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Digital storytelling as a literacy-based intervention for a sixth grade student with Autism Spectrum Disorder: an exploratory case study

Brent A. Daigle

Louisiana State University and Agricultural and Mechanical College

DIGITAL STORYTELLING AS A LITERACY-BASED INTERVENTION FOR A SIXTH
GRADE STUDENT WITH AUTISM SPECTRUM DISORDER: AN EXPLORATORY
CASE STUDY

A DISSERTATION

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by
Brent A. Daigle
B.A., University of Missouri – St. Louis, 2002
M.Ed., Northwestern State University, 2004
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DEDICATION

I dedicate this dissertation to Tiffany, my best friend and wife. Her support and continuing encouragement has been a tremendous source of inspiration and strength. She is a caring mother and loving wife. I look forward to a lifetime of memories with her.

I also dedicate this work to Aubrie, Claire, and Parker. Each day Aubrie asks, "When can I read your book," to which Claire replies, "When he's finished with Chapter 5...right dad?" Parker, although somewhat less interested in my "book" has enjoyed "finding" an endless source of paper to draw on. These are the memories I will cherish for a lifetime. May you always keep the energy, love of each other, and sense of wonder that you have today.

evaluate, and implement evidence-based practices that promote improved outcomes for students in special populations. Her influence and example have inspired me to pursue a career as a researcher and educator.

Ms. Carolyn Tate is a gifted leader and compassionate mentor to parents, teachers, and students. Her experience and knowledge as a veteran educator provided our students with engaging learning experiences and skills that will remain with them for a lifetime. She is a dear friend, and any teacher would be fortunate to work with a paraprofessional like Ms. Tate.

My parents, Ronnie and Roxie Daigle, deserve my highest respect and deepest gratitude for their support throughout this prolonged academic journey. From an early age, my parents stressed the importance and transformative power of education. They taught me to be a critical thinker, an active learner, and to value the contributions of others. I will remember and benefit from these lessons for a lifetime.

Last, I want to thank my grandparents, without whom I would never have been able to achieve so much. My grandfather, A.A. Daigle, is a living example of what it means to be a hard worker, a caring father, and a devoted husband. His influence has been integral to my academic and personal achievements. My grandmother, Lorena Daigle, taught me to be proud of my accomplishments, but that it should be tempered with gratitude and humbleness. Grandma has used our nightly telephone calls for the past twelve years to impart her advice and wisdom on life. Each night I looked forward to these calls because it was a source of inspiration and renewal. She is the matriarch of our family, and no words can perfectly describe the deep love and gratitude I have for her.

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ABSTRACT

This study investigates the use of Digital Storytelling as an intervention to improve the academic performance and social interactions of a sixth grade student with High-Functioning Autism.

Qualitative methodology, using an inductive approach informed by grounded theory, was employed throughout this exploratory case study. Three separate data sources, consisting of document analysis, interviews, and participant observation, contributed to the findings of this study. Triangulation of inquiry methods enhanced the validity and rigor of this investigation.

The findings from this inquiry indicate that Digital Storytelling was beneficial to the participant in this exploratory case study. Engaged student processes and critical analysis of writing was observed throughout this intervention. The flexibility of Digital Storytelling was responsive to the learning style of preference of the participant in this study.

Implications from this investigation are discussed at length. Recommendations are given for future efforts to replicate and expand the findings of this study.

CHAPTER 1.

INTRODUCTION

Background

Autism Spectrum Disorder (ASD) is a term used to describe a set of closely related

exceptionalities along the developmental disability continuum. Pervasive Developmental

Disorder-Not Otherwise Specified (PDD-NOS), Rett's Syndrome, Asperger Syndrome,

Childhood Disintegrative Disorder, and Autism are generally associated with ASD (Dunlap &

Bunton-Pierce, 1999). While the range of variability in this population is considerable,

individuals with ASD typically exhibit similar characteristics that may include repetitive patterns

of behavior, delays in verbal and nonverbal communication, and difficulty with social

interactions and relationships (American Psychiatric Association, 1994). Figure 1.1 illustrates

the exceptionalities generally associated with ASD.
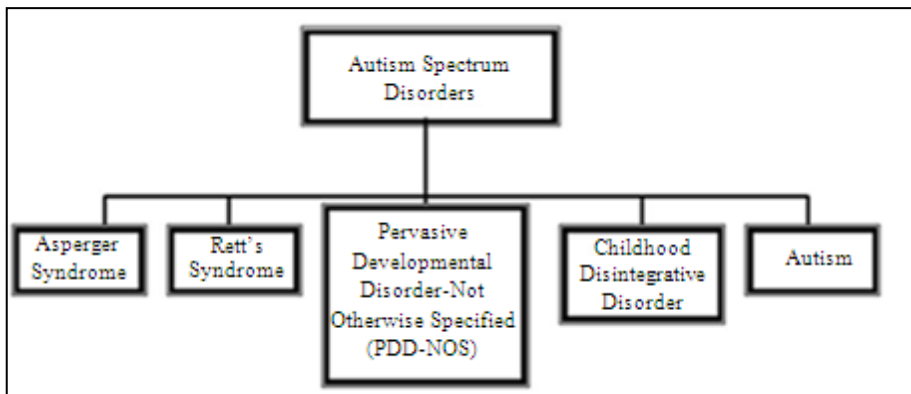
Figure 1.1. Range of Developmental Disabilities Associated with ASD

Throughout the past fifty years, the incidence of ASD has increased from 4 to

approximately 30-60 children per 10,000 (see Figure 1.2) (Dunlap & Bunton-Pierce, 1999;

Fombonne, 2003). There is little consensus on the cause of this exponential increase in the rate of

ASD. Rutter (2005), for example, suggests that an evolving criterion associated with the

identification of ASD, in addition to better diagnostic procedures, contributes to the current

prevalence rate.

Dunlap and Bunton-Pierce (1999) raise the possibility that environmental factors

contribute to this rise. A popular argument suggests that, "…clusters [of Autism] may be

associated with environmental contaminants or regional medical practices" (p. 3). There has been

little empirical data to validate these claims (Dunlap & Bunton-Pierce, 1999). Daniels (2006)

addresses the relationship between environmental factors and the rise in Autism at some length:

> Much of the concern surrounding environmental factors and autism comes from the perception that the prevalence of autism is increasing. There has clearly been a rise in the number of individuals who are actually diagnosed with an ASD; however, there are few systematically collected data in the same population over time that can be used to evaluate true prevalence rate trends (Fombonne 2003; Rutter 2005). Many factors could contribute to increases in prevalence estimates over time, including changes in diagnostic criteria, increasing availability of specialized diagnostic tools, improved case ascertainment, and true changes in the prevalence (p. 3).
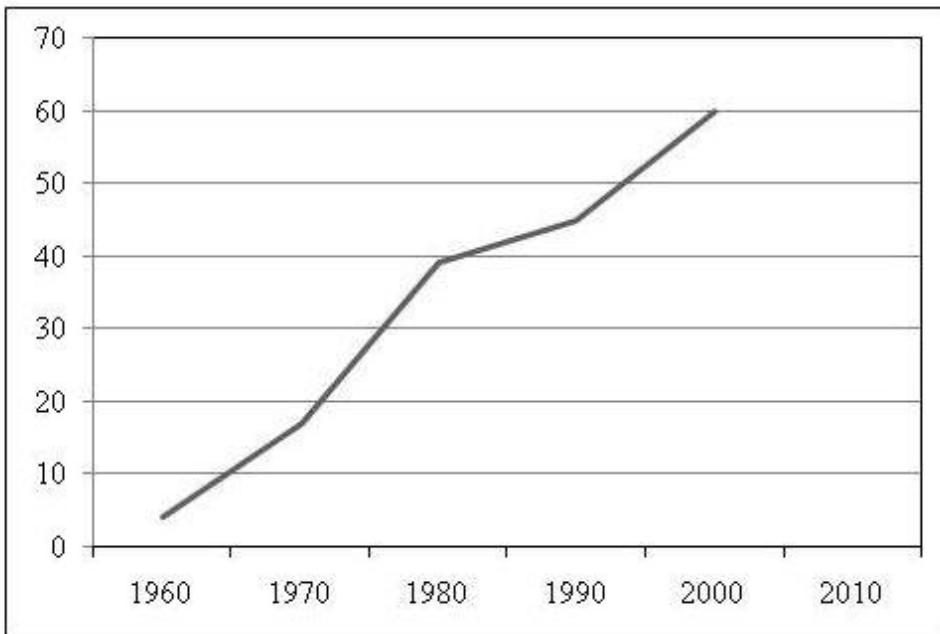
Figure 1.2. Prevalence Rate of Autism from 1960-2007

While consensus may not yet exist to explain the reasons for this increase, there is little

dispute that the academic, social, and pedagogical needs of this population will remain ongoing

and critical. Regardless of how the prevalence rate is calculated, the considerable number of students identified with ASD underscores the urgency for effective and practical interventions in educational settings.

Statement of the Problem

A significant number of individuals with Autism do not possess the necessary literacy or communication skills to function on an independent level (Foley & Staples, 2003). Nation, Clarke, Wright, and Williams (2006) argue that a pervasive struggle with language and communication skills places this group at risk for ongoing failure in literacy related areas. The effectiveness of literacy related interventions, however, have been difficult to assess because of the variability that exists within this group (Nation, Clarke, Wright, & Williams, 2006). Koppenhaver and Erickson (2003) advocate the need for instructional strategies that integrate emergent literacy skills in reading comprehension and sight word fluency for students with ASD and communication deficits.

Unfortunately, there is a limited research base on writing interventions for this population (Mirenda, 2003). While many students with ASD demonstrate an ability to write, their skills in this area are often basic and limited. Tasks with more complexity, such as the skills needed to write a narrative, require a set of competencies that are difficult for many in this population (Bedrosian, Lasker, Speidel, & Politsch, 2003). Eikeseth and Jahr (2001) suggest that future research efforts should examine a learner-centered approach to instruction that integrates the lesson goals of a particular unit with a topic that is familiar to the student. Opportunities to target specific writing deficits may be possible from this performance-based approach because it integrates the unique strengths and preferences of the individual student.

Purpose of the Study

When a visual sequence is used to present complex information and tasks, retention and student engagement among individuals with ASD seem to increase (Gordon and Stark, 2007). Digital Storytelling has potential as a literacy-based intervention because it relies on a series of sequential tasks to lead a student towards a specific goal through a digital and visually engaging format. The process of Digital Storytelling integrates personal experience as the foundation to writing a narrative while incorporating visual, auditory, and kinesthetic approaches to learning.

Digital Storytelling employs a systematic process based on predictable steps and routines. The first step begins with a written narrative. A student is encouraged to create a story about themselves or their lives that describes a particular interest, experience, or activity. When the written narrative is complete, the student then finds images to best represent the story; this may include images from a textbook, the internet, or from those captured with a digital camera or similar technology. The teacher collaborates with the student on their story, however it is important to note that the process is student driven in their choice of ideas, creativity, and edit decisions. The digital story is eventually displayed it in a mini-movie or documentary style format. The student has a choice to make the story public, or to retain it for personal reflection and growth.

Digital Storytelling is an emerging pedagogical approach typically used with students in the general population (Maier & Fisher, 2007). The purpose of this study is to expand the instructional use of Digital Storytelling to high-functioning students with ASD. This case study investigation examined the potential of Digital Storytelling as an intervention to improve the literacy outcomes of a high-functioning student with ASD. This adapted Digital Storytelling

format incorporated strategies and methods to facilitate the development of social, communication, and literacy based skills throughout the study.

Theoretical Underpinnings of the Study

The current direction in special education research places an emphasis on identifying effective interventions to improve the academic outcomes of students in this population (Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005). A stated goal of the No Child Left Behind Act of 2001 (NCLB) is to discourage instructional practices that may have a popular appeal but offer little scientific validation towards its effectiveness (No Child Left Behind [NCLB], 2002). Moreover, NCLB authorizes significant "…consequences to those schools that continually fail to improve student achievement as a result of using programs and practices for which there is no evidence of success" (U.S. Department of Education, 2003).

The current model of funded research in special education attempts to replicate the methodological standards similar to the medical model used in fields such as chemistry, biology, and physics. Therefore, the parameters of a scientific based education practice follow a narrow and well-defined standard based on random assignment, control groups, and experimental design. "Studies that test random samples of the population and that involve a control group are scientifically controlled. To gain scientifically based research about a particular educational program or practice, it must be the subject of such a study" (U.S. Department of Education, 2003). Slavin (2002) notes, "this was the first time in history that federal education funding has been linked directly to evidence of effectiveness" (p. 15).

The Division of Research for the Council for Exceptional Children (CEC) considers the implication of these federal NCLB guidelines to future research efforts in special education practice and policy (Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005). The CEC

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advocates an ongoing systematic agenda of scholarship and academic inquiry to identify research-based approaches in special education. This committee outlines four distinct research methodologies that contribute to the present knowledge base in special education research.

a) Experimental group

b) Correlational

c) Single subject

d) Qualitative designs (Odom et al., 2005, p. 138)

The goal of this "task force was to establish quality indicators for each methodology and to propose how evidence from each methodology could be used to identify and understand effective practices in special education" (Odom et al., 2005, p. 138).

Berliner (2002) criticizes the current federal position on what constitutes quality research practices in education. Berliner argues that research standards, practices, and logistics in the field of education do not easily conform to the model used in fields such as chemistry, physics, or medicine. "We [educational researchers] do our science under conditions that physical scientists find intolerable. We face particular problems and must deal with local conditions that limit generalizations and theory building—problems that are different from those faced by the easier-to-do sciences" (Berliner, 2002, p. 18). The need for multiple and flexible research methodologies in the field of education is the best way to fully understand and document effective classroom practices. Berliner (2002) concludes:

> Our science forces us to deal with particular problems,
> where local knowledge is needed. Therefore, ethnographic
> research is crucial, as are case studies, survey research, time series, design
> experiments, action research, and other means to collect reliable evidence for
> engaging in unfettered argument about education issues (p. 20).
>
> Noddings and Witherell (1991) make a similar argument. They assert that a
> research-oriented approach that builds theory from the investigation of individual
> cases helps to clarify and explain a particular educational trend, intervention,

strategy, or approach. Noddings and Witherell (1991) state, "Working case by case, we can build impressive arguments that something is wrong, or that something works, or that something comes in infinite varieties" (p. 280).

Pugach (2001) suggests that qualitative methods, in particular the use of case study research, have the potential to offer substantive benefits to our current educational practices in special education. Although case study research, under a qualitative paradigm, is appropriate and useful for special education, it is not widely accepted in this field. The perception of qualitative approaches in special education may explain the partiality towards quantitative-based methodologies. The reluctance to use "qualitative research in special education is perhaps less problematic, however, than the fact that in beginning to accept it, what appears to have been adopted is a relatively narrowly defined perspective on the paradigm itself" (Pugagh, 2001, p. 442).

