, this study showed that with adequate support and guidance across a series of scaffolded lessons and staged experiences, students with

ASD were able to create their own digital media, thus suggesting that there may be room for a more student-centred approach for future research in this field. Such findings support the growing trend in Special Education research towards interactive and self-regulated approaches learning (Chaplin et al., 2013; Hulusic & Pistoljevic, 2012; Lane et al., 2010; Sani-Bozkurt et al., 2017; Sharmin et al., 2011). Moreover, the results of this study similarly lend support to the findings of other small-scale studies that suggest that there may be potential for students with ASD to take part in the design and production of digital stories (Faux, 2005; Oakely et al., 2013; Rao et al., 2009), animations (Holmgaard et al., 2013, Shepherd et al., 2014), 3D designs (Diener et al., 2016), games (Sarachan, 2012) and videos (Pandya, Hansuvadha & Pagdilao, 2016). This study's implementation of a student-centred approach indicates favourable implications for students' engagement that may benefit future programs and studies in a similar field. These implications are discussed further as follows.

While acknowledgement of some of the communication difficulties that are experienced by individuals with an ASD were needed to inform the study's focus and intervention, this study adopted a strengths-based approach to ASD that runs counter to many conventional ASD interventions presented in the literature that are predominantly shaped by deficit models (Kaldy et al., 2016). This study viewed students with ASD as facing 'different' communication experiences rather than having 'communication impairments' when compared to typically developing peers. Further, when examined from a strengths-based perspective, these differences were not defined as deficits in this study, but rather unique and alternative ways of making and communicating meaning.

In accordance with a strengths-based approach, like many recent studies in the field of communication interventions for ASD (Dakin & Frith, 2005; Kaldy et al., 2016; Oakley et al., 2013; Simmons et al., 2009), this study similarly sought to build upon and support students' visual learning strengths and dispositions and preferences for using technology (Kuo et al., 2013; Orsmond & Kuo, 2011). Nevertheless, as previously mentioned, unlike the majority of reported technology-based communication interventions, the study positioned students in a more active role regarding the use of technology to design and produce digital media using their own content as opposed to merely viewing/consuming it.

By adopting a strengths-based perspective of ASD the study's findings lend support to the research of Oakely et al. (2013), Holmgaard et al. (2013), Diener et al.

(2016), Sarachan (2012), and Pandya, Hansuvadha and Pagdilao (2016). These studies similarly provide descriptive accounts of what students with ASD are able to achieve in relation to communicating their experiences through digital media creation, as opposed to analysing their efforts in relation to a deficit model that defines their capabilities by what they cannot achieve when compared to students who do not have ASD.

Teachers as Facilitators.

As previously mentioned, the study's DMIP was shaped by the gradual release of responsibility pedagogical model (Pearson & Gallagher, 1983) also referred to as the modelled, guided and independent teaching cycle (Harris et al., 2003) - a scaffolded approach to teaching that aims to provide adequate support for students as they learn new skills, guidance in the co-implementation and exploration of those skills, and then opportunities to apply skills to new contexts independent of direct teacher instruction. Consequently, the role of the teacher (and in this case the role of the researcher as a teacher also) as a facilitator and guide was central to the implementation of the study's DMIP.

Specifically, each time a digital media form was introduced, the researcher conducted a lesson that modelled the process. In following lessons, with the assistance of the researcher, the class made a digital media form together. Subsequently, in the following lessons conducted by the classroom teacher students worked independently on their own digital media assignments. With the exception of Damien, each case study was able to apply the skills that they learned in modelled and guided lessons to create their own podcast, digital story, slowmation and blended digital media assignments with minimal teacher support. It was this independent phase of the DMIP that constituted the focus of the current study.

Results show that unlike his peers, Damien required considerable teacher support throughout the independent phases of the DMIP. At this point, while the other case studies planned, designed and produced their own digital media assignments without direct teacher assistance, Damien required the teacher to continually prompt him to stay on task, help him to operate software accordingly and produce written scripts (scribed from his verbal explanations) for his narration. While the other case studies had moved on to the independent phase of the program, it appeared that he was not yet ready to create his own digital media without assistance.

While providing students with guidance across modelled and guided lessons, the researcher similarly guided the teacher in preparation for delivering lessons for the independent phases of the DMIP. It appeared that the scaffolded approach similarly enabled the teacher to gain adequate skills and professional development for running lessons independent of direct researcher instruction, thus enabling the researcher to take on an observer role for data collection during these lessons. Just as the teacher facilitated independent learning across phases of the DMIP, the program was similarly designed in a staged way that incrementally increased in modal complexity with the intention of scaffolding students' multimodal literacies accordingly. This following section will describe the guidance afforded by this staged approach and why it has relevance for a DMIP for students with ASD.

A Staged Approach to Digital Media-Making.

As previously mentioned, this study was adapted from a national project designed for use with university science educators and their students. This project originated from Professor Garry Hoban's Office of Learning and Teaching National Senior Teaching Fellowship, of which I worked as a Fellowship Facilitator to support a series of workshops at various universities in Australia in which educators were taught how to create and teach their own students how to create a suite of digital media for explaining and communicating science. These workshops and the website that was developed to support the project (www.digiexplanations.com) were deliberately designed in a staged way that introduced each digital media form in order of modal complexity. For example, learners were introduced to the media form of a podcast (using the mode of voice), they then explored video (voice and moving image), digital stories (voice and still image), and animation (voice and slow-moving image). Each of these media forms culminated in the final and most multimodally complex media form of a 'blended digital media' which involved the combination of a range of media forms (e.g. digital story, animation and video) and the modes with which they were comprised of.