Maxwell (2004) writes, "The reemergence of a narrowly defined 'scientifically based research' that marginalizes qualitative approaches represents a major threat to qualitative research" (p. 35). Schopler (2005) maintains a similar position as it relates to research design for students in the ASD population. Schopler (2005) argues "that flexibility in the methods used to investigate treatment effectiveness be given priority over the rigid prescription of Randomized Clinical Trial (RCT) methods" (p. 709).

The following themes from the current literature on ASD emerge as part of the theoretical foundation of this study:

a) An educational intervention that is flexible and creative

b) An instructional approach that is individualistic

c) An intervention that relies on the visual learning strengths of students with ASD

d) An environment to carry out the intervention that is familiar and naturalistic

Flexible and Creative Educational Interventions

Variability associated with the behavioral, social, and cognitive skills of individuals with ASD is a hallmark of this population (Gerlach 2003). Educators often struggle with the choice of an intervention that is useful and beneficial to this group of students. This task can be somewhat difficult, because "what works wonders for one individual may have absolutely no effect on another (Gerlach, 2003, p. vi). The need for flexible and creative academic, social, and behavioral interventions in the field of special education is an urgent priority. Lord et al. (2005) suggest that future research efforts "should continue to define critical gaps in the evidence base, opportunities for moving the field forward, and creative use of existing or new mechanisms to support and facilitate advances in the field of psychosocial intervention research in autism" (p. 705). The Digital Storytelling intervention examined in this study has the potential to benefit students in this population because it is adaptable to the unique needs of each individual.

Individualized Approach to Instruction

A National Research Council [NRC] summary of instructional approaches for students with ASD contends that no single intervention has a universal benefit to this population of students with ASD (2005). Furthermore, the NRC noted an overall lack of intervention research for students with ASD. Their recommendation for the direction of future research in this area suggests three specific areas for improvement: better documentation of interventions, the development of individualized treatments with realistic objectives and goals, and a focus on generalizing the benefits of the intervention to multiple settings (NRC, 2005). An individual approach to the targeted skills in this intervention is an essential part of the theoretical foundation to this study.

Instructional Methods that Integrate Auditory and Visual Cues

Children with autism respond best to teaching methods that incorporate visual information as part of the teaching and learning process (Rao & Gagie, 2006). "Children with autistic spectrum disorders are known to have visual rather than auditory strengths" (Tutt et al., 2006, p. 74). The visually intense technology driven approach of this intervention reflected the consensus of ASD specific literature in this area.

Familiar and Naturalistic Environment to Carry out Intervention

A review of literature addressing the instructional needs of students with ASD emphasizes structure, familiarity, and predictable routines as necessary components to effective instruction (Tutt, Powell, & Thornton, 2006)**.** Jensen and Sinclair (2002) note that, while intervention effectiveness has been a challenge for ASD research, the approaches that have demonstrated success were ones carried out in a natural and familiar setting. The present study was carried out in an after school setting at a public library.

The foundation of this research effort relied on a polytheoretical approach to inquiry. More specifically, this study did not limit itself to one specific pedagogical theory (e.g., behaviorism, cognitive science, constructivism). Rather, this study made use of procedures and strategies from a number of theoretical frameworks. Instead of attempting theoretical purity, this study adopted an empirical approach that involved continuous and iterative assessment of the emerging instructional materials and interactions that developed throughout the intervention. This approach is similar to a grounded theory orientation put forth by Glaser and Strauss (1967). Grounded theory is a widely used and accepted methodology, particularly with qualitative data, in the fields of sociology (Glaser & Holton, 2004), counseling psychology (Fassinger, 2005), and education (Willis, Nilakanta, & Jost, 2007). This theoretical foundation was useful to the goals of

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the current study because it allowed the researcher to use successive waves of data to develop, modify, and improve theory as it related to Digital Storytelling for an individual with ASD.

Research Questions

A well-designed research question, or set of questions, helps guide the discovery of knowledge, the collection of information, and the application of this data to current practices (Anfara, Brown, & Mangione, 2002). The integrity of a study depends on transparency between the investigation protocol, its methodology, and the issues that were resolved or extended for future research (Constas, 1992).

Throughout the literature, a persistent need exists for substantive empirical support to determine the effectiveness of technology as a tool for improved outcomes in student learning (Roblyer, 2005). Pollard and Pollard (2004) recommend the need for a "rigorous documentation of the link between technology use and learning" (p. 159). This investigation attempts to reconcile the lack of empirical data on the use of Digital Storytelling for students with ASD and attempts to answer the following questions:

1. How does Digital Storytelling impact the academic and social outcomes of a student with ASD?

2. What factors contribute to the use of Digital Storytelling as an approach to literacy instruction for a student with ASD?

3. How does prior knowledge of technology contribute to the implementation of Digital Storytelling for a student with ASD?

Definitions of Terms

This section provides a definition of the terms common throughout this study. While some concepts have multiple applications, these definitions specify its use within the framework of this study.

Applied Behavior Analysis (ABA)

A systematic approach used to identify the function of a specific behavior. Reinforcement or punishment is used to either increase or decrease a particular behavior. An ABA approach uses quantitative data collection methods to document, analyze, and determine the function of each behavior. Baer, Wolf, and Risley (1968) describe ABA as a "self-examining, self-evaluating, discovery-oriented research procedure for studying behavior" (p. 91).

Autism Spectrum Disorder (ASD)

This classification refers to a broad set of closely related developmental disorders that have similar behavioral, cognitive, and social characteristics. Rett's syndrome, Asperger Syndrome, Childhood Disintegrative Disorder, and Autism are generally associated with Autism Spectrum Disorder (Lord,Cook,Leventhal,& Amaral, 2000). ASD is synonymous with Pervasive Developmental Disorder (PDD). Typically, ASD is the term used in education, while PDD is more common in clinical settings.

Digital Storytelling

A personal narrative that describes an event, situation, or challenge through a multi-media format involving digital photography, written text, music, and still photography. Rozaitis (2006) provides a broad description of Digital Storytelling as a "learning object which uses digitally produced or enhanced materials to create narrative" (http://xrl.us/DigtalStorydefinition).

High Functioning Autism

An individual with high functioning Autism exhibits an average or advanced level of social, behavioral, and cognitive ability. Strengths in one area, however, may not be indicative of strengths in others. Lord, Cook, Leventhal, and Amaral (2000) explain that " a child with high

functioning autism or Asperger's syndrome may do well academically in a fifth grade program

for children gifted in mathematics but need the support of

an assistant teacher in order to benefit from social activities and help him as he begins to

understand that he is different from other children" (p. 357).

No Child Left Behind Act of 2001 (NCLB)

Public Law 107-110 is a federal education act passed by the 107th Congress of the United

States. The goals of this mandate are to raise the national academic standards of public

elementary and secondary schools through accountability at the building, school district, and

state level. Federal funding to each school and school district is contingent on meeting annual

goals in math, reading, attendance, and graduation.

Pervasive Developmental Disorders (PDD)

This category in the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition

(DSM-IV) refers to a broad set of closely related developmental disorders with similar

behavioral, cognitive, and social characteristics. Rett's syndrome, Asperger Syndrome,

Childhood Disintegrative Disorder, Autism, and Pervasive Developmental Disorder not

otherwise specified are PDD (Bildt, Sytema, Ketelaars, Kraijer, Volkmar, & Minderaa, 2003).

Self-Contained Classroom

A special education classroom setting that homogeneously groups students with similar

academic, social, and behavioral needs. A range of grade and age levels may exist in this type of

setting. Although the format and structure of a self-contained classroom can differ, it is typical

for one teacher, with the assistance of a paraeducator, to be responsible for instruction in all

content areas.

Summary

An exponential increase within the past forty years of individuals with ASD has significant implications in both our immediate and future system of education. Literacy related deficits are common for many students in this population. Paradoxically, some individuals with ASD demonstrate skills in one or more academic, social, and behavioral area that is comparable or higher to their chronological age group.

Selection of a classroom approach that addresses the needs of this population is difficult for many educators. The range of variability within this group prevents teachers from implementing a universal academic intervention, strategy, or instructional method. Perhaps this reality explains the limited number of empirical-based interventions available to students with ASD.

This case study of a high functioning sixth grade student with ASD examined the potential use of Digital Storytelling as a literacy intervention. Digital Storytelling offers promise as an effective pedagogical tool in Special Education settings as it integrates visual, auditory, and kinesthetic components. The grounded theory approach used throughout this study promoted theoretical sensitivity and a framework to conceptualize new ideas from each successive wave of data.

The following chapters discuss the literature base for this intervention, the methodology that guided this investigation, the results from this examination, and the implications of this intervention for a student with ASD. Chapter two describes the historiography of ASD and the academic, social, and behavioral challenges that are common to this population. Chapter three delineates the methodological framework, data collection, and analysis procedures used in this case study. Chapter four presents the findings from this study. Chapter five discusses the

implications of these findings and offers recommendations for future research priorities with

Digital Storytelling for students with ASD.

CHAPTER 2.

REVIEW OF THE LITERATURE

Introduction

The goals of this chapter are threefold; to examine the early developmental challenges for children with ASD, to review the current research base of interventions available to students in this population, and to evaluate the potential use of Digital Storytelling as a literacy-based intervention for students with ASD. To accomplish this, the first section examines patterns of social development and literacy acquisition common to children with ASD. An overview of current social skills and literacy-based interventions, and the effectiveness and criticisms associated with these approaches, then follows. The final section considers the empirical basis of Digital Storytelling as a potential intervention to improve the social and literacy outcomes of high functioning students in this population.

Stages of Social Development

At three months of age, an infant with typical social development begins to recognize and imitate the facial expressions of their caregiver (Herba & Phillips, 2004). A child at this age also attempts to use body movement as a way to reciprocate basic forms of communication. These movements eventually become more deliberate and coordinated during the first year (Gesell & Amatruda, 1947).

Social development skills become more complex around twelve months of age. It is common for children in this stage of development to initiate basic communication in response to their particular environment (Brooks & Meltzoff, 2005). When the primary caregiver leaves a room, for example, a child may cry or become shy around less familiar people (Talay-Ongan & Ap, 2005). Preferences to certain foods (Benton, 2004), people (Michel & Tyler, 2005), and toys are common for this group (Striano, Chen, Cleveland, & Bradshaw, 2006).

Social interactions, by two years of age, begin to reflect an awareness of individuality. Behavior imitation expands from the primary caregiver to include other children and less familiar adults (Fenstermacher & Saudino, 2007). At this stage, separation anxiety gradually begins to fade as an individual begins to show enthusiasm to be in the company of their peers (Avidan & Zee, 2006). Defiant behavior is common at this age as a way to communicate preferences and wants (Carter, Briggs-Gowan, & Davis, 2004). A persistent failure to meet these early milestones of social development often provides the first indication of ASD.

Although a reliable diagnosis of Autism is possible by age two (Moore & Goodson, 2003), a formal identification is more common around ages three or four (Gupta et al., 2007). The first signs of Autism, however, may be evident from an early age. Children with ASD often exhibit developmental delays from the initial stages of infancy. Their ability to recognize their caregiver, make eye contact, or respond to familiar voices typically occurs much later than the general population (Dawson, Webb, & McPartland, 2005). Chawarska, Klin, Paul, and Volkmar (2007) list the following behaviors that many children with ASD exhibit by age two. These behaviors affect the overall development of appropriate social skills and interactions:

a) Limited response to name

b) Poor eye contact

c) Limited response to joint attention bids

d) Lack of pointing

e) Delays in functional and symbolic play (p.135).

Social Interactions

Our daily interactions with others rely on a set of unspoken cues, rules, and procedures. Both our conversational behavior and the function of our communication allow us to transmit ideas, instructions, and information. The unspoken behaviors that occur during a conversation,

such as eye contact, head nodding, and posture allow individuals to acquire, imitate, and act

upon new and existing information (Banerjee, 1992).

Individuals with ASD generally fail to recognize and interpret the appropriate social cues

from others (Bellini, et al., 2007). A person with ASD, for example, often demonstrates an

aversion to hugs, winks, and attention from others. Consequently, the behaviors exhibited in the

context of a social paradigm may show dispassion and seem to lack empathy with others.

The characteristics of ASD are possible from an early age. Werner, Dawson, Osterling,

and Dinno (2002) report that behavior typically associated with ASD may be evident by eight to

ten months of age. A particular challenge for infants in this population is the ability to recognize

and orient towards their name. Werner, Dawson, Osterling, and Dinno (2000) suggest that name

recognition integrates multiple domains of development because "orienting to name involves

aspects of both the social and communication domains, as well as attention, so it taps nearly all

the domains known to be impaired in autism" (p. 161). Questionnaires designed to assess the

temperament of children with ASD report that children in this population, as early as six months

of age, exhibit less vocalization than peers with typical development, do not consistently respond

to an attempt by a caregiver for attention, and fail to initiate social interactions with their primary

caregiver (Zwaigenbaum, Bryson, Rogers, Roberts, Brian, & Szatmari, 2005).

At twelve months of age, these delays in social development are more profound and

severe. When sensory input is increased, a person with ASD may react in a manner that is

disproportionate to the environment or situation. Typical behaviors may include self-mutilation

or self-injurious behavior. In a conversation at this age, a child with ASD may be unable to

maintain eye contact and visual tracking, exhibit poor attention to the conversation, or become

fixated on the extraneous environment unrelated to the speaker (Zwaigenbaum, Bryson, Rogers, Roberts, Brian, & Szatmari, 2005).

As children with Autism enter their toddler years, the capacity for meaningful social interactions and relationships becomes more difficult and problematic. Evidence of this occurs in situations that involve play. When presented with an opportunity to engage in self-directed play, it is common for children with ASD to prefer isolation, exhibit idiosyncratic behavior, and demonstrate an aversion to any attempt made by an adult to facilitate and guide social interactions (McGee, Feldman, & Morrier, 1997).

In a summary of behaviors observed by children with Autism during play, Sigman and Ruskin (1999) reiterated the level of variability that exists with this exceptionality. When given the opportunity to interact and play with peers, some children with ASD exhibit behaviors that are consistent with the general population. Others, however, segregate themselves from their peers on the playground. A student with ASD may watch from a distance, recite a monologue (e.g., from a movie, favorite television show, or a phrase heard by teacher and other adults) to no particular audience, or sit quietly alone.

A unique phenomenon may explain the difference between students with ASD who exhibit developmentally appropriate social interactions and those who do not. Sigman and Ruskin (1999) suggest that students in the general population welcome students with ASD into their network of friends. The reason social interactions fail to occur between each group, in part, is because many students with ASD do not initiate a dialog or social exchange with peers. Essentially, the decision to remain isolated from others may explain the persistent challenge with their ability to foster and maintain positive social relationships.

The characteristics of playground behavior are similar to experiences reported in the classroom. Verbal outbursts, prolonged crying, and physical aggression are common for students with ASD. These behaviors usually occur when there is a degree of uncertainty, such as a transition from one task to another, a disruption in the lesson, or in a stressful situation, such as an unexpected fire drill.