This study similarly adopted the staged approach of the National Fellowship project, however, with a focus on supporting students with ASD in the creation of their own digital media forms for communicating meaning as part of their English assignments. Accordingly, university workshops were replaced with high school lessons run by both the teacher and researcher, and the website was not used as a teaching

resource. The role of the staged approach in supporting students' digital media-making skills and developing multimodal awareness would be an interesting area for further research. The national project was deliberately designed to gradually introduce media based on its modal complexity with the goal of familiarising learners with the affordances of modes of communicating within different mediums and for managing the introduction of new skills and content without overwhelming learners. The decision to similarly adopt a staged approach to teaching students how to create digital media throughout the DMIP was made based on research concerning the ways in which students with ASD learn most effectively. Literature shows that students with ASD benefit from new content and skills being segmented into manageable sizes of information as they have a tendency to become distracted if learning experiences provide too much stimulus (overselectivity) or if they lack structure and consistency (Baron-Cohen, 2006; Lovaas Koegel, 1979; Rincover & Ducharme, 1987).

Results from this study suggest that students benefited from the staged approach of learning about and creating digital media as evidenced by their capacity to draw on skills developed in previous lessons and their capacity to ultimately combine media forms in the creation of blended digital media assignments. Nevertheless, in alignment with literature, on occasions students did experience distractions and difficulty focusing on their tasks. Specifically, Damien and to a lesser extent Charlie and Jimmy appeared to become distracted when gathering images for digital media assignments and needed to be prompted to stay on task.

It appears that the teacher involved in the study similarly benefited from the staged approached as evidenced by his capacity to acquire new skills across lessons and then transfer new skills and understandings in the implementation of lessons he ran concerning students' creation of digital media (assignment delivery and support). Further research is needed to ascertain whether or not he would be capable of implementing the DMIP with a new cohort of students and without the assistance of the researcher.

Student Decision-making and Choice.

A key factor contributing to students' sense of ownership of their work throughout the DMIP was the provision of choice and flexibility. Hoban's (2005; 2007) research suggests that the process of students taking on the role of designers and creators of digital media can be empowering as the provision of choice provides them with an

opportunity to take greater ownership of their learning by using their own content. While Hoban's research was not conducted with students in Special Education settings, findings from the current study indicate that it may have relevance for students with ASD as students were observed to experience increased independence and self-regulation through creating digital media assignments. Each student appeared to take responsibility for the creation of their own digital media assignments by making their own design decisions with minimal prompting and support from the teacher. Moreover, they demonstrated interest in each task and were observed to remain focussed and on task with the intent of completing their assignments which was not the case for other written assignments according to their teacher. They also appeared to demonstrate a sense of pride in their work as evidenced by their eagerness to share their work with others. Many interventions don't afford students the opportunity to make these decisions and exercise personal choice, perhaps because prominent theories of ASD indicate that they lack the theory of mind and executive functions (Pellicano, 2007) to be able to successfully organise and express their ideas in such a manner or context. Nevertheless, this study shows that students responded capably and positively to the provision of choice and thus lends support to findings from similar studies (Diener et al., 2016; Holmgaard et al., 2013; Oakely et al., 2013; Pandya, Hansuvadha & Pagdilao, 2016; Sarachan, 2012) that show that students with ASD can make their own decisions regarding modal use and the design of digital media.

Multimodal and Hands-on Learning Opportunities.

Another factor contributing to students' engagement throughout the DMIP was the multimodal and hands-on nature of digital media creation. Unlike written tasks, DMIP assignments actively involved students in physically representing and re-representing their ideas through moving models, capturing photographs and videos, and recording audio. Such roles were likely engaging because they were hands-on and active, unlike the passive nature of essay writing or copying and pasting information from the Internet. In support of this, findings showed that increases in students' engagement with digital media assignments throughout the DMIP complemented increased opportunities that tasks enabled for hands-on learning/ communication opportunities. For example, interviews revealed a consensus among the case studies that the least enjoyable task was the podcast, which relied merely on written text and voice. Rather, digital media

assignments that involved capturing visual media (e.g. digital stories and videos) and/or moving characters (e.g. animation) were well received and a more popular preference for students.

It is also likely that tasks that enabled students to communicate their ideas using a range of modes, especially visual modes, were more conducive to students' learning preferences and dispositions. With a greater variety of modal options for communicating their experiences students were not limited by the use of one mode, and their strengths regarding the use of particular modes (e.g. images) appeared to support and extend their use of other modes (e.g. writing and speech).

The addition of visual modes in DMIP assignments such as images and videos appeared to enhance students' engagement while creating, viewing and sharing their digital media assignments. For example, prior to the study, observations showed that students were disengaged when their peers spoke during Social Club. In contrast, students appeared engaged and interested in the interests of their peers when they were presented in the multimodal form of blended digital media assignments. This was evidenced by students' eagerness to share their digital media with peers, their observed listening behaviours during media viewing, and the feedback and dialogue that occurred between them in the form of commendation and questions following the viewing of peer digital media tasks. Research reveals that many students with ASD have visual strengths and dispositions for using digital technologies and communication using visual mediums (Dakin & Frith, 2005; Kaldy et al., 2016; Simmons et al., 2009), and hence it is likely that these preferences influenced their engagement with their own digital media assignments, as well as those of others.

Another aspect influencing student engagement was the connection of DMIP assignments to students' life worlds and the opportunities that they created for students to share personal interests with each other. Pandya, Hansuvadha and Pagdilao (2016) reason that this is necessary in order to facilitate authentic learning experiences for students that have meaning and experiential relevance. It is also likely that the DMIP was personal relevant to students as it built on their strengths and interests in digital technology. Kuo et al. (2013) and Orsmond and Kuo (2011) report that students with ASD, like most youth, spend a lot of time engaging with digital technologies in their spare time. Consequently, the digital nature of the assignments in the DMIP may have appealed to students' interests and dispositions for using technology.

Collaboration and Dialogue.

This study reveals that a DMIP can provide unique opportunities for student collaboration and dialogue. Findings regarding the social engagement of students with ASD in this study will benefit future programs or research in this field in a number of ways. Students' social engagements throughout the study and implications for practice are discussed as follows.

The DMIP involved students working in pairs to create their own slowmation and revealed the need for students to develop skills necessary for group work. The cases of Jimmy and Damien showed that it was possible for students to interact positively with one another to equally contribute to the design and production of a slowmation task, but the cases of Charlie and Riley show a need for social skill development. Nevertheless, both instances showed that the DMIP scaffolded teamwork skills, this indicating that future programs could similarly be used to address social issues and provide opportunities for the development and application of specific skills.

By definition, students with ASD experience social skill difficulties (American Psychiatric Association, 2013) and thus the issues that arose for Charlie and Riley are not surprising. Nevertheless, the fact that Jimmy and Damien did not experience the same issues shows that students with ASD have different social capabilities and that it is possible for them to develop skills for successfully completing partner activities. Further research is needed to identify the impact of students co-creating other digital media assignments together such as a podcast, digital story and blended digital media to further examine the potential for a DMIP to support the development of students' skills.

Not only did the partnered slowmation task provide an opportunity to apply and develop students' group work skills, but it also facilitated social interaction between students that would not have occurred if they were working independently. While this interaction was often task-related it also led to dialogue of a personal nature regarding shared interests and experiences, suggesting the DMIP could also be implemented as a strategy for increasing students' social interactions.

As a result of making a blended digital media assignment about their interests, students learned things about their peers. This facilitated dialogue between students that would not have otherwise occurred. Further, unlike their behaviour during Social Club in which students appeared disengaged and disinterested in the presentations of their peers, all case studies appeared engaged and actively listened to the blended digital

media assignments of their peers. Comments made following the viewing of each assignment provide evidence of this interest and engagement and suggest that the DMIP was effective in enhancing students' knowledge of, interest and awareness of peers, thus potentially facilitating theory of mind and relationship building. Students' blended digital media assignments even show evidence of an awareness of audience and that students were capable of designing their media with an audience in mind, and made modal decisions based on an awareness of audience needs and responses.

While it cannot be proven, it is also possible that the DMIP enhanced social interactions between Damien and Riley. Prior to the study, the students avoided one another as they had a long history of conflict that involved heated and physical arguments. Nevertheless, throughout the DMIP each student was observed to watch and commend one another on their digital media assignments. For the first time they were also observed to play a game of chess together. Whilst not a claim of the research, it is possible that the DMIP broke down barriers between the students and provided a neutral environment for collaboration, and that their engagement with each of the digital media tasks may have distracted them from their negative social behaviours towards each other. Nevertheless, this study did not set out to measure the social implications for the DMIP and more research is needed to substantiate these claims. Findings similarly seem to indicate increased levels of social engagement among the other case studies after the DMIP however further research is needed to identify whether this had any relation to the DMIP.

As communication practices and digital technologies rapidly evolve (Mills, 2010; Walsh, 2008; 2009; 2010) there is a need for pedagogies and school literacy practices to enhance implementation (Cercone, 2017; Miller & Bruce, 2017). It has been proposed that a student-centred multimodal approach is necessary to comply with the demands and expectations of 21st century learning amid a rapidly changing digital landscape (Jewitt, 2008; Kress, 2010; Kress et al., 2001; Kress & van Leeuwen, 2001). While Johnson et al. (2015) report that student-generated media-making is a trend that is increasing in general education settings, a review of the literature shows that few studies have attempted to explore this in the field of Special Education. Consequently, there is a need for further research to match innovations in research and practice for regular classroom contexts and to ensure that we are meeting the needs of 21st learners with ASD in our classrooms today and in the future.

Limitations

While this study claimed that the implementation of a DMIP enhanced communication experiences for students with ASD, there are a number of limitations of the research that require consideration. Perhaps one of the most significant limitations could be seen to be the integral role of both the teacher and researcher in the study, and, in particular, the expertise and multiple roles of the researcher. Consideration of these roles raises the questions: 'could such a study be replicated with a different teacher and researcher? and 'is such a program practical for use within other school settings?' For example, the researcher had expertise and familiarity with digital media forms and technologies from working as a facilitator on a national project. In addition, while the teacher had limited experience, after training implemented by the researcher he was able to jointly instruct lessons for students. Nevertheless, further research is needed to explore whether or not the teacher could run the whole DMIP again with a different class and without the support of the researcher. Dissemination of the program beyond the current study would need appropriate professional learning for teachers and support staff as well as a resource support web site.

As an Australian National Senior Teaching Fellowship informed this study, there are available resources (including the website www.digiexplanations.com) that could assist teachers in professional development and equip them with the skills for facilitating student digital media-making experiences. The national website designed for university science students could be redesigned for use with students with autism and could include teacher support videos. Alternatively, a new set of online resources including a website (like the one designed for the National Senior Teaching Fellowship), could be developed for use with teachers of students with ASD, or teachers in general. Online resources could also be accompanied by professional development for teachers in the form of workshops or seminars (like the ones implemented for Science educators as part of the national senior teaching fellowship) as part of in-service training.

While it can be seen as a limitation that the researcher played an active role as a teacher and facilitator throughout the study, in the context of special education, and especially considering the nature and needs of learners with ASD, these roles can similarly be viewed as a strength of the study that enabled rich data collection to take place within the authentic context of regular class. The researcher was present in the

classroom for almost an entire school year and thus the students became comfortable with them and viewed them as a part of the class. If the researcher did not get to know the students or appeared to be a stranger the students would not have felt comfortable sharing information with them, thus impacting on regular routines and happenings in the day –to-day classroom situation. Further research should similarly consider the importance of teachers/researchers adopting a 'participant as observer' role so as to minimise distractions and or risks to students' class routines and experiences, and to gather data in an authentic environment.