Early deficits related to social development rarely ends in childhood. Poor social skills among individuals with ASD often lead to a variety of "detrimental outcomes, such as poor academic achievement, social failure and peer rejection, anxiety, depression, substance abuse, and other forms of psychopathology" (Bellini, Peters, Benner, & Hopt, 2007, 153). Bellini, Peters, Benner, and Hopt (2007) suggest that the paucity of these core skills in social functioning ultimately contribute to a lifetime of isolation and social withdrawal, in part because meaningful relationships are hard to establish and difficult to maintain. The impaired executive functions common to this population often produce lifelong negative effects (Hill, 2004).

ASD is a lifelong condition that greatly influences the lives of individuals with this exceptionality. As this population enters adulthood, many are never able to live independently, maintain gainful employment, or develop meaningful emotional attachments and lasting social relationships. A recent longitudinal study of adults with ASD who transition into adulthood reports that most participants (57%) experience dismal lifelong outcomes (Billstedt, Gillberg, & Gillberg, 2005). The results of this study emphasize the need for interventions that promote improved outcomes for a successful transition into adulthood. The sample chosen for this study, however, may limit inferences to the larger ASD population. Billstedt, Gillberg, and Gillberg (2005) selected participants with ASD who experience severe and profound limitations in their

ability to function on a daily basis. Caution, therefore, is necessary with comparisons to individuals with less severe language, social, and cognitive limitations.

Jennes-Coussens, Magill-Evans, and Konig (2006) examine the quality of life for adult males with Asperger syndrome. The participants in this study represent a range of abilities that is characteristic for many individuals in this population. This group reports significant challenges in the areas of job security, relationships, and education. The persistent social delays that characterize this exceptionality appear to limit the opportunities for a successful transition to self-reliance, "most individuals with Asperger Syndrome or Autism rely heavily on the support of their families and remain highly dependent" (p.404). While Jennes-Coussens, Magill-Evans, and Konig extend the scholarship on Asperger Sydrome, the selective sample in this report may limit its generalizability to similar populations within the spectrum of Autism related disorders.

Executive Functions

Hill (2004) contends that deficits with executive functions limit the outcomes of individuals with ASD. Hughes, Russell, and Robbins (1994) define executive functions as the "mental operations which enable an individual to disengage from the immediate context in order to guide behavior by reference to mental models or future goals" (p. 477).

The Tower of Hanoi, created by Édouard Lucas in 1883, is a mathematical puzzle that requires mastery of multiple executive functions, particularly those related to cognitive, social, and behavioral skill sets. The Tower of Hanoi consists of three pegs and disks of various sizes. The puzzle begins with each of the disks stacked neatly on top of each other, the largest on the bottom followed by each of the others arranged in descending order. The purpose of this game is to maintain the descending order while moving each one to an opposite peg. Figure 2.1 is an illustration of the Tower of Hanoi, a game that requires the use of multiple executive functions.
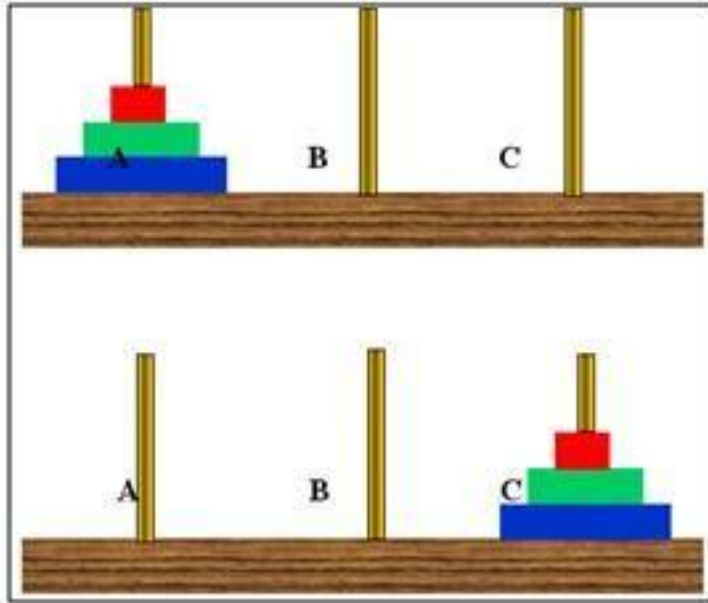
Figure 2.1. Tower of Hanoi

Successful completion of the Tower of Hanoi requires ongoing planning, a system to monitor actions, make predictions, demonstrate initiation, use working memory, and exhibit self-regulatory behavior (Joseph, McGrath, & Tager-Flusberg, 2005). Most children with ASD are unable to complete the Tower of Hanoi with success (Ozonoff & Jensen, 1999). This assessment provides educators with the strongest evidence of the impaired executive functions experienced by individuals with ASD (Joseph, McGrath, & Tager-Flusberg, 2005). Future research on executive functions, and its role in social development, should examine the impact of interventions that target its impact on children with ASD.

Language and Communication

Frith and Happe (1994) explain, "communication problems form one of the key diagnostic criteria for autism, but there is a wide variety of manifestations" (p. 97). Students with ASD often exhibit a set of communication traits that is atypical and difficult to use in multiple settings. Some children, for example, remain mute throughout their lives, while others achieve

developmental milestones in language development much later than their counterparts in the general population.

Many individuals with ASD display atypical language patterns that are counterproductive to meaningful communication. Examples of the stereotypical language and communication traits attributed to individuals with ASD are repetitive or monotonous speech and Hyperlexia (Nation & Norbury, 2005). An antecedent to the inappropriate behaviors that characterize this population, in many cases, originates from the frustration experienced with a limited ability to communicate effectively. Valente (2004) suggests that intense reactions often occur because "a child with autism tends to respond negatively to stress or change because of limited coping skills, poorer impulse control, and a less effective response system. He or she may overreact with dangerous behavior, intense frustration, or depression" (p. 237).

Early descriptions of ASD refer to academic and cognitive delays as a core feature of this exceptionality. Hans Asperger, in his seminal account of Asperger syndrome, explains the persistent struggle with handwriting and reading; "In the end, it was possible to teach him to write only by making him trace letters and words written in red pencil. This was to guide him to make the right movements. However, his handwriting has so far been atrocious" (Asperger, 1944 translated in Frith, 1991, pg. 49). Leo Kanner (1943) delineates similar literacy-related challenges for students with Autism. Reading skills, he explains, "…[are] acquired quickly, but the children read monotonously, and a story or a moving picture is experienced in unrelated portions rather than in its coherent totality" (Kanner, 1943, p. 42).

The current literature on ASD verifies many of the early descriptions of this exceptionality. Children with ASD experience profound and lifelong impairments with literacy development and acquisition (O'Connor & Klein, 2004). Receptive and expressive speech

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abilities, skills related to reading and writing, and advanced language knowledge create permanent challenges for children with ASD. Impairments with expressive and receptive communication contributes to negative outcomes in academic, employment and social settings (Rice, Warren, & Bertz, 2005).

Instructional approaches for individuals with ASD represent an amalgamation of interventions that often do not have an empirical basis of support (Tutt, Powell, & Thornton, 2006). Simpson (2004) differentiates between the quantity and quality of available interventions stating, "yet, in spite of the significant changes in intervention options and treatments for persons with ASD that have occurred over the past several decades, there has been a consistent lack of agreement related to the efficacy of these methods"(p. 139). Tutt, Powell, and Thornton (2006) acknowledge the excessive number of instructional models that exist for students in this population, but caution educators to consider its effectiveness in relation to the body of validated current research. The field of "Autism, perhaps more than any other condition, attracts curative and therapeutic approaches in education as well as in medicine" (p.71). An intervention with commercial success and mass appeal may not satisfy the standard of a research based academic approach.

Scientific inquiry involving topics specific to ASD devotes considerable attention to the social and behavioral demands of this population (O'Connor & Klein, 2004). The search for improved academic interventions, unfortunately, has been slow and inconsistent. The dearth of literacy specific approaches provides sufficient evidence of this reality (O'Connor & Klein, 2004). Foley and Staples (2005) add, "what research there is shows that some individuals with autism can learn to read and write, and that those who do, have a wider range of educational, social, and vocational opportunities throughout life" (p. 325). Until better instructional models

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for students with ASD become possible, educators may need "… to employ what is known about effective literacy instruction for individuals without disabilities or with less-severe disabilities" (p. 325-326).

Children with ASD often demonstrate an atypical pattern of literacy development (Koppenhaver & Erickson, 2003). Literacy skills seem to emerge in discrete categories. A student with Autism, for example, may display an advanced ability to decode written symbols into sounds (Mirenda, 2003) yet find it difficult to integrate this text based material to a concept that is familiar and understood (Frith, 2003). The research on literacy development supports the conclusion that comprehension and the use of information from text is an ever-present challenge for this group of learners (Frith, 2003).

O'Connor and Klein (2004) examine the specific deficits that lead to poor outcomes in reading comprehension for individuals with ASD. Students with ASD may find it difficult to activate relevant prior knowledge, demonstrate an inconsistent use of strategies to check comprehension, and interpret sentences and paragraphs as isolated events that are unconnected from one another. O'Connor and Klein (2004) also compared the effectiveness of three instructional approaches in literacy; cloze sentences embedded in the text, a set of pre-questions to help the student focus on relevant information in the text, and anaphoric cuing to determine the reference of each pronoun to previous information. Anaphoric cuing was the only intervention to yield a statistically significant result. Students who used anaphoric cuing exhibited higher gains than the control condition of students who read a passage and then tested for comprehension. Although few studies like this one are currently available, the results warrant further investigation in this area.

Literacy Based Interventions

O'Connor and Klein (2004) note the amount of literacy-based instructional strategies that are commonplace in the general population. While each of these approaches seem useful for many students, the opposite may be true for those with ASD. The use of pre-reading questions, for example, appears to lead students with ASD to a set of responses that does not promote comprehension. The results of their study lend credence to the notion that teaching strategies used successfully with most children may be ineffective in settings with ASD.

Sencibaugh (2005) provides additional support to the need for differentiated instruction for unique groups of learners. Students with learning disabilities, Sencibaugh argues, respond well to literacy instruction grounded in explicit instruction. While this approach may be useful to children with learning disabilities, it is not likely to benefit children with ASD, who instead report positive responses to instructional approaches that rely on visual supports and systematic instruction (Dunlap & Bunton-Pierce, 1999).

Nation, Clarke, Wright, and Williams (2006) compare the literacy performance of individuals with ASD to the general population. Comparisons between each group in the areas of word recognition, nonword decoding, text reading accuracy, and text comprehension skills indicated similar abilities across various literacy content areas. Children in the general population demonstrated strength in each of the four categories while the ASD group displayed proficiency in three of the four categories. Text comprehension deficits were a consistent challenge for individuals in this group. Although traditional methods of literacy instruction may remain effective in areas such as decoding and word recognition, the results of this study suggest that semantic and linguistic aspects of literacy require innovative and specialized instructional approaches for students with ASD. The range of skills present in this study is consistent with the

characteristics of ASD; "there was considerable variability across the sample with performance on most tests ranging from floor to ceiling levels. Some children read accurately but showed very poor comprehension, consistent with a hyperlexia reading profile; some children were poor at reading words and nonwords whereas others were unable to decode nonwords, despite a reasonable level of word reading skill. These findings demonstrate the heterogeneous nature of reading skills in children with ASD" (Nation, Clarke, Wright, and Williams, 2006, p. 911). The parameters of ability and learning patterns in children with ASD require academic interventions to provide more options and flexibility than what is possible in the general population.

Empirical Basis for Current Interventions

Current treatment options to improve academic, behavioral, and social outcomes for children with ASD rely heavily on behaviorist principles and theory. Lovass, for example, developed an intervention to reduce the inappropriate behaviors that are common for children with ASD (1987). The Lovaas Method operationalizes the behavioral theories put forth by Skinner through an emphasis on Applied Behavior Analysis (ABA). Among interventions based on ABA principles, the Lovaas Method has "received the most empirical study using group designs and so might be considered the appropriate treatment for comparison [to similar interventions]" (Lord et al., 2005, p. 702). Although the Lovaas method shows limited potential as an intervention to to help mitigate inappropriate behavior and improve the social skills of children in this population, it may not be the panacea many expected (Schreibman, & Anderson, 2001).

The rigid structure of the Lovaas Method places a great deal of responsibility on educators, acquaintances, and family. Individuals who implement the Lovaas Method should be aware of the commitment that is necessary to carry it out with fidelity. The treatment begins prior to age five and may last several years. The purpose of early intervention is to establish

appropriate behaviors before the characteristic features of Autism become permanent and more difficult to change. Family involvement is an essential component to the success of this approach. Forty hours a week of intensive training at home is expected. Each day, between six and eight hours should be devoted to the program. Individuals who work with this student must undergo a period of training to demonstrate appropriate implementation of the Lovaas Method.

This is a useful intervention to help mitigate the atypical behaviors associated with Autism, however generalization beyond this area seems limited. Specifically, students of the Lovaas Method, as well as those who are not, exhibit an persistent struggle with the ability to initiate and maintain satisfactory relationships with others (Tutt, Powell, & Thornton, 2006). The available research on adults with Autism may provide insight on this issue. The deleterious impact of poor social and relationship skills within this population is a core feature of ASD.

One explanation, the Theory of Mind, suggests that individuals recognize and interpret the mental states of others to predict behavior and adjust their interactions accordingly (Premack & Woodruff, 1978). Children with Autism often fail to recognize the independent thought process and actions of others. Interventions rooted in behaviorist fundamentals, such as the Lovaas Method, do not seem to improve on the skills needed to empathize and facilitate meaningful communication with others (Baron-Cohen, 1995).

A criticism of the Lovaas Method is the reliance it places on verbal cues, reinforcement, and instruction. Eric Schopler and Gary Mesibo developed an intervention that maintains a foundation in behaviorist theory with an emphasis on the visual instructional needs of this population. Treatment and Education of Autistic and related Communications handicapped Children (TEACCH) helps students with ASD adjust to transitions and unexpected changes that often occur in a classroom environment. To address the behaviors and social deficits that result

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from these situations, TEACCH provides educators with a systematic approach to instruction that encourages predictable routines, consistent visual cues, and a modified environment that accommodates the diverse sensory, academic, and social needs of this population. Although the empirical support for this approach is limited, enough exists to justify its consideration as a guideline for effective practice (Panerai *et al.* 1997,1998; Norgate, 1998; Kunce & Mesibov, 1998; Keel *et al.* , 1997; Ozonoff & Cathcart, 1998).

Interventions that use group interventions to reduce inappropriate behavior may be counterproductive for this population. These approaches "may actually increase the levels of antisocial behaviors in conduct-disordered children" (Lilienfeld , 2005, p. 763). Hobson (1993) suggests that interpersonal relatedness is a fundamental challenge for this population. To foster positive affective and social relationships with others, a child-specific approach is imperative. The Option Method (named after the Option Institute in Massachusetts) is a treatment that matches this theoretical perspective. Barry and Samahria Kaufman, out of frustration with the behaviorist methods used for their child with autism, developed an intervention to promote meaningful relationships with others. The Options Method does not attempt to eliminate the behaviors associated with Autism; rather it accepts these behaviors as a point of initial reference. The use of systematic procedures to extinguish, shape, and reinforce desired behaviors has no use in the Options Method. Instead, proponents of this intervention allow each child to guide the interactions and responses with others. This intervention lends support to the constructs of interpersonal relatedness and theory of mind. Unfortunately, the Options method has little empirical validation in the literature (Starr, 2005).

The range of ASD-related social, behavioral, and academic interventions is expansive. Although some interventions gain widespread popular acceptance by the public (sometimes

referred to as *fad treatments*), many do not have a sound pedagogical foundation to substantiate any of its claims (Machalicek, O'reilly, Meretvas, Sigafoos, & Lancioni, 2007). The Lovass, TEACCH and Options Method represent the earliest interventions that gained widespread use in family, school, and community settings.

The historiography of ASD reveals an emphasis on behaviorist theory to reduce negative interactions that are common for this population. This may explain the lack interventions that address specific areas of academic weakness. The academic strategies and methods that exist for students with ASD are seldom without a component for behavioral or social skills improvement. Roberts (2004) asserts, "It is clear that there is insufficient empirically sound research evaluating outcomes of programs for children with autism, despite the range of treatments available to parents and the claims made by the exponents of some of these programs" (p. 7).

Digital Storytelling as a Literacy Intervention

Individuals with ASD often exhibit a heightened response to visual and sensory information (Deruelle, Rondan, Gepner, & Fagot, 2006). Digital Storytelling is one approach that may improve the academic and social outcomes of students with ASD. A digital story involves the use of a multimedia platform with audio, video, and text-based technologies to create to a narrative that is personal, unique, and meaningful. This intervention may benefit students with ASD because it integrates sensory-based technology with a visual approach to instruction. Lambert outlines the qualities of an effective digital story. Each story originates from the perspective of the writer to address a particular problem, need, desire, or want (Lambert, 2002). Within this framework, Lambert explains, the dramatic question is resolved. Resolution of the dramatic question is critical to the story (Bull & Kajder,2004). This one element is the difference between simple documentation and elaborate storytelling. A travelogue, for example, "…may

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have an accompanying narrative, sprightly music, and cutting-edge transitional effects. However, it does not hold our attention in the same manner as a well-constructed digital story" (p.3).

The emotional content of each story is important to recognize, develop, and integrate into the story. The viewer connects to the digital story through its emotional content. Laughter, tears, anger, and compassion are possible responses to a well-written story that makes effective use of emotional content. A recent use of instructional technology allows students to document the progress of a classroom unit or theme with multi-media technologies (Bull & Kajder, 2004). While this may be a useful way to incorporate technology into the existing instructional framework, it does not rise to the level of Digital Storytelling. A digital story is one that "…works to pursue, discover, and communicate new understanding that is rooted in who we are as humans (p. 4).

Another unique element of a digital story is the voice of the writer. The voice of the author "narrates the content of a story in a natural way, expressing the proper emotional state adapted to the progress of the story" (Linaza, Eskudero, Lamsfus & Marcos, 2004, p.1). The choice of when to present certain images, along with the choice of background music used to emphasize the tone of the story, are the final elements in the digital story process.

There are seven elements to a digital story to help with the overall creative process (Lambert, 2002). These guidelines are intentionally broad to promote autonomy with story development. Jakes (2005) explains that each digital story begins with an engaging narrative. This process is systematic and logical. The parameters of a digital story often follow a specific format and sequence. The written content for each story should be less than 250 words (Watkins & Russo, 2005), the number of images should not exceed twenty-five (Jakes, 2005), and the final version should be less than three minutes in length. The stages of Digital Storytelling generally

follow a sequence of prewriting, writing, and post writing. After the edits to the story are complete, digital technology is integrated with the text into a multimedia platform such as Microsoft Movie Maker version 2.1 or Macintosh iLife Suite 2008. The final stage of a digital story is its publication to a wide audience (Jakes, 2005). Figure 2.2 illustrates each component of a Digital Story.
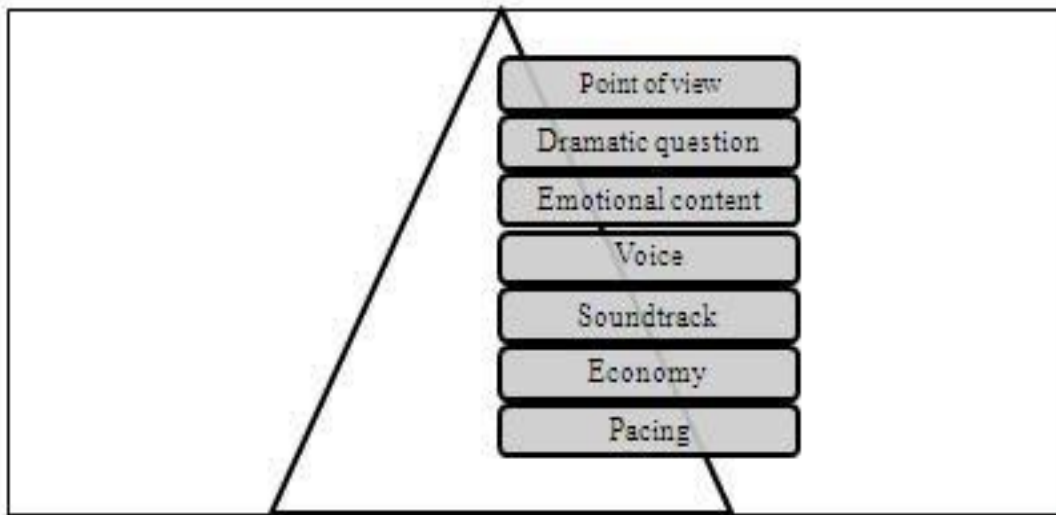
Figure 2.2. Seven Elements of Digital Storytelling (Lambert, 2002)

Empirical Basis of Digital Storytelling

In the strictest sense, literacy refers to a set of skills. It is "a minimal ability to read and write in a designated language, as well as a mindset or way of thinking about the use of reading and writing in everyday life" (Venesky, Wagner, & Ciliberti, 1990, p. 142). This definition, however, is simplistic. Layton and Miller (2004) explain, "for the past sixty years, researchers, practitioners and policy makers have been debating and exploring definitions and interpretations of literacy and what it means to be literate, from diverse perspectives" (p. 58).

Kirsch, Jungeblut, Jenkins, and Kolstad (1993) base the definition of literacy on a social paradigm; literacy is the use of "printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential" (p.2). Mongomery (1995), however, considers each perspective a necessary part of literacy; literacy encompasses a set of skills, such

as the ability to read, write, and speak, and a set of social competencies, such as the ability to

listen and think that allows us to function as individuals and as a society.

Weaver (2002) reminds us, "first and foremost, reading means constructing meaning" (p.

3). A policy statement on the topic of literacy acquisition from the International Reading

Association [IRA] (1999) supports the position that reading involves a set of skills involving

multiple competencies. According to IRA, Literacy acquisition requires:

a) the development and maintenance of a motivation to read

b) the development of appropriate active strategies to construct meaning from

print

c) sufficient background information and vocabulary to foster reading

comprehension

d) the ability to read fluently

e) the ability to decode unfamiliar words

f) the skills and knowledge to understand how phonemes or speech sounds are

connected to print (p.3).

Recent scholarship expands the common definition of literacy to encompass skills that

are essential in an era of rapid technological change and advancement. Russo, Watkins , and

Chan (2007) suggest that an effective approach to literacy instruction integrates a pedagogical

orientation towards "…the 'new literacy,' a field of studies which describes the skills demanded

of audiences as they negotiate the potential of expanding digital services" (p. 15). An era of

greater reliance on technology and digital communication elevates the importance of

instructional approaches to literacy that reflect the needs and goals of this new paradigm

(Armstrong & Warlick, 2004). Barrett (2006) asserts that Digital Storytelling integrates the

traditional goals of literacy with modern challenges of an information-based society. Digital

Storytelling uses collaboration to promote student engagement, reflection for deep learning,

technology integration, and project-based learning (Barrett, 2006). Figure 2.3 demonstrates the

student-centered approach to learning that exists with Digital Storytelling.
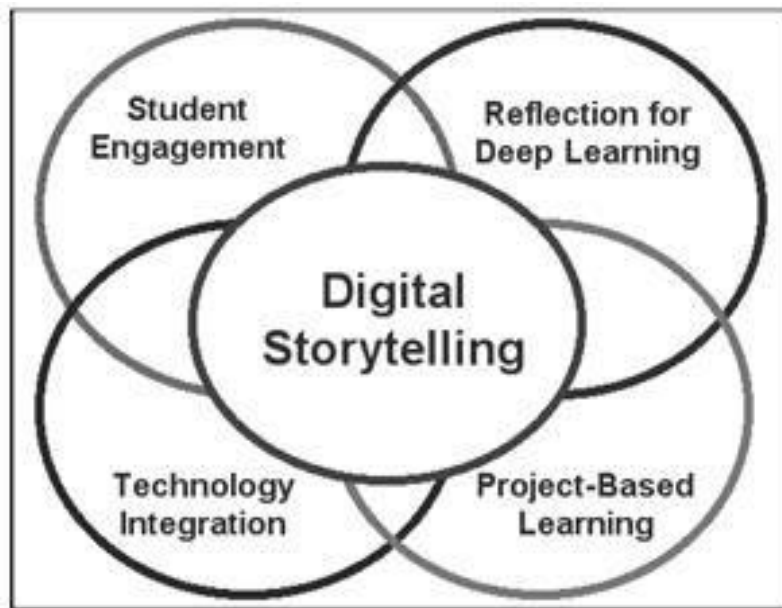
Figure 2.3. Convergence of Student-Centered Learning Strategies (Barrett, 2005)

Maier and Fisher (2007) examine the effectiveness of Digital Storytelling as a literacy

intervention for middle school age students in the general population. This intervention seemed

to improve social interactions and language outcomes. Advance organization, preferably with

visual cues, is recommended when this concept is introduced to students, "In early experiences it

is helpful to have something to aim for. Showing student examples helps them visually

conceptualize what their end goal will be. See what their peers came up with. Media rich writing

prompts are crucial for lending initial structure" (Maier & Fisher, 2007, p. 189).

Verdugo and Belmonte (2007) investigate the effect of Digital Storytelling on the

listening comprehension skills of Spanish young learners of English. The post-test comparison

reveals higher outcomes in the area of listening comprehension with the experimental group in

this study. Verdugo and Belmonte (2007) explain, "It is believed in this study that digital stories, if appropriately selected, can prove to be very useful in developing children's listening skills. They tend to be visual, interactive and reiterative" (p. 88).

Summary

The limited number of studies on Digital Storytelling documents the benefit of this approach as an instructional tool for literacy improvement. Myers (2006) suggests that Digital Storytelling and other media rich technologies are necessary components of modern instructional pedagogy; "It is not a choice we have as teachers of English to decide whether these symbolic tools have value in our classrooms, because they are already integrated into the production of our own as well as students' consciousness" (p. 64).

The concept of Digital Storytelling is consistent with the unique learning style of individuals with ASD. This approach to instruction encourages choices (Kern, Mantegna, Vorndran, Bailin, & Hilt, 2001), video modeling (Neumann, 2004), and computer use (Stromer, Kimball,Kinney,& Taylor, 2006) to reinforce skills that lead to higher academic, social, and behavioral outcomes for this group of students (Kimball , Kinney, Taylor, & Stromer, 2003). Digital Storytelling is especially attractive because it makes use of technologies that currently exist in many classrooms (Becker, 2000) and has a basis in research-based principles for effective instruction for this population.

CHAPTER 3.

METHODOLOGY

Theoretical Framework

Brantlinger, Jimenez, Klingner, Pugach, and Richardson (2005) define qualitative research as "a systematic approach to understanding qualities, or the essential nature, of a phenomenon within a particular context" (p. 195). Although this perspective represents one aspect of action research, it may be somewhat oversimplified in its description. Qualitative research, while difficult to define with precision (http://xrl.us/qualitativedefinition; Denzin , Lincoln, 2005) is a research methodology that strives to investigate, understand, and give meaning to a particular case, setting, characteristic, or event. This approach is necessary **"**to uncover meaning via analysis of non-numerical data that come from multiple sources of information including interviews, observations, audio-visual materials, and existing and researcher-developed documents" (O'Conner, 2002, p. 80).

The role of the investigator is critical to participatory research (Creswell, 1998). In a qualitative study, the investigator is an instrument of the process. This individual "gathers words or pictures, analyzes them inductively, focuses on the meaning of the participants, and describes a process that is expressive and persuasive in language" (Creswell, 1998, p.14).

A case study is beneficial because it "investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2003, p. 13). A case study is an approach to research, as opposed to a data collection instrument or research design methodology, and is useful with quantitative and qualitative data (Yin,2003). Stoecker suggests that, "the case study is the best way by which we can refine general theory and apply effective interventions in complex situations" (p. 109). Case

study research is a useful strategy for nascent academic interventions such as Digital Storytelling because it provides a systematic framework to document and analyze continuous data as it develops and begins to emerge.

Creswell (2002) defines this as a bounded system. A bounded system, "means that the case is separated out for research in terms of time, place, or some physical boundaries" (p. 485). A bounded system may include "a program, events, or activities" (Creswell, 2002, p. 485). Examples of a bounded system may include students, faculty, school administration, community, and schools (Merriam, 1998). Adelman, Jenkins, and Kemmis (1983) suggest that a bounded system with clear limits is beneficial to the qualitative aspect of a case study. In the current study, the student represents a single component of analysis within a bounded system of technology, time, and classroom materials.

An orientation towards grounded theory is possible within the framework of qualitative methodology. Grounded theory allows the investigator "to develop theory through an iterative process of data analysis and theoretical analysis, with verification of hypotheses ongoing throughout the study" (Savenye & Robinson, 1996, p. 1177). Grounded theory is an iterative approach to theory development through an ongoing analysis of data (Chenitz,& Swanson, 1986).

The inductive nature of grounded theory allows investigators to develop a new understanding, hypotheses, and potential explanations from successive waves of data that emerge. A researcher, for example, might look at the first wave of data from the study, develop a tentative theory based on the data, and then collect more information to test the theory. They may proceed to the next wave of data if the current version coincides with the initial theory. Modifications to the theory are possible if the original explanation conflicts with a new set of

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relevant data. This process continues until there are no revisions to the theory or no data is available to interpret. Each point of data contributes and builds upon prior knowledge. The theories that emerges from within the study should encourage generalization to other settings and similar experiences (Jensen,Gwyer,Shepard,& Hack, 2000).