Suggestions for Further Research
Measuring skills.

The extent by which students can demonstrate cognitive skills and the transferability and sustainability of their skills to other contexts needs further research. In particular, the role of the teacher in scaffolding and supporting students' skills throughout the DMIP needs to be examined, as well as the impact of a scaffolded approach to incrementally teaching multimodal literacies and media-making skills across a progressive teaching and learning cycle that increases in modal complexity across each phase of a DMIP. How students developed skills throughout the DMIP and the role of the DMIP design, and the support of teachers (and in some instances peers) in scaffolding and supporting the development and application of students' cognitive and communication skills, are all areas that warrant further research to extend ASD theory. It is possible that novelty effect may have contributed to students' experience and engagement with digital media creation and thus further research is needed to explore the role of technology and whether student-generated digital media tasks impact differently on the attention and engagement of students over time than reported by this research. This study suggests that each of these variables may have impacted upon students' capacities and opportunities for communication and skill development and application, but further study is needed to examine these ideas, identify trends, and substantiate claims that are beyond the scope of the current study. Perhaps a study with an experimental design that included some students receiving particular training and/or scaffolds and other students not, would provide valuable insights into the role of teacher facilitation across a DMIP. Further, a study that compares students' experience producing written assignments with their experience creating digital versions would be

useful to identify the ways in which the use of technology may have influenced particular results.

Different Students.

This program was adapted from a national project that explored the media-making possibilities of university science educators and their students. Findings in this study showed that four high school students with ASD could make digital media (with the guidance of an expert and the scaffolding of a staged approach to media-making within a DMIP). Research with a larger number of students with ASD and perhaps the comparison of treatment and control groups is needed to substantiate claims and strengthen the study's findings, as due to the limited participants, small-scale nature of this research, and the qualitative case study design, findings cannot be generalised to the population of students with ASD. It would also be interesting to identify whether or not such a study could take place with students with ASD who are in primary school, or who have more severe forms of autism. Further research is also needed to explore if other groups of students may also benefit from a DMIP. Perhaps students with more severe forms of autism or intellectual disabilities may benefit from creating their own digital media assignments. The supports that these students would require would need to be clarified by further study.

Long-term Effects.

Whilst this study was not designed as an evaluation of the DMIP, research that measured students' digital media-making skills and experiences after the DMIP would help to identify the sustainability and transferability of what students learned from the program and to see the practical application of these skills beyond the classroom context. It would also be interesting to follow up to see whether the teacher could run the program with a different cohort of students with ASD without researcher support, and/or if students could similarly mentor and/or teach other students the skills they gained from the program. Furthermore, it would be worthwhile to research whether the students were able to use their newly acquired skills in subjects within mainstream classes or perhaps in a subsequent school year or in their home environment. A study that measures students' social behaviours before, throughout and after a DMIP could also better identify social communication impacts and potentially contribute value to intervention literature related to ASD and social behaviour.

Conclusion

To conclude, as technology continues to rapidly evolve and transform communication possibilities, schools should similarly evolve to meet the needs of 21st century learners of all abilities. Students with ASD represent a group of individuals with unique abilities and learning preferences and emerging research advocates for the use of technology-based, multimodal and student-centred approaches to enhance students' learning and development, communication and social skills. This study has revealed potential for implementing a DMIP that positions students as designers and creates new opportunities that allow for the use of multimodal digital representations as a means of improving and diversifying students' communicative experiences. It is hoped that findings from this study will enlighten researchers and educators about ways to align teaching and learning experiences with 21st century media-making and literacy practices that are inclusive of the skills, strengths, interests and preferences of students with ASD.

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Appendices

Appendix 1 University of Wollongong Ethics Approval

UNIVERSITY OF WOLLONGONG

14 March 2013

Ms Alyce Shepherd
School of Education
Faculty of Social Sciences
University of Wollongong NSW 2522

Dear Ms Shepherd

I am pleased to advise that the application has been approved and forwarded to the Department of Education and Training for approval of your SERAP application.

Ethics Number:	HE13/032
SERAP No:	2012013
Project Title:	Using "Slowmation" to Enact a Cognitive Behavioural Intervention for Developing the Social Skills of Students with Autism Spectrum Disorder (ASD)
Researchers:	Ms Alyce Shepherd, A/Professor Garry Hoban, Dr Roselyn Dixon
Approval Date:	14 March 2013
Expiry Date:	13 March 2014

The University of Wollongong/Illawarra Shoalhaven Local Health District Social Sciences HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*. The HREC has reviewed the research proposal for compliance with the *National Statement* and approval of this project is conditional upon your continuing compliance with this document.

A condition of approval by the HREC is the submission of a progress report annually and a final report on completion of your project. The progress report template is available at http://www.uow.edu.au/research/rso/ethics/UOW009385.html. This report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

As evidence of continuing compliance, the Human Research Ethics Committee also requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforseen events that might affect continued ethical acceptability of the project.

Please note that approvals are granted for a twelve month period. Further extension will be considered on receipt of a progress report prior to expiry date.

Your original application will be forwarded to the Department of Education and Communities and you should receive an email from them confirming receipt of your application and contact information in the next seven days.

If you have any queries regarding the HREC review process, please contact the Ethics Unit on phone 4221 3386 or email rso-ethics@uow.edu.au.