The need for qualitative research in the area of special education is urgent and immediate. Through qualitative studies, the potential exists to better understand the needs, perspectives, and challenges that individuals with disabilities experience in school, work, and family environments (Brantlinger,Jimenez,Klingner, Pugach, & Richardson , 2004).

A qualitative-based investigation of digital storytelling, within the context of a case study for a student with ASD, creates the potential for better understanding the complexities of this intervention. This study is particularly adaptable to a case study approach because of the parameters that exist for the individuals and objects studied (Merriam, 1998).

Setting

This section describes the setting and location for this case study. Background of the community and school district is explained. Student data of statewide scores is also provided.

The Community

Baton Rouge, Louisiana is located in the southeast section of Louisiana in the United States of America. Two universities and a community college are within the geographical boundaries of this city. In addition to the business and education sector, the state capitol is also located in Baton Rouge, Louisiana. Each of these factors contribute to the diverse level of education, earning potential, and quality of life for residents in this area.

The geographic location is ideal for international trade. The Port of Greater Baton Rouge Parish, one of the busiest in the nation, is situated on the Mississippi River, the second longest

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river system in North America. The strategic location of the port and its access to nonrenewable energy sources has attracted multinational corporations, industrial factories and chemical complexes Baton Rouge.

The census data from 2000 indicates that 412,852 residents live in East Baton Rouge Parish (U.S. Census Bureau, 2000). According to the U.S. Census Bureau, the following racial and ethnic groups live in this parish: Caucasian (53.3%), African American (43.3%), Asian (2.4%), Hispanic or Latino origin(2.2%), American Indian and Alaska Native (0.2%) (U.S. Census Bureau, 2000). Figure 3.1 represents the ethnic and cultural diversity of this county.
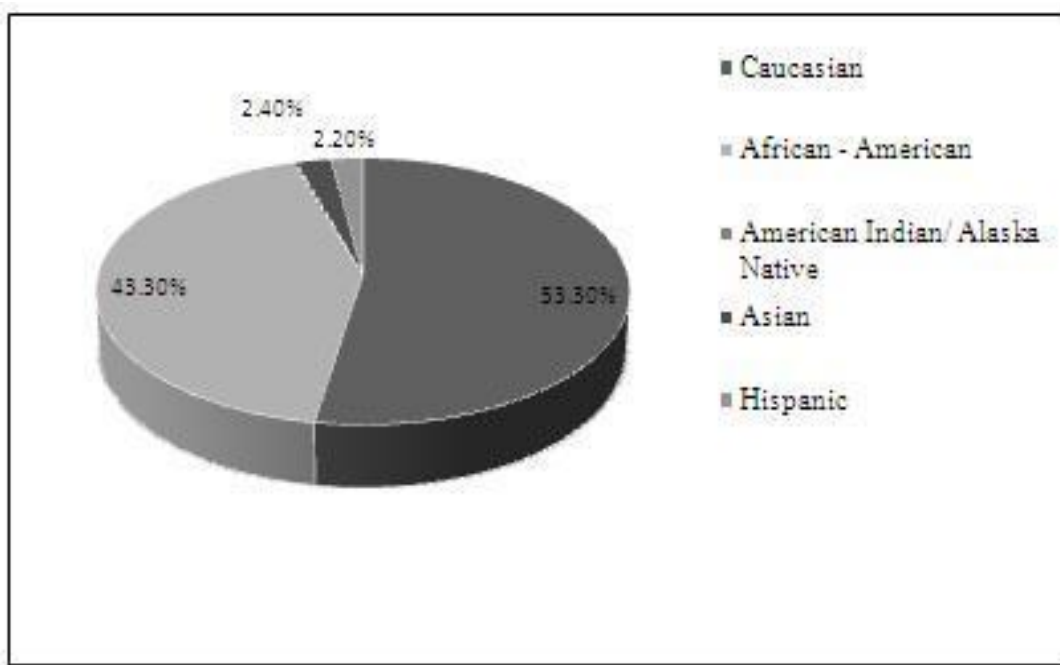
Figure 3.1. Ethnic Composition of East Baton Rouge Parish (U.S. Census Bureau, 2000)

The Educational System

On May 23, 2001, the 107th United States Congress passed Public Law 107-110, otherwise known as the No Child Left Behind Act of 2001 (NCLB). This congressional mandate requires elementary and secondary education programs that receive federal funds to demonstrate adequate yearly progress (AYP) in teacher quality and student achievement. Adequate Yearly

Progress (AYP) refers to the minimum level of academic growth needed to demonstrate satisfactory improvement on an annual basis. Individual states determine the criteria for each subject area. The ultimate goal of NCLB is for each student to achieve math, language arts, reading and science proficiency by the year 2014.

The Louisiana Department of Education (DOE) uses the Graduation Exit Exam (GEE), Louisiana Educational Assessment Program (LEAP), and the integrated Louisiana Educational Assessment Program (ILEAP) to assess student proficiency on specific skills in each grade level. Figures 3.2, 3.3, and 3.4 compare the state average scores of the LEAP and GEE to the results of students in East Baton Rouge Parish School District during the 2005-2006 school year.

Figures 3.2, 3.3, and 3.4 provide comparisons of the LEAP and GEE scores of students in the East Baton Rouge Parish School District and the state. More specifically, figure 3.2 compares the current fourth grade LEAP data in Science, English, and Math. Figure 3.3 is a comparison of eighth-grade LEAP scores. Figure 3.4 compares the GEE data between East Baton Rouge Parish School District and the state for the 2006-2007 school year.
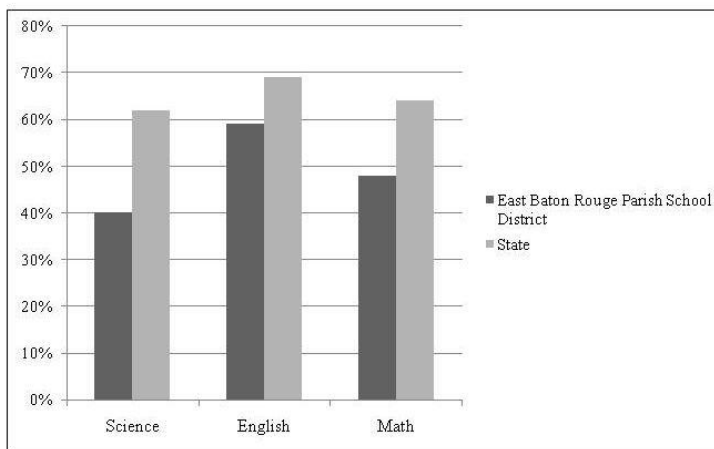
Figure 3.2. Comparison of 4th Grade 2006-2007 East Baton Rouge Parish School District and State LEAP Scores (Louisiana Department of Education, 2007)

Figure 3.3. Results of 8th Grade 2006-2007 East Baton Rouge Parish School District and State LEAP Scores (Louisiana Department of Education, 2007).

Figure 3.4. Results of 2006-2007 East Baton Rouge Parish School District and State GEE Scores (Louisiana Department of Education, 2007)

Background of Principal Investigator

In a qualitative study, the researcher is an "instrument of data collection" (Patton, 2002,p. 51), analysis, and interpretation (Lincoln and Guba, 1985). To make a significant contribution to the current literature, it is imperative that data collected from the study is "credible, trustworthy, authentic, balanced about the phenomena under study, and fair to the people studied" (Patton, 2002,p. 51). Geertz (1973) reminds us that a goal of a qualitative approach to research is to collect enough data to provide enough descriptive information to help determine meaning.

Figure 3.3. Results of 8th Grade 2006-2007 East Baton Rouge Parish School District and State LEAP Scores (Louisiana Department of Education, 2007).

Figure 3.4. Results of 2006-2007 East Baton Rouge Parish School District and State GEE Scores (Louisiana Department of Education, 2007)

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Merriam offers this explanation of the critical role an investigator brings to a qualitative research effort:

> Because the primary instrument in qualitative research is human, all observations and analyses are filtered through that human being's worldview, values, and perspective…The researcher thus brings a construction of reality to the research situation, which interacts with other people's constructions or interpretations of the phenomenon being studied. (pp. 22-23)

One objective of this study is to document this case study in a manner that retains the authenticity of the lived experience. Denzin and Lincoln (1991) urge careful attention to this aspect of a study because of the inherent subjectivity that exists. Subjectivity, they warn, is likely when the principal investigator attempts to describe the lived experience or observed phenomenon.

Within the context of educational research, the issue of subjectivity can become especially problematic (Eisner, 1998). Often, our descriptions of a qualitative phenomenon rely on linguistic formalities to help reduce the appearance of subjectivity. Eisner (1998) asserts, "we formalize our language as much as possible to depersonalize our presence in the works we create" (p. 45). One example of this, Eisner (1998) explains, is the tendency to use "the researcher," rather than "I," in reference to ourselves. Because of the interpretive nature of this study, and to situate myself within the context of this study, the first person use of "I" is used to clarify both the role and background of the researcher and the search for meaning throughout this investigation.

Living with Attention Deficit Hyperactivity Disorder (ADHD)

A substantial part of my graduate coursework has been devoted to high incidence disabilities within the field of Special Education. My interest in this area is due, in part, to both professional and personal experiences. Living with Attention Deficit Hyperactivity Disorder has given me a dual perspective; I can relate in many ways to the challenges students experience

with regard to their academic, social, and behavioral limitations, while recognizing the social and academic skills that are critical to educational, social, and economic independence.

The American Psychiatric Association defines Attention Deficit Hyperactive Disorder as a "persistent pattern of inattention and/or hyperactivity and impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development" (4th ed.; *DSM-IV*; American Psychiatric Association, 1994). Behavioral deficits represent one aspect of ADHD. The diagnostic criterion associated with ADHD requires that characteristics of this disorder occur over an extended period of time and in multiple settings.

I received a diagnosis of ADHD during my sophomore year in high school. In class, my behavior and social interactions were typical of individuals with this exceptionality; I was easily distracted, forgetful, and could rarely finish in its entirety. The difficulty I experienced with maintaining a sustained level of attention was an ever-present struggle throughout my education. Constant interruptions, excessive talking, and incessant levels of hyperactivity were the hallmarks of my behavior. My situation is unique, in that a formal identification came much later than most individuals in this population. Although I exhibited the typical behaviors associated with ADHD throughout my elementary and high school matriculation, my parents did not seek a professional opinion until my teenage years.

In many ways, I can identify with the experience of my students with Autism. The organization of my classroom, the instructional approaches that I use (i.e., an emphasis on visual cueing), and the behavioral management practices that I use each reflect my own experiences of living with impaired attention and hyperactivity. Perhaps, the success of this approach in my class reflects the potential comorbidity of ASD and ADHD. Ghaziuddin, Ghaziuddin, and Greden (2002) explain, "Preliminary data suggest that a significant number of higher functioning

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children with autism/Asperger syndrome present with hyperactivity, impulsivity, and distractibility (meeting the criteria for the diagnosis of attention deficit hyperactivity disorder)…"(p. 301). Ovsanna T. Leyfer et al. (2006) acknowledge the diagnostic challenge when an individual meets the criteria for ADHD and Autism; "It has not been clear in the past how to diagnose ADHD in persons with autism because of these unusual and idiosyncratic attention-inattention patterns" (p. 857).

Graduate Work in Special Education

In 2002, I completed an undergraduate degree in American History from the University of Missouri-St. Louis. I chose to enter the field of special education through an alternative path to certification. I completed a master's degree in Education from Northwestern State University in 2004. I hold a certification in Mild Moderate Special Education for grades k – 12.

Classroom Experience

My first year as a teacher was in a classroom for students with severe and profound cognitive disabilities. My second and third year as a teacher, I worked with higher functioning elementary age students identified with emotional disorders and ASD.

For the last two years, I have taught at my present location. It is an elementary classroom for students with ASD. I currently have three students, each at various levels of functioning. Two students attend their core subjects with the general population, and the other is in my classroom for the entire day. Two of my students are in the fourth grade, the other is in the sixth grade.

Conference Presentations Related to ASD and ADHD

Throughout my graduate studies, I have devoted my academic interests to the area of ADHD and ASD topics in education for students in special populations. My thesis topic to complete a Master's degree in Education from Northwestern State University, for example,

examined classroom interventions and instructional approaches for students with ADHD. As a doctoral candidate at Louisiana State University, I have presented at state, national, and international education conferences relevant to the area of ASD and ADHD. I have been invited to present at the following conferences about ADHD and ASD related topics: Louisiana Super Conference on Special Education, Baton Rouge, Louisiana (2006), Midwest Symposium for Leadership in Behavior Disorders, Kansas City, Kansas (2006), National Rural Education Association Convention, Tucson, Arizona (2005), 16th Biennial world Conference World Council for Gifted Children, New Orleans, Louisiana (2005), and the Northwest Regional Educational Laboratory Annual Convention, Portland, Oregon (2005).

Subject

Jessica, a sixth grade student with high functioning Autism, is a possible candidate for this case study. Jessica is a student in my class. Although she is a member of my class, Jessica receives instruction with the general population for math, science, reading, English language arts, and social studies. To accommodate her sensory limitations, Jessica returns to my classroom at designated times throughout the day to complete her assignments, study for tests, or work on school projects in an environment that is more suitable to her needs. Additionally, I have established rapport with her family.

The choice of Jessica for this case study on Digital Storytelling is based on the following: a) her ability to function with the general population b) the skills she demonstrates in my class with the use of technology and multimedia formats c) her ability to generalize academic, social, and behavioral strategies from my class to her classes with the general population. Moreover, her parents, through informal conversations, express an ongoing interest

with interventions that may lead to improved outcomes in literacy related areas for Jessica. At this time, there is no formal agreement with her parents to carry out this intervention.

Participant Selection

A useful sample is the cornerstone of a quality study. The selection of each participant depends on their ability to provide insight and detailed information to a particular research area. The goal, Patton (1990) suggests, is to locate cases that are "information-rich" (p.169). Jessica seems to be an ideal candidate for this case study because she is identified with ASD and possesses the necessary computer skills needed to provide more insight, descriptions, and information on the potential effectiveness of Digital Storytelling as a literacy intervention. Moreover, Jessica functions at a high academic, social, and behavioral level. She currently demonstrates a prior knowledge of the audio, visual, and computer-based technology that is essential for a successful Digital Storytelling experience.

Site Location

Patton (1990) suggests that the "logic and power behind purposeful selection of information of informants is that the sample should above all be information rich" (p. 169). An appropriate site location, consistent with the goals of the study, provides the foundation for useful information and inquiry. Marshall and Rossman (2006) delineate the following criteria for the site location of a qualitative study:

> A realistic site is where (a) entry is possible; (b) there is a high probability that a rich mix of the processes, people, programs, interactions, and structures of interest is present; (c) the researcher is likely to be able to build trusting relations with the participants in the study; (d) the study can be conducted and reported ethically; and (e) data quality and credibility of the study are reasonably assured (p. 62).