Yours sincerely

Professor Kathleen Clapham
Executive Member, Social Sciences
Human Research Ethics Committee

Appendix 2 Amended Ethics Approval

UNIVERSITY OF WOLLONGONG

In reply please quote: HE13/032

2 August 2013

Ms Alyce Shepherd
School of Education
Faculty of Social Sciences
University of Wollongong NSW 2522
ats997@uowmail.edu.au;

Dear Ms Shepherd

I am pleased to advise that the amendments received 30 July 2013 to the following Human Research Ethics application have been approved. The University of Wollongong/ Illawarra and Shoalhaven Local Health Network District (ISLHD) Social Science HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*.

Ethics Number:	HE13/032
Project Title:	Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder
Name of Researchers:	Ms Alyce Shepherd, A/Professor Garry Hoban, Dr Roselyn Dixon
Amendments:	1. Change of the title of the study to *Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder*.
	2. Change in method of capturing research. Participants will now create a digital media recount about their weekends and favourite books with the goal of developing literacy and communication skills.
	3. Participants will be required to take home an iPad over the weekend to capture photos of their interests for inclusion in their own digital media recounts
Amendment Approval Date:	1 August 2013
Expiry Date:	13 March 2014

Please remember that in addition to reporting proposed changes to your research protocol the HREC requires that researchers immediately report:

- serious or unexpected adverse effects on participants
- unforseen events that might affect continued ethical acceptability of the project.

The University of Wollongong/ ISLHD Social Sciences HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*. A condition of approval by the HREC is the submission of a progress report annually and a final report on completion of your project. The progress report template is available at http://www.uow.edu.au/research/rso/ethics/UOW009385.html. This report must be completed, signed by the appropriate Head of School and returned to the Research Services Office prior to the expiry date.

If you have any queries regarding the HREC review process, please contact the Ethics Unit on phone 4221 3386 or email rso-ethics@uow.edu.au.

Yours sincerely

Cheryl Jecht
Ethics Assistant on behalf of the
Social Sciences Human Research Ethics Committee

Appendix 3 NSW Department of Education and Training Ethics Approval

NSW | Education & Communities

Ms Alyce Shepherd
Keiraview Accommodation
75-79 Keira Street
WOLLONGONG NSW 2500

DOC13/148816
SERAP Number **2013013**

Dear Ms Shepherd

I refer to your application to conduct a research project in NSW government schools entitled *Using "Slowmation" to Enact a Cognitive Behavioural Intervention for Developing the Social Skills of Students with Autism Spectrum Disorder (ASD)*. I am pleased to inform you that your application has been approved. You may contact principals of the nominated schools to seek their participation. **You should include a copy of this letter with the documents you send to schools.**

This approval will remain valid until 27 March 2014.

The following researchers or research assistants have fulfilled the Working with Children screening requirements to interact with or observe children for the purposes of this research for the period indicated:

Name	Approval expires
Alyce Tayla Shepherd	18/03/2014

I draw your attention to the following requirements for all researchers in New South Wales government schools:

- School principals have the right to withdraw the school from the study at any time. The approval of the principal for the specific method of gathering information must also be sought.
- The privacy of the school and the students is to be protected.
- The participation of teachers and students must be voluntary and must be at the school's convenience.
- Any proposal to publish the outcomes of the study should be discussed with the Research Approvals Officer before publication proceeds.

When your study is completed please forward your report to: Manager, Schooling Research, Department of Education and Communities, Locked Bag 53, Darlinghurst, NSW 1300.

You may also be asked to present on the findings of your research.

I wish you every success with your research.

Yours sincerely

Dr Susan Harriman
A/Leader, Quality Assurance Systems
April 2013

Policy, Planning and Reporting Directorate
NSW Department of Education and Communities
Level 1, 1 Oxford Street, Darlinghurst NSW 2010 – Locked Bag 53, Darlinghurst NSW 1300
Telephone: 02 9244 5060 – Email: serap@det.nsw.edu.au

Appendix 4 Letter to School Principal

University of Wollongong

LETTER TO SCHOOL PRINCIPAL

Dear Principal,

As a NSW DEC teacher doing her PhD in Special Education, Alyce Shepherd, wishes to invite one of your teachers to participate in a research project conducted by the University of Wollongong. The project is entitled: ***Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder***. I write to seek your approval and assistance to conduct research in your school.

The purpose of this research is to examine how creating digital media can support the communication and literacy skills of students with ASD. Specifically this study will investigate:
1. To what extent are students with ASD able to create their own digital media?
2. In what ways does the intervention support the acquisition and understanding of multimodal literacies for students with ASD?
3. To what extent does the intervention impact on the social behaviour of students with ASD?

The project would involve the researcher conducting approximately eight 60 minute sessions with the 7 students in the autism support class to support their development of digital media-making skills. Students may be individually withdrawn from their regular classes within their autism unit to participate in interviews during this time.

Your approval would enable the researcher (Alyce Shepherd) to collect data in the form of:
- semi-structured student and teacher interviews;
- video recorded intervention session observations;
- direct behaviour observations;
- teacher checklists and diary entries;
- school behavioural records and behaviour assessments for each student; and
- student work samples (e.g. storyboards, photographs and slowmations)

This application has been reviewed by the NSW Department of Education and Training and the University of Wollongong's Human Research Ethics Committee. Please find attached to this letter the Participant Information Sheets and Consent Forms for teachers, students and parents/caregivers.

The findings of this research will be published in the form of a thesis and potentially shared in educational journals. A report of the study will be provided to the Department of Education and Training and also made available at request to the principal, teachers and parents/caregivers of students involved in the study. Please be assured that the school and all participants involved in the study will remain confidential. If there are any ethical concerns you can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on (02) 42214457.

Should you require any further information regarding the study, please do not hesitate to contact members of the research team. We will be more than happy to answer any questions you may have.

Yours sincerely

Alyce Shepherd	Associate Professor Garry Hoban	Dr Rose Dixon
PhD Candidate	Faculty of Education	Faculty of Education
University of Wollongong	University of Wollongong	University of Wollongong
0401324652	42214450	42215292
ats997@uowmail.edu.au	ghoban@uow.edu.au	roselyn@uow.edu.au

University of Wollongong

PARTICIPATION INFORMATION SHEET FOR STUDENTS

Dear Student,

You have been invited to be part of a project that Alyce Shepherd (a teacher) is organising as part of her university studies at the University of Wollongong. The project is called ***Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder***. Alyce is doing this project because she wants to learn more about the best ways teachers can teach their students and make learning interesting and practical.

WHAT WE WOULD LIKE YOU TO DO

Make Digital Media Recounts

If you choose to be part of this project you will be working in a classroom with Alyce for eight 60 minute lessons to make two digital media recounts. The first one will be about your experiences on the weekend for "news" and the second one will be about your favourite book. All technology will be supplied to you at school and you will learn:

-how to create digital stories
-how to blend photographs and video with MovieMaker software; and
-how to create your own simple animation.

To take part in this study you will be given an iPad to take home over the weekend to take photographs and videos of things that you enjoy doing. You will use these photographs and videos to make a digital media recount in class. You will also be required to bring in your favourite book and any items from home that you would like to use as props (e.g. toys, Lego) in the making of your book into an animation.

Tell us about it

Alyce might ask you questions during the lessons, so that she know what you think about making digital media. These questions will give you the chance to talk about what you liked about lessons, what you didn't like and what you are learning. These talks will be tape recorded so that Alyce can listen to the talk again and make sure she is being a good listener and hearing everything that you are saying. The lessons that you will be involved in will be video recorded so that after the lessons, Alyce can watch what was happening while she was teaching and see the ways that you were learning.

IT IS YOUR CHOICE

There is no risk to you if you want to be a part of this project. It is just like another lesson at school and it is safe. If you decide that you don't want to be a part of the project that is ok. You don't have to be involved. Even if you come to a few lessons and decide you don't want to go to anymore, that will be fine and you won't be made to keep going. If you choose to not be a part of these lessons you will attend regular class. It is your choice and completely up to you. If you want to be a part of the project, talk about it with your parent/caregiver and write your name on the piece of paper attached to this one.

WHY BE PART OF THE PROJECT?

This is a good opportunity for you to learn new things about technology and have fun making your very own slowmation (movie) that you can keep and view forever. Once you learn how to

make digital stories, videos and animations you have the skills to make as many as you like at home. The content covered by this project will help you to develop skills and understandings that meet outcomes from the NSW English Syllabus and support the current literacy programs of your school.

Thank you for your interest in this study, I hope to see you soon in class ☺
Alyce

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the NSW Department of Education and Training (DET) and the University of Wollongong's Human Research Ethics Committee (Social Science, Humanities and Behavioural Science). If you have any ethical concerns you can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on (02) 42214457.

Should you require any further information regarding the study, please feel free to contact members of the research team. They will be available and more than happy to answer any questions you may have. **The investigators from the University of Wollongong involved in this study are:**

Alyce Shepherd
PhD Candidate
University of Wollongong
0401324652
ats997@uowmail.edu.au

Associate Professor Garry Hoban
Faculty of Education
University of Wollongong
42214450
ghoban@uow.edu.au

Dr Rose Dixon
Faculty of Education
University of Wollongong
42215292
roselyn@uow.edu.au

University of Wollongong

LETTER OF INFORMATION TO PARENTS/CAREGIVER

Dear Parent/Caregiver,

Your child has been invited to participate in PhD research conducted by Alyce Shepherd (a NSW DEC teacher) for the University of Wollongong. The project is entitled: ***Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder***. I write to seek your approval to conduct research and to involve your child as a participant in this study.

PURPOSE OF THE RESEARCH
The purpose of this research is to examine how creating digital media can support the communication and literacy skills of students with ASD. Specifically this study will investigate:

1. To what extent are students with ASD able to create their own digital media?
2. In what ways does the intervention support the acquisition and understanding of multimodal literacies for students with ASD?
3. To what extent does the intervention impact on the social behaviour of students with ASD?

METHOD AND DEMANDS ON PARTICIPANTS
The project would involve the researcher conducting approximately eight 60 minute lessons with students in the autism support class. The focus of these sessions would be on students developing digital literacy skills. This study will provide a hands-on experience for the students involved as they make two digital media recounts. The first one will be about their experiences on the weekend for "news" and the second one will be about their favourite book. All technology will be supplied to students at school and it anticipated that they will learn:

-how to create digital stories
-how to blend photographs and video with MovieMaker software; and
-how to create simple animations

To take part in this study, students will be given an iPad to take home over the weekend to take photographs and videos of things that they enjoy doing. They will use these photographs and videos to make a digital media recount in class. They will also be invited to bring their favourite book and/or items from home that they would like to use as props (e.g. toys, Lego) in the making of their animation.

Each of the lessons will be video recorded to assist in classroom observation. Written observations of students in regular class will also be conducted. Student work samples and school behaviour records (related to students' specific communication skills and behaviours) will be accessed for the purpose of analysing the effect of the lessons on student engagement, learning and behaviour. Students will also be interviewed briefly before and after lessons. During these interviews students will be asked questions about their knowledge of communication and digital media-making literacies, and their level of satisfaction with what they are learning.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
I can foresee no risks or inconveniences to participants involved in this study, apart from the time involved in the eight lessons that take place outside of regular class. Rather, this research project provides a unique opportunity for students to explore the designing and making benefits of computer animation technology and social narratives. Please be assured that the school and all participants involved in the study will remain confidential. Your participation in the study is completely voluntary and students can withdraw themselves and their data at any point during the project with no detrimental consequences.