The site for this case study is the public library located in the community where Jessica lives and attends school. Consideration was made to locate a site for this study that was familiar to Jessica. Additionally, two factors contributed to this location of this public library as an ideal

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setting for this case study; (a) the parents request that any future study involving Jessica does not interfere with her current class schedule or instructional day and (b) Jessica is familiar with this library as the location of previous afterschool tutoring sessions.

The library in this community is one of the newest in East Baton Rouge parish. Built in 2005, the 12,086 square foot facility includes an area for reading, large group gatherings (capacity for 75 people), and separate rooms for individual or small group use. Personal computers for the public are available throughout the facility, including the large meeting room and the spaces designated for computer and class use. Patrons can reserve any of the rooms for meetings, presentations, or after school tutoring.

For a case study to yield meaningful results, meaningful interactions between the participant and the investigator are an essential component. Lincoln and Guba (1985) note, "in order for the human instrument to use all of [his or her] abilities to the fullest extent possible, there must be frequent, continuing, and meaningful interaction between the investigator and the respondents" (p. 107). Jessica will spend time each day with the principal investigator on various aspects of the Digital Storytelling process. The interactions, dialogue, and experiences of this instructional approach will provide the qualitative data, analysis, and descriptions throughout each level of the Digital Storytelling process.

The intervention will take place after school at a public library located near the school. The length and format of each session was flexible, and was carried out on a daily basis for approximately four days a week. Some sessions were also held on the weekend. While the overall structure of each session relied on the progress of the prior meeting, the expected timeframe for this study will range from approximately four to nine weeks.

Role of the Researcher

In a qualitative study, the primary investigator is often responsible for data collection, management, and analysis. Merriam (1998) argues that the role of the researcher is critical to understand and place within the context of the study.

> Because the primary instrument in qualitative research is human, all observations and analyses are filtered through that human being's worldview, values, and perspective…The researcher thus brings a construction of reality to the research situation, which interacts with other people's constructions or interpretations of the phenomenon being studied. (pp. 22-23)

I have a strong background in the use of technology within a classroom setting. Although my training has not specifically been in the area of educational technology, my activities outside of the classroom have helped cultivate a deep understanding of current trends with the use of technology in a classroom setting. My website (brentdaigle.co.cc) and blog (blogbrentdaigle.co.cc) to fellow educators provide evidence of my familiarity with the applied use of technology in an educational setting. This information is relevant to the study because of the potential bias it presents. I must remain aware of my skill level in relation to the subject's familiarity with multimedia technology. Throughout this study, I must ensure that my current understanding of technology adaptability for the purpose of Digital Storytelling does not influence or impose itself on research process.

Bias

Merriam recognizes that "biases or subjectivity shape the investigation and its findings" (p.23). Although this may be a potential limitation of the study, proactive efforts can reduce the impact of bias on the outcome of the investigation. The goal, Maxwell (1996) argues, "…is not to eliminate bias but to understand how values influence the conduct and conclusions of the study" (p. 91).

An extensive effort to reduce the negative effect of bias on the results of this study will ensure the reliability of this investigation. Transparency of the process, triangulation of the data, and an audit trail that clearly delineates each part of the study will help ensure the trustworthiness of the researcher and the reliability and internal validity of the study.

A certain level of responsibility is inherent to the researcher because of their role as an instrument in the study. This aspect reveals the character and ethics of the principal investigator. It is for this reason that my role as an instrument to the study will be carried out with professionalism, structure, and fidelity.

Data Collection Procedures

A grounded theory paradigm, within the context of a case study, relies on multiple sources of data to build, shape, and extend knowledge of a particular concept (Eisenhardt, 1989). A typical study based on qualitative methodology includes participant observation, interviews, and a review of relevant documents and records (Creswell, Hanson, Clark, & Morales, 2007). The goal of this study is to provide descriptive insight and analysis of the potential use of Digital Storytelling as an instructional approach with students in a classroom setting for ASD. To achieve this objective, three sources of data was collected.

Observation

Creswell (2002) explains that a researcher may carry out the role of participant observer, non-participant observer, or a combination of both. In the present study, participant observation is an essential part of the data collection methodology. This approach allows the investigator to consider each interaction, challenge, and aspect of Digital Storytelling as a potential classroom intervention for students with ASD. As questions arise, and then are resolved, new questions will

emerge. This iterant process of observation through active participation and inquiry continues until each question, issue, and theme reaches saturation (Sterk et al., 2006).

Participant-observation used in this study helps clarify and better understand the data as it is collected. Observational data in each session provides the basis for further reflection and analysis. My role as a participant-observer provides the opportunity to better describe and catalogue each aspect of this intervention.

Triangulation of data helps compare and ensure the accuracy of multiple data points and sources of the same event (http://xrl.us/Triangulation). Triangulation helps strengthen the reliability of the sources and the internal validity of the study. Observational data becomes an important piece of triangulation that occurs later in the study. Adler and Clark (2003) advocate the use of participant observation when the research area is an emerging phenomenon or when the environmental or social situation changes at a rapid pace. The time spent on this intervention each day lends itself to participant-observation as a valid instrument for documenting the Digital Storytelling process with Jessica.

Interview

The effectiveness of some qualitative data collection methods, such as the use of an interview, may be problematic for individuals with impaired expressive communication skills (Lloyd, Gatherer, & Kalsy, 2007). The limited research on individuals with delays in expressive communication in the area of the use of interviews as a valid research instrument suggests that its usefulness is best determined on a case-specific basis (Lloyd, Gatherer, & Kalsy, 2007).

The format used for an interview is critical to the outcome of the study. Although variations exist, there are generally three separate interview formats used for qualitative research purposes (Myers & Newman, 2007). A structured approach asks the interviewee a set of

questions that is prepared prior to the meeting. Although the validity of a structured interview tends to be impressive (Schmidt & Rader, 1999), the format does not promote opportunities for deviation from the explicit goals of the study. A group interview allows the researcher an expedited method of data collection from a large group of participants. A group interview has the potential to present multiple viewpoints, perspectives, and opinions for the researcher to later consider, analyze, and develop (Powell & Single, 1996). A semi-structured interview begins with a partial script, however its purpose is to help guide the interview towards a general theme. The flexibility of a semi-structured interview allows the researcher to acquire more descriptive and detailed information on a given research topic (Hamilton & Bowers, 2006). The type of interview selected for data collection purposes should align with the goals of the study; a semi-structured interview format is the approach used in this study.

A semi-structured interview often begins with a flexible set of open-ended questions that help direct the conversation towards a general area of the research topic. The ethical considerations of an interview guide the appropriateness and need for this instrument in a research study. An interview provides further considerations and details of the study. For this reason, it is imperative that the researcher approach the subject matter and interviewee with impartiality, sensitivity, and thoughtfulness.

When carried out with fidelity, a semi-structured interview allows an investigator to explore a particular aspect of the research question with more detail and consideration. Patton advocates six types of questions that are relevant to a semi-structured interview: those based on experience, opinions, feelings, knowledge, sensory experience, and background information (p.292). This framework will guide the interview format with Jessica and members of her family.

A semi-structured interview with the parents and the subject is an essential part of this study, as it may provide critical insight into the struggles, limitations, and achievements experienced by a family member with ASD. Additional interviewees may include other professionals, such as the speech therapist, school counselor, and former teachers, who have close knowledge of the subject. The cumulative data from these interviews generated new insight, suggestions, and ideas related to the introduction and implementation of Digital Storytelling for Jessica. Table 3.1 is a table shell of the semi-structured interview format used in this study.

Table 3.1. Table Shell for Interview Format Used in this Study

Type of Question	Information Collected	Example
Experience		
Opinions		
Feelings		
Knowledge		
Sensory Experience		
Background		

Documents and Artifacts

Documents, such as historical records, personal artifacts, and journals are an information-rich source of accessible data that has the potential to make a significant contribution to a research study in the area of Special Education (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005). Merriam (1998) explains the integration and analysis of documents in a qualitative study as a two-fold contribution. The first relates to the convenience and accessibility of critical records and documents. The collection and analysis of documents provides a non-intrusive method of data collection. The research setting and participants remain unbiased or

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altered from this type of inquiry. The second aspect relates to the impartiality of multiple data sources. Merriam notes that documents are not "…dependent upon the whims of human beings whose cooperation is essential for collecting good data through interviews and observations" (p. 112).

A majority of the documents used for analysis in this study currently exist. The school historical record for the subject of this case study included a narrative writing samples, notes from parent-teacher conferences, drawings, standardized assessments, and report cards. An additional source of information emerged from the study. Merriam (1998) emphasizes the importance of research-generated documents created throughout a qualitative study. Journals, field notes, transcripts, and activity logs each contributed to the overall reliability and internal validity of this investigation. Each document addressed the larger research questions in this study.

Data Analysis

This section describes the methods for data analysis used in this case study. Three separate sources of data contributed to the findings of this investigation. Triangulation was used to ensure the validly of the participant observation, interviews, and documents collected throughout this research.

Coding

Coding is an essential part of the data analysis process. Adler and Clark (2003) define coding as, "associating words or labels with passages in one's field notes or transcripts" (p.503). O'Rouke (2000) explains that coding data facilities with the organization and analysis of the data that is collected. The data analysis used in this study is an adaptation of the three iterate stages suggested by Anfara, Brown, and Mangione (2002); coding, trends, and theory building.

During the initial stage, codes are assigned to the themes, patterns, and insights that develop in the study. These codes were entered into Weft QDA for analysis and exploration. Weft QDA, a computer program assised with the analysis of data in this study and helped examine the trends in each of the " text documents, and doesn't make any particular assumptions about how to think about and generalise from [the] data" (Fenton, 2006, p.1).

The second stage of data analysis attempts to explore the themes and trends that develop from the assigned codes. Attempts are made to integrate codes with similar themes, characteristics, and responses. The goal is to saturate this data to a level that is manageable and responsive to further analysis and explanation.

The third stage of data analysis relates to the advancement of theory based on the results of this study. Anfara, Brown, and Mangione (2002) advocate that, throughout each stage of data collection and analysis, the investigator maintains a level of transparency and openness towards the process. This allows examination of the study from other individuals, and may extend the research into unexplored areas of related topics.

Triangulation

The triangulation of data contributes to the authenticity and trustworthiness of the information collected throughout this study. Creswell (2005) suggests that triangulation is a characteristic of a well-designed study:

> Triangulation is the process of corroborating evidence from different individuals, types of data, or methods of data collection. . . . This ensures that the study will be accurate because the information is not drawn from a single source, individual, or process of data collection. In this way, it encourages the researcher to develop a report that is both accurate and credible. (p. 252)

The observations, interviews, and documents used in this study to answer the research questions related to Digital Storytelling for an individual with ASD will be triangulated to ensure reliability and internal validity of the data.

Graneheim and Lundman (2002) note that "Research findings should be as trustworthy as possible and every research study must be evaluated in relation to the procedures used to generate the findings" (p. 109). Constas (1992) suggests a documentation table to help "…make explicit the configuration of actions and temporal qualities associated with category creation in a given study" (pp. 256-257). The public disclosure of each stage of this process, in addition to an organization of the data into a format that is structured and systematic, will contribute to the trustworthiness of this study. The audit trail that results from this study will be on display as final evidence of the reliability and internal validity of this study. Data will be collected until a level of saturation is met. Once each aspect of the research question is addressed, the implications of Digital Storytelling as a useful intervention for students with ASD will be considered. Figure 3.5 represents the triangulation of data used to address each research question.
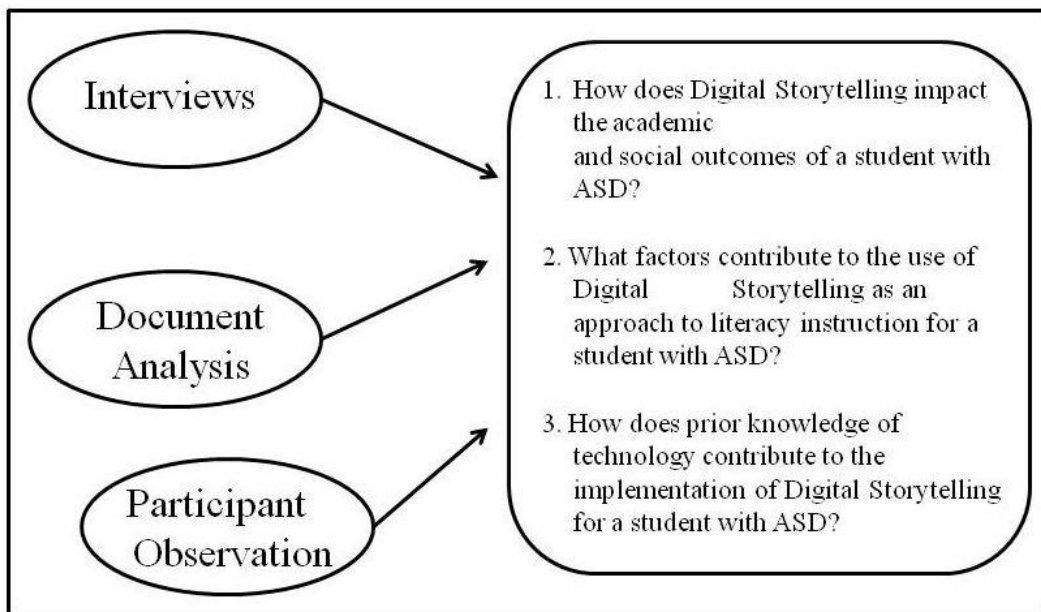
Figure 3.5. Data Collection Methods

Summary

This study uses an exploratory single-subject case study design to investigate the potential use of Digital Storytelling in a classroom setting for students identified with ASD who function at a high academic and social level. The data collection procedures chosen for this study address the research questions with thoroughness and detail. The multiple sources of data and data collection methods are used to triangulate and make inferences about the research questions. Trustworthiness of this study increases through the transparency of the process, methods, and data analysis procedures used to address the central goals of this study.

In chapter 4, I will report the findings from this study. In chapter 5, I provide an analysis of these findings and discuss the implications for future research with Digital Storytelling in educational settings.

CHAPTER 4.

FINDINGS AND ANALYSIS

Introduction

In this chapter, I present the results of data collected and analyzed for the purposes of this study and provide analysis and discussion to the following research questions: (a) How does Digital Storytelling impact the academic and social outcomes of a student with ASD, (b) What factors contribute to the use of Digital Storytelling as an approach to literacy instruction for a student with ASD, and (c) How does prior knowledge of technology contribute to the implementation of Digital Storytelling for a student with ASD? This chapter begins with an overview of the challenges Jessica experiences with ASD. The remaining section presents the findings of the case study.