FUNDING AND BENFITS OF THE RESEARCH

If you consent to your child being involved in this study you can be assured that their participation is valuable to educational theory and practice. This research is socially responsible and significant in that findings would contribute to teachers' understanding of ways in which to best support the communication and literacy development of students with ASD, reinforcing the value of the implementation of specific strategies, approaches and use of communication technology.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the NSW Department of Education and Training (DET) and the University of Wollongong's Human Research Ethics Committee (Social Science, Humanities and Behavioural Science). If you have any ethical concerns you can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on (02) 42214457.

Should you require any further information regarding the study, please feel free to contact members of the research team. They will be available and more than happy to answer any questions you may have. **The investigators from the University of Wollongong involved in this study are:**

Alyce Shepherd	Associate Professor Garry Hoban	Dr Rose Dixon
PhD Candidate	Faculty of Education	Faculty of Education
University of Wollongong	University of Wollongong	University of Wollongong
0401324652	42214450	42215292
ats997@uowmail.edu.au	ghoban@uow.edu.au	roselyn@uow.edu.au

Should you approve of your child's participation in the project please complete the attached consent forms with your child and return them as soon as possible to your child's classroom teacher.

Thank you for your interest in this study.

Appendix 7 Consent Form for Children and Parents/Caregivers

Consent Form for Students and Parents/Caregivers

Research Title: *Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder (ASD).*
Researcher's Name: Alyce Shepherd
Supervisors' Names: Associate Professor Garry Hoban and Dr Rose Dixon

I, the **student**, have read the participant information sheet and have had the opportunity to ask the researcher any further questions that I may have had. I understand that my participation in this research project is voluntary and I may withdraw at any time from the study without it affecting my treatment at school in any way.

I understand that risks to me in this study are minimal. I have read through the information provided with a parent/caregiver regarding my role in the project and therefore understand that by consenting to participation in the study I will attend eight 60 minute lessons during which I will work towards creating my own digital media recounts about my weekend experiences and my favourite book. I am aware that these lessons will be video recorded but only viewed by the researcher. I also understand that I will be interviewed twice by the researcher which will involve briefly being asked questions about my learning. I understand that these interviews will be audio recorded. Photographs may also be taken of my work and my school behaviour files may be accessed for the purpose of analysing the effect of the lessons on my engagement, learning and behaviour. I am aware that my name will not be used to identify my work or comments in the study and that my information will remain confidential.

If I have concerns or complaints regarding the way the research is or has been conducted I can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on (02) 42214457.

By signing below I am consenting to: (Please tick boxes)
- ☐ Participating in eight 60 minute lessons in which I will create my own digital media recounts about my weekend experiences and my favourite book.
- ☐ Taking home an iPad over the weekend to take photographs and short videos of things that I enjoy doing.
- ☐ Bringing in my favourite book and any items from home (e.g. action figures, toys, Lego) that I wish to use as props in the making of my own book into an animation.
- ☐ Having two interviews (that will be audio recorded) with the researcher asking me questions about my work and learning experiences.
- ☐ Having copies or photos of my work taken for work samples demonstrating my learning.
- ☐ Allowing the researcher access to my school-based behaviour records regarding specific social skills (for the purpose of looking at the lessons' influence on student behaviour).
- ☐ Having my participation in each lesson video recorded (viewed only by researcher).

I understand that information from me will be used for a thesis and possibly other published studies and I consent for it to be used in this manner.

Student Name (please print)   ....

Student Signature ....

I, the **parent/guardian**, have discussed this consent form with my child. I have read the attached information sheets and am aware of what is required of my child to participate in this study.

I give permission for my child .... (Please insert your child's name) to participate in this research.

Parent/ Guardian Signature .... Date ..../....../......

University of Wollongong

Participant Information Sheet for Teacher

Dear Teacher,

Alyce Shepherd, a NSW DEC teacher, is looking to conduct research as part of her PhD in Special Education with the University of Wollongong. This study is entitled ***Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder***. I write to seek your approval and assistance to conduct this research, involving yourself and students as participants.

I write to seek your approval and assistance to conduct research in your school.

PURPOSE OF THE RESEARCH
The purpose of this research is to examine how creating digital media can support the communication and literacy skills of students with ASD. Specifically this study will investigate:

1. To what extent are students with ASD able to create their own digital media?
2. In what ways does the intervention support the acquisition and understanding of multimodal literacies for students with ASD?
3. To what extent does the intervention impact on the social behaviour of students with ASD?

METHOD AND DEMANDS ON PARTICIPANTS
The project would involve the researcher conducting approximately eight 60 minute sessions with the 7 students in the autism support class to support their development of digital media-making skills. Students may be individually withdrawn from their regular classes within their autism unit to participate in interviews during this time.

Your approval would enable the researcher (Alyce Shepherd) to collect data in the form of:
- semi-structured student and teacher interviews;
- video recorded intervention session observations;
- direct behaviour observations;
- teacher checklists and diary entries;
- school behavioural records and behaviour assessments for each student; and
- student work samples (e.g. storyboards, photographs and slowmations)

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
I can foresee no risks or inconveniences to participants involved in this study, apart from the time involved in the eight lessons that take place during regular class. This research project provides a unique opportunity for students to explore the designing and making benefits of computer animation technology and social narratives. Please be assured that the school and all participants involved in the study will remain confidential. Participation in the study is completely voluntary and you or your students can withdraw themselves and their data at any point during the project with no detrimental consequences.