Data collected from three sources contributed to the results of this study. The multiple data sources used for this study included participant observation, interviews of key informants and analysis existing strategic documents. The first source, observational data and resultant field notes, helped identify transformational change as it occurred throughout this study. For example, field notes written after each session helped to quickly assess the appropriateness and progress of this intervention. The second data source, interviews with Jessica, her family, and her teachers, provided insight into the pedagogical framework and instructional approaches lending themselves to broader implementation of Digital Storytelling. Thirdly, a review of documents and artifacts as data related to her experience in school was useful in implementing this intervention based on her learning style and unique educational needs. The documents and artifacts examined in this study were critical to understanding the contribution of this

intervention for Jessica. Table 4.1 highlights data sources that informed this study and timeline for collection.

Table 4.1. Data Sources and Data Collection Timeline

Data Collection Timeline	
Procedure	Date
Study Proposal	March 4, 2008
IRB Submission	March 7, 2008
IRB Approval	April 10, 2008
Smith Interview	April 13, 2008
Jessica Interview	April 16, 2008
Smith Interview	April 23, 2008
Harold Interview	April 24, 2008
Hill Interview	April 27, 2008
Davis Interview	May 12, 2008
Hill Interview	May 15, 2008
Epps Interview	May 28, 2008
Digital Storytelling Session Field notes	April 19, 2008
Digital Storytelling Session Field notes	April 20, 2008
Digital Storytelling Session Field notes	April 23, 2008
Digital Storytelling Session Field notes	April 26, 2008
Digital Storytelling Session Field notes	April 27, 2008
Digital Storytelling Session Field notes	April 9, 2008

(Table 4.1 Continued)

Data Collection Timeline	
Procedure	Date
Digital Storytelling Session Field notes	April 10, 2008
Digital Storytelling Session Field notes	April 16, 2008
Digital Storytelling Session Field notes	April 17, 2008
Digital Storytelling Session Field notes	April 20, 2008
Digital Storytelling Session Field notes	April 24, 2008
Digital Storytelling Session Field notes	April 25, 2008
Digital Storytelling Session Field notes	April 27, 2008
Digital Storytelling Session Field notes	April 30, 2008
Digital Storytelling Session Field notes	April 31, 2008
Document Review	April 27, 2008
	May 12, 2008
	May 19, 2008
	May 28, 2008

Participant Observation: 11.25 Hours
Interviews: 4.0 Hours

Assurance of Confidentiality and Approval

Jessica and her parents signed a declaration of informed consent to participate in this study. This agreement permits the use of audio and videotape during each Digital Storytelling session for the express purpose of research documentation, inquiry, and analysis. The

Institutional Review Board (IRB) at Louisiana State University, after examining the research protocols and materials that are part of this study, gave their approval on April 10, 2008.

Scope and Generalizabilty

Walton (1992) suggests that, "case studies are likely to produce the best theory" (p. 129). While the goal of this case study is to extend and build upon the existing theoretical foundation regarding approaches designed to assist children with ASD in areas of literacy development and related to the use of Digital Storytelling, the reader should remain aware of the scope and generalizabilty from these findings. Jessica represents an ideal case for this intervention. The questions I examined represented an attempt to contribute to the limited research on Digital Storytelling for students with ASD. The research findings, therefore, lend itself to a specific application of Digital Storytelling as a literacy intervention for a high functioning student with documented ASD. Interpretations and future applications from this case study should be understood within the parameters of moderatum generalization. The interpretive nature of this effort does not attempt, "to produce sweeping sociological statements that hold good over long periods of time" (Payne & Williams, 2005, p. 297), but instead provides the framework for future research to either refute or confirm these results, "through further evidence" (p.297).

<div align="center">

Presentation of Descriptive Characteristics of the Case

</div>

Pseudonyms are used throughout this study for all individuals referred to by name. Jessica is the middle of three girls. Her father works as a welder. Her mother currently works as a fulltime homemaker with no outside employment. Her Grandmother, Cathy Smith, is a strong influence and support to Jessica and her family. Jessica and her family live in the house adjacent to Ms. Smith on the same property. At the request of the parents, Ms. Smith provided background information about the medical, academic, and behavioral history Jessica has experienced to this point. Ms. Smith holds a graduate degree in psychology and works in the

mental health field as a rehabilitation counselor. Her contributions added deep insight and overall depth to the study.

Jessica was born full term on September 1, 1995. There were no complications associated with the pregnancy. Jessica's mother, "had excellent prenatal care" (Smith, personal communication, April 13, 2008), complied with the advice of her doctor, and had a natural delivery with no complications.

Jessica seemed to reach all of the developmental milestones during her first twelve months. She was an, "active, happy baby" (Smith, personal communication, April 13, 2008) who showed, "all of the signs of normal development" (Smith, personal communication, April 13, 2008). The pediatric notes during this time appear to support this observation. Each well baby visit during the first year indicates that Jessica, "…is within normal limits" (Pediatric notes) for social, physical, emotional, and intellectual development.

All of this changed after Jessica received, "those first immunization shots" (Smith, personal communication, April 13, 2008). Around fifteen months of age, Jessica began to exhibit behavior, social, and emotional shifts in her development. Ms. Smith explains how these factors ultimately led the family to initially become concerned for Jessica:

> All of a sudden, it was like this child – she was there one day
> and gone the next--like a blank stare…distant eye contact. We
> first noticed [these changes] in the baby bed. All of a sudden,
> she was banging her head [on the bed]. I mean, you know,
> like she meant it. We thought, maybe she's having some headaches
> or some pain. We had her checked out and nothing was found (Smith, personal
> communication, April 13, 2008).

Gradually, Jessica began to withdraw from social interactions with others. Jessica began to exhibit episodes of intense agitation and resistiveness to family interactions. For example, Jessica preferred isolation to interaction, struggled to engage in conversation with others, and was increasingly disturbed and agitated by loud noises around her. Smith describes how Jessica,

"emotionally withdrew" (Smith, personal communication, April 13, 2008) from members of the family, seldom made eye contact with others, and was reluctant to give affection of any kind. She would sit on her rocking horse and, "rock for hours…to the point where she [eventually] knocked a big hole in the wall" (Smith, personal communication, April 13, 2008).

The family sought the opinion of their pediatrician for insight into the sudden onset of behavioral changes and affective instability. The doctor explained that her, "behaviors [are] consistent with a diagnosis of Autism … such as engaging in excessive, repetitive behavior and strong reactions to noises or smells" (Pediatric Notes). Prior to receiving a diagnosis of Autism, it is common that other possible causes should first be eliminated. Meanwhile, the pediatrician recommended a behavior management plan that emphasized appropriate interactions and helped reduce family stress.

The grandmother first tried a series of behavioral strategies. Although Jessica responded well to some of the approaches, the overall results were mixed. After a period of assessment protocols, a dual diagnosis of Autism and Attention Deficit Hyperactivity Disorder was made on August 8, 2002, at nearly seven years of age. The medical notes from this visit suggested that family members, "allow a quiet place if she becomes overexcited and monitor for self-mutilation" (Pediatric Notes).

A pharmacological regime with anti-psychotic medication was used to mitigate behaviors associated with self-injury and aggression. Unfortunately, according to interview data, this did little to improve her condition. Her behavior deteriorated to a point that she required urgent attention. At the recommendation of her grandmother, Jessica was committed to a mental health facility for additional evaluation. Smith explains the reason for this decision:

> We had to take her to [the local hospital] one night because we were noticing that she kept doing repetitive things; like spinning…for hours. She'd get into the middle of a room and just spin like a top. Now I recognize it, and we recognize it now, as trying to calm herself down (Smith, personal communication, April 13, 2008).

Cognitive, Communication, and Language Development

Her cognitive growth, especially in the area of communication and language, seemed to progress at a normal developmental rate. Communication and social skills during the first year of life also seemed consistent with typical development. Around the age of one, following the first round of immunization shots, there was a marked difference in the rate of progress with language and communication (Smith, personal communication, April 13, 2008).

All verbal communication ended from the age of one until three and a half. Both her family and the medical professionals who treated Jessica were unable to understand the reason for her mutism. During this period of time she would indicate her needs by making vocalizations and pointing. When verbal communication resumed, her speech was described as, "...one-sided" (Smith, personal communication, April 13, 2008) with inconsistent patterns of speech (Educational Diagnostician documentation).

The language skills Jessica exhibited were, "fragmented" (speech therapist documentation). Her expressive communication skills were guarded, "did not speak with complete sentences" (speech therapist documentation). Since this time, communication has been a struggle in the areas of receptive and expressive language development. Interviews with her family members and teachers, as well as the documents from her pediatrician and school officials, emphasized the ongoing and persistent challenges Jessica experienced in the area of language production, speech processing, and comprehension.

Initial Formal Schooling

      The adjustment into kindergarten was demanding to the family and school personnel. In many ways the communication, behavioral, and social challenges her parents began to notice during the first years of her life became more intense during the transition from home to school. Her behavior was often irrational and, "out of control" (Smith, personal communication, April 13, 2008).

      At home, Jessica would draw pictures, color, or rock on her toy horse. She continued to have minimal interactions with other family members. Her grandmother and parents made a concerted effort to accommodate her sensory limitations. At school, she exhibited similar patterns of behavior and personality characteristics. The sensory experiences within a typical classroom environment of twenty students was overwhelming for Jessica (Smith, personal communication, April 13, 2008).

      Analysis of school records from kindergarten offer detailed accounts of challenges she experienced during the first year of school. On most days, Jessica would exhibit a range of, "unpredictable behavior" (Kindergarten Teacher documentation). Temper outbursts, negative emotions, and unpredictable behavior were typical interactions between Jessica and her teacher. Her behavior sometimes was a danger to herself and others in the class.

      At home, family members experienced similar problems. Jessica only wanted to draw and watch cartoons. If anyone tried to divert her attention from these activities she would become aggressive. Family members recall how she was, "preoccupied with mundane objects. She has a strong interest in horses and cartoon characters" (Smith, personal communication, April 13, 2008). The lowest point in kindergarten came when, "she started pulling her hair out, biting

herself [hand], and pinching the kids in her class" (Smith, personal communication, April 13, 2008).

The impact of her behavior on the family is difficult to fully describe or understand. Smith recalled, "it was like she was on full out-and-out attack. That's what was noticed early on, I mean she was just wild. I don't know any other way to put it" (Smith, personal communication, April 13, 2008). Ultimately, Jessica returned a second time to a mental health facility to adjust medication and try different behavioral modification approaches.

The social, communication, and behavioral challenges Jessica experienced the first year of school affected her overall academic success. Informal documentation from kindergarten provides evidence of the substantial challenges Jessica experienced in literacy areas. There were, "no strengths noted in reading" (teacher documentation). Her handwriting consisted of, "tracing dotted line patterns and copying single or isolated patterns" (teacher documentation). At the suggestion of school officials, her parents chose to retain Jessica another year because of the, "limited progress she made in reading, writing, communication, and behavior" (Kindergarten documentation).

In addition to the social and behavioral challenges Jessica experienced her first year in school, delays were also noted in the area of reading development. In particular, "sound blending, letter association, and reading comprehension" (Kindergarten documentation) were especially problematic for Jessica. Often, her behavioral outburst would occur when she was asked to perform a task that was extremely challenging and stressful, "such as writing, reading, or changing activities" (Kindergarten documentation).

Educators who worked with Jessica had no prior experience of teaching students with Autism. They relied on advice and support from the family to guide instructional planning.

Teaching strategies that addressed a diverse range of instructional, social, and behavioral goals were used to better serve her needs. It was, according to Smith, a "trial-and-error-do-what-you-can-approach" (Smith, personal communication, April 13, 2008).

Basic social gaming skills, like turning taking and appropriate peer interactions, often did not conform to behavioral expectations. Her teacher integrated adaptations to the curriculum to better meet her needs. There was often little response to these modifications. She, "always wanted to be right and when she didn't understand something she would put her head down and refuse to even try" (Teacher documentation).

Those who worked with Jessica soon began to recognize a unique strength in the area of memory recall. Family members first noticed this phenomenon. Ms. Smith explains that a cartoon, movie, or song heard for the first time was often committed to memory. Jessica would memorize entire movie scripts, songs, and plays. She especially enjoys plays; when she sees a play for the first time, "she remembers it ...it's like ... watching a Broadway show ...and she remembers it" (Smith, personal communication, April 13, 2008).

Jessica soon began to use this ability to memorize large amounts of information as a strategy in class. This method allowed her to compensate for the deficits in both cognitive and academic functioning. Within a regular education setting, she would memorize entire parts of the lesson to complete her daily activities, finish classroom assignments, and pass tests (Jessica interview). Teachers eventually began to use instructional strategies that promoted memorization of content. With this skill, Jessica slowly made progress in the core academic subjects.

Advancement at 5 Years of Formal Schooling

Although her academic functioning in many areas was close to her peer group, behavior was an ongoing impediment to continued, advancing academic progress and growth. In the

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fourth grade, these persistent challenges with inappropriate social interactions and classroom

behaviors finally lead to a reevaluation of her educational placement.

The following communication between home and school demonstrates range of behaviors

she exhibited throughout the school year:

> 11-28-05
> This afternoon [Jessica] kept biting herself all in her hands and arms. I brought
> her to the office and was told to bring her to the clinic. I showed the clinic her
> hands and arms. I asked her [i.e., Jessica] why she was doing that and she told me
> that she didn't know.

> 2-11-06 (8:50 am)
> [Jessica] would not sit at the kidney table when told. She was warned 2 times to
> sit down, she refused to do so. [Jessica] threw her chair on the floor (Teacher
> documentation).

A meeting was held near the end of her fourth grade year to discuss alternative placement

for Jessica. Although her academic functioning was on an appropriate grade level, her behavior

interfered with the classroom environment and was a barrier to her ongoing academic and social

growth. After a careful review of her Individualized Educational Plan (IEP), the IEP committee

made a decision to move her from the general population to a self-contained Special Educational

setting. The goals on her revised IEP highlighted social interaction and behavior by indicating

that social and behavioral skills, in addition to meeting the core curriculum requirements, would

be addressed on a daily basis. While the IEP committee recognized the immediate need for an

educational setting that provided substantial adaptations to the curriculum, they also understood

the importance of education in a regular classroom setting.

Ms. Smith, who participated as a member of the IEP committee, stressed the temporal

quality of this new educational placement. Smith maintained that Jessica should return to the

general population as soon as her behavioral and social skills were at a level that would allow her

to function in a general education setting. For Jessica to remain on an educational path towards a

high school diploma, Smith argued, it was imperative for her to expeditiously return to the general population. The IEP committee gave an assurance that, once she was able to regulate her emotions and thus exhibit appropriate behavior to changing situations, as well as demonstrate a proportionate response to diverse situations, she would be able to return to an educational placement with the general population.