FUNDING AND BENFITS OF THE RESEARCH
If you consent to being involved in this study you can be assured that your participation is valuable to educational theory and practice. This research is socially responsible and significant in that findings would contribute to teachers' understanding of ways in which to best support the social needs and development of students with ASD, reinforcing the value of the implementation of specific strategies, approaches and use of communication technology.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the NSW Department of Education and Training (DET) and the University of Wollongong's Human Research Ethics Committee (Social Science, Humanities and Behavioural Science). If you have any ethical concerns you can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on (02) 42214457.

Should you require further information regarding the study, please contact members of the research team. They will be available and more than happy to answer any questions you may have. Thank you for your interest in this study.

The investigators from the University of Wollongong involved in this study are:

Alyce Shepherd	Associate Professor Garry Hoban	Dr Rose Dixon
PhD Candidate	Faculty of Education	Faculty of Education
University of Wollongong	University of Wollongong	University of Wollongong
0401324652	42214450	42215292
ats997@uowmail.edu.au	ghoban@uow.edu.au	roselyn@uow.edu.au

Appendix 9 Consent Form for Classroom Teacher

Consent Form for Teacher

Research Title: *Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder*
Researcher's Name: *Alyce Shepherd*

I have been given information about: *Using Student-created Digital Media to Support the Literacy and Communication Skills of Students with Autism Spectrum Disorder*. I have discussed this project with Alyce Shepherd, who is conducting this research for her PhD degree supervised by Associate Professor Garry Hoban and Dr Rose Dixon from the Faculty of Education at the University of Wollongong.

I understand that potential burdens associated with this study include the time involved in the eight lessons that take place outside of regular class and I have had an opportunity to ask Alyce Shepherd any questions I may have about the implications of this and other aspects of the research and my participation. I understand that my involvement in this project is voluntary and I am free to refuse to participate and to withdraw from the research at any time, with no adverse consequences.

I am aware that if I consent to participate in this project I will be agreeing to my class participating in eight 60 minute lessons with the researcher. I also recognise that the researcher will sit in on numerous regular classes to conduct written observations of student participants' behaviour. I am aware that I will be required to make accessible (with parental consent) student school behavioural records (relating to specific social skills and behavioural challenges) before lesson implementation and maintain a consistent record of this behaviour for up to two months after the intervention. I recognise that my involvement in this study will also include two 20 minute interviews with the researcher so as to provide feedback concerning my observations and experiences with students prior to, throughout and after the study. I understand that students will also be interviewed briefly before and after lessons about their understanding of specific skills, and that these interviews will be audio recorded and transcribed by the researcher. I am also aware that all lessons conducted by the researcher will be video recorded to assist in data analysis and that they will not be shown to any audience except the researcher. I also recognise that student work samples may be photographed and/or collected but that all data used for the study will remain confidential, containing pseudonyms to protect participant and school confidentiality.

If I have any enquires about the research, I can contact Alyce Shepherd 0401324652 and/or Associate Professor Garry Hoban 4221 4450. If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on 42214457.

By signing below I am indicating my consent to participate in the research. I understand that the data collected from my participation will be used primarily for a PhD thesis, and may also be used in summary form for journal publication, and I consent for it to be used in that manner.

Signed ....   Date ..../......./......

Name (please print) ....

Appendix 10 Data Gathering Audit Trail

This table provides an audit trail that outlines the data collected, its corresponding data reference code, and the dates of collection. It also acts as a timeline of lessons.

Data	Code	Date
Pre-study Class Observations	**PCO**	04/02/13-18/02/13
Student school behaviour records	**SBR**	04/02/13
Student ASD presentations (baseline)	**BP**	07/02/13
Student Pre-study interview (baseline)	**BSI**	25/02/13
Student Pre-study survey (baseline)	**BSS**	25/02/13
Teacher Pre-study interview (baseline)	**BTI**	25/02/13
Podcast —Lesson 1	**PL1**	07/05/13
Podcast —Lesson 2	**PL2**	08/05/13
Student Podcast Interview	**PSI**	08/05/13
Teacher Podcast Interview	**PTI**	09/05/13
Digital Story —Lesson 1	**DS1**	03/06/13
Digital Story —Lesson 2	**DS2**	04/06/13
Digital Story —Lesson 3	**DS3**	05/06/13
Digital Story— Class Viewing	**DSV**	06/06/13
Student Digital Story Interview	**DTSI**	06/06/13
Teacher Digital Story Interview	**DSTI**	06/06/13
Slowmation —Lesson 1	**SL1**	12/08/13
Slowmation —Lesson 2	**SL2**	13/08/13
Slowmation —Lesson 3	**SL3**	14/08/13

Slowmation— Class Viewing	**SV**	15/08/13
Student Slowmation Interview	**SSI**	15/08/13
Teacher Slowmation Interview	**STI**	15/08/13
Blended Digital Media 1—Lesson 1	**BDM11**	09/09/13
Blended Digital Media 1—Lesson 2	**BDM12**	12/09/13
Blended Digital Media 1—Lesson 3	**BDM13**	16/09/13
Blended Digital Media 1— Class Viewing	**BDM1V**	17/09/13
Student Blended Digital Media 1 Interview	**BDM1SI**	17/09/13
Teacher Blended Digital Media 1 Interview	**BDM1TI**	17/09/13
Blended Digital Media 2—Lesson 1	**BDM21**	14/10/13
Blended Digital Media 2—Lesson 2	**BDM22**	15/10/13
Blended Digital Media 2—Lesson 3	**BDM23**	17/10/13
Blended Digital Media 2— Class Viewing	**BDM2V**	21/10/13
Student Blended Digital Media 2 Interview	**BDM2SI**	21/10/13
Teacher Blended Digital Media 2 Interview	**BDM2TI**	21/10/13
School Digital Media Viewing	**SDMV**	07/11/13
Student Post-study interview	**PSI**	11/11/13
Student Post- study survey	**PSS**	11/11/13
Teacher Post-study interview	**PTI**	18/11/13