EBR has a limited number of elementary classroom programs for students with ASD. The school she attended from kindergarten until fourth grade did not have special education services for students with ASD. The school where I taught was the closest location to Jessica for ASD related services. In the beginning of her fifth grade school year Jessica transferred to my self-contained classroom. All of the students in my classroom are identified with ASD. The students in my classroom exhibit a range of functioning from moderate to mild.

Jessica in a Self-Contained Educational Environment

Initially, the transition to my classroom was difficult. Adjusting to an unfamiliar school, a different set of classmates, and a new teacher caused a considerable amount of anxiety for Jessica. Her initial reaction was to internalize these changes. During this time, she came to her desk, would not interact or speak to anyone in the classroom, and seemed to have an excessive preoccupation with her hair and hands. Throughout the day she would pull at her finger nails, twist her hair, or constantly scratch her arm. This behavior sometimes lasted throughout the entire day.

The speech therapist, Ms. Harold, experienced similar behaviors when she first attempted to provide services to Jessica. Harold explains, "I do small group pullout. I would pull Jessica [from class]...she was reluctant to come with me at first because she didn't know me. It took *a lot* of coaxing [for her] to come" (Harold interview). Eventually, "she would come into the

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classroom, but once she got there, she was, for lack of a better word, a little standoffish" (Harold interview). Her behavior, "was not the norm" (Harold interview). Over time, her behavior became less problematic and she made some improvement in the speech therapy sessions. Each session, however, was an ongoing challenge; "she [Jessica] had to be redirected to attend to and stay on task" (Harold interview).

Shortly after Jessica came to my classroom it became clear that her ability level was substantially higher than my other students. Although the initial transition was difficult and challenging, I was impressed with both her academic skills and her strict adherence to her own internal system of organization, planning, and routine. She seemed to have a way of processing and comprehending large amounts of new information through a reliance on visual cues and multisensory integration.

Consideration of these factors influenced my decision to select Jessica for this case study. Digital storytelling requires a working knowledge of technology use, writing ability, and creativity. The other students in my classroom did not possess the necessary skills and knowledge base to meet the demands of this intervention. I was intrigued with Jessica, in part, because of the way she integrates relevant technology use as part of her daily schedule. Jessica was an ideal candidate for this case study as well because her strengths and level of functioning allowed me to closely examine the feasibility and impact of this intervention. From a research perspective, she represents an ideal case to deeply examine and analyze the complex processes and outcomes of Digital Storytelling.

The fall of 2006 was my earliest recollection of working with Jessica. My initial experiences with her were similar to the accounts given by her previous teachers. She exhibited a range of behavior throughout the day. It was difficult to predict or anticipate her reaction to any

given situation. The range of social interactions with her peers or me was variable and unpredictable. It seemed that Jessica, on some days, was more social than others. Other times, she would exhibit impaired levels of social and behavioral functioning that may include depression, tantrums, or aggressive behavior.

There was little predictability associated with the success of her day. For example, when she arrived in the morning part of her routine was to greet both the adults and students in the classroom. Most days, she would participate in the lesson, cooperate with her peers on a classroom activity, or finish a task from an earlier lesson. Other times she became withdrawn, shy, or would refuse to interact with anyone.

Anxiety, depression, and nervous behaviors were common for Jessica when she first arrived in my class. On some days she would talk incessantly, fidget with her hair, constantly rearrange the materials on her desk, or exhibit frantic behavior. Other times she would become angry and defiant if either corrected by an adult or when upset with a peer. Some days she would enter the classroom, place her head on the desk and refuse to speak or engage in any interactions with others throughout the entire day.

To address the inappropriate classroom behavior and social interactions, I first implemented an extrinsic, token-reward system that rewarded appropriate behavior with time set aside to use the computer. Her immediate response to this was positive. This strategy provided opportunities for ongoing dialog with her about appropriate interactions and expectations in a classroom setting. I chose to use this approach for behavior modification based in part on a conversation with her grandmother. Smith used a similar token-reward based system with Jessica at home to encourage appropriate interactions and behavior. Smith explains, "I've used [computers] as a reward system because it would appeal to her. A token-reward system, if you

will, to use as an encouragement [to reinforce appropriate behavior]" (Smith, personal communication, April 13, 2008).

Over time, Jessica became familiar and appeared comfortable with the daily classroom routine, speech therapy format, and the expectations of behavior. These daily informal discussions with Jessica became a valuable strategy to help teach and promote lessons related to self-management or strategies to use when she experiences anxiety or anger. Our informal conversations provided her a familiar and constant routine in a predictable environment where she had the opportunity to discuss ways to adapt and eventually generalize these skills to other areas.

Near the end of the school year, in one of these discussions, we discussed the possibility of attending class with her peers in the general population. Jessica was both excited and reluctant about this idea. She indicated that she would like to attend, "math class with the other students"(Jessica, personal communication, May 11, 2007).

Towards the end of Jessica's 5th grade school year it was evident to me, her family, and teachers who worked with Jessica that she was demonstrating significant progress in the areas of academic and behavioral functioning. I sought additional input from other teachers, her family, and speech therapist about the potential of allowing her to attend math class in a regular education setting.

The speech therapist, Ms. Harold, was cautiously optimistic about this idea. She ultimately agreed with the other IEP committee members, in part, because of the progress Jessica began to show during speech therapy sessions near the end of the school year. Towards the end of school, Jessica's, "comfort level was much, *much*, better. Actually, she could tell the [Special

Education] teacher what time she was supposed to come to therapy and she would actually come

on her own" (Harold, personal communication, April 24, 2008).

Smith suggested since math was a subject Jessica enjoyed, this placement would be the

best class to use as a way to slowly re-introduce her to the general population. According to

Smith, Jessica demonstrated a fascination with mathematical concepts since an early age. She

especially seems to enjoy numbers and numerical patterns. This ability to recognize

mathematical patterns and relationships is difficult for others to understand, in part because of

the academic limitations she experiences in other areas (Smith, personal communication, April

13, 2008).

Smith recalls one of the earliest examples of this unique mathematical ability. Jessica, as

a young child, was at the house and her attention was drawn to a commercial on the television.

> [It was a] car commercial [that showed] a whole screen full of numbers...and, I
> mean...just so quickly this child grasped that there was a pattern in the numbers.
> I'm sitting here, and she's talking about it and pointing it out on the T.V. to me.
> I'm like, here I am...I've got to laugh...I've got a Master's Degree and [Jessica]
> could pick up patterns and point them out to me (Smith, personal communication,
> April 13, 2008).

The school and home partnership was important to the approach we used to provide more

opportunities for Jessica to attend class with the general student population. During the last four

weeks of school she went to a 5th grade math class with the general student population. Her

family strongly believed that, "if she could successfully get past those [behavior and social]

barriers, she could be mainstreamed in with the other students" (Smith, personal communication,

April 13, 2008).

Although her time in this 5th grade class was brief, Jessica seemed to enjoy it very much.

The transition, however, was difficult at first. She had difficulty with turn taking, raising her

hand, remaining in her seat. Ms. Davis, her math teacher, explains that Jessica soon began to exhibit a great deal of self-management and behavioral control.

The last week of school Jessica was eager to tell me her grade. She made a "B" in the class. Reflecting on the overall process, Ms. Davis recalls that Jessica, "was a hard worker, smart, and a joy to have in my class" (Davis, personal communication, May 12, 2008).

Following the success of this math class, I had a series of ongoing discussions with Jessica and her family to consider more opportunities to attend class with the general student population. The success from the fifth grade math class gave me hope that it may be possible to expand her educational placement to additional subject areas. Her parents and grandmother were receptive to this idea. They felt that Jessica should attend math and reading with the general population. We agreed, as she became more independent and comfortable in these two classes, other subjects, such as science and social studies, could then be included.

Jessica Enters 6th Grade

Jessica enjoyed her experience the year before in math class. She was excited to begin the sixth grade in this math class. Her reaction to reading class, however, was not as positive. Jessica did not want to attend reading class because, "…she thinks the other students will know that she can't read as good as them" (Smith, personal communication, April 13, 2008). I made a suggestion to discuss with Jessica in very detailed and specific terms the plan that we will put into place to successfully integrate into this class. I met with the reading teacher, Jessica, her parents, grandmother, and the paraeducator in my classroom to develop and agree to a systemic approach that leads to more opportunities for inclusion in a reading class with her peers.

The data from this study, including interviews with her teachers, a review of her historical academic records, and observing her through the intervention, reconfirms the struggle

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she has with literacy. In the first grade, based on the results of an evaluation by the school district, Jessica began to receive services in a special education setting to address deficits in behavior, social skills, and literacy. The Educational Diagnostician for the school district offers an explanation for the delays Jessica exhibits with communication development:

> Communication problems affect [Jessica's] educational performance in her communicative interaction, classroom participation, and academic achievement in the area of reading recognition (sound blending, letter/sound association), reading comprehension, and written language (Educational Diagnostician documentation)

East Baton Rouge Parish School District uses the Wide Range Achievement Test (WRAT-3) to assess literacy achievement and improvement. The WRAT-3 is a standardized assessment that is, "intended to measure the basic skills of reading" (Wilkinson, 2002, p. 62) and to, "directly assess the skills required in reading (Wilkinson, 2002, p. 62). The WRAT-III assessment was given to Jessica at the end of the fourth grade. The results of this assessment support the observational data that math is an area of strength, and that her level of literacy functioning falls approximately 1 to 2 years below her peer group in the general population.

The following narrative was written by the assessor who administered the WRAT-III to Jessica:

> According to the Wide Range Achievement Test (WRAT), that was administered March 2006 [Jessica] scored reading 3rd grade level, Spelling 4th and Math 4th grade. Her Edusoft scores from the fall of 2005 are as follows: Reading - Unsatisfactory 28%, with 7/25 correct, and Math - Basic 64%, with 32/50 correct. Jessica has deficits language and reading as well as her diagnosis of ADHD and Autism which impedes her performance in the general curriculum.

More opportunities for inclusion began in the sixth grade. In addition to Math class, she began to attend reading class with the general population of students. The class was a significant change in her daily routine, level of comfort, and educational placement. To help her adjust, a paraprofessional attended this class with Jessica with her until she could fully transition into the new environment. I met with the reading teacher, Ms. Hill, on a regular basis throughout the year

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to discuss the progress Jessica made in reading and to inquire about specific areas that I could help supplement and reinforce during her time in my class.

Ms. Hill recalls Jessica's anxiety when she came to the new reading class. The instructional format, Hill explains, is a combination of independent and group activities. Jessica preferred to work independently and was, "kinda intimidated in the beginning, as far as group work was concerned"(Hill, personal communication, April 28, 2008). Jessica, in this new setting, had to adjust quickly to a larger group of students, less time for transition from one task to another, and an overall change in her sensory environment. When Jessica first attended this class it seemed, "as if she knew some of the material but wasn't sure [how to interact]. She would just sit back and watch the other kids" (Hill, personal communication, April 28, 2008).

Jessica remained in the sixth grade reading class for the entire school year. Although her standardized assessment scores indicate skills in this area are below average, Hill maintains that she observed a substantial improvement in writing, reading comprehension, and social functioning. Hill believes that a regular education setting with literacy-based instruction is more beneficial to Jessica than receiving literacy enrichment opportunities exclusively in a self-contained Special Education setting.

> [Jessica was] able to see how other students worked in the classroom and learn differed things. I felt like she had just missed out, and she just wanted to take in so much at one time. The experience was great for her. Allowing her to grow and I believe that if she will continue to do this, this will help her out a lot (Hill, personal communication, April 28, 2008).

As her Special Education teacher for two years (i.e., 2006-2008), I observed a substantial degree of improvement in the areas of academic, behavioral, and social functioning. Over time, I came to understand and use instructional approaches that best accommodated her unique needs. It is my belief that three factors contributed to her successful move from a special education setting to the general population: a) ongoing dialog with Jessica and her parents about

educational programming, b) collaboration with her teachers in the general setting to offer

guidance about instructional and classroom-management approaches for Jessica, and c)

maintaining, as much as possible, a daily structure and routine to provide Jessica with a sense of

stability as more opportunities for transition into general academic settings become available.

Digital Storytelling with Jessica: A Description of the Process

For the purposes of this examination Jessica and I met each day after school for a period

of three weeks to plan, write, develop, edit, and produce a Digital Story. This intervention was

carried out in a public library that is located in close proximity to her school and home. Each

session was approximately forty-five minutes in length. We met a total of 15 days for 675 total

minutes or 11.25 hours.

While I use computer, digital, and web-based technology for personal and instructional

use, this was my first experience to observe and interact with the entire Digital Storytelling

process. My knowledge of Digital Storytelling prior to this study was purely anecdotal. Jessica,

likewise, came to this intervention with a prior knowledge of multimedia technologies and a

basic understanding of computer use and application. I asked Jessica about her familiarity and

level of comfort with technology and computer use. On a daily basis she accesses the internet,

"to check emails, listen to [her] MP3 player, and play video games on the computer" (Jessica

interview).

At school, she uses Microsoft Office Suite to complete homework assignments and

classroom projects. Ms. Hill, for example, commented about a Powerpoint presentation she made

to the class for a reading activity about Asia. Ms. Hill was impressed with the skills Jessica

demonstrated on this project. The technology component for this assignment seemed to be high

motivation for Jessica. She, "was very excited to do this report...each day she kept working on

this presentation in class until one day I finally had to tell her to turn in what she had" (Hill interview).

Interviews collected throughout this project with family members and school personnel, in addition to my experience and personal knowledge as her teacher for the past two years, provided the framework for the implementation of this study with Jessica. I used our first session to introduce Jessica to the concept of Digital Storytelling. I explained the general parameters of a Digital Story and showed her three examples of a Digital Story that I obtained from the Internet. The example stories were made by students in an equivalent age and grade level. Following this introductory session, we began the process of making a Digital Story. The following is a presentation and analysis of the findings from this investigation.

Study Findings

This section presents the case study findings from this investigation. This section explicitly states each research question, along with an analysis and discussion of the results from this study. A synthesis of findings follows this section.

Research Question 1: How Does Digital Storytelling Impact the Academic and Social Outcomes of a Student with ASD?

Narrative theory, as put forth by Fisher, is an encompassing paradigm that challenges the traditional requirements of literacy and communication (1985). Within this context, "narrative theory provides a foundation for an emphasis on meaning, interpretation, and understanding" (Weick & Browning, 1986). Coherence to the structure of a story (i.e., setting, plot, character, theme) and fidelity to the personal experience shared through this medium allows an individual to take an active role in the construction of their own knowledge. Narrative theory promotes a reader-centric model for storytelling and literacy development. Under this framework, the

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following components were established to analyze the data as it relates to the first research question: (1) participation (2) engagement (3) and reflection.

Active Participation

Digital Storytelling is based on the principles of active learning and participation. While the teacher may begin a Digital Storytelling session with a range of goals and objectives, the unique student-focused emphasis of this strategy relies on a certain level of unpredictability and the ability to quickly adapt to the evolving content, structure, and narrative format.

Recognizing the critical role of flexibility in Digital Storytelling was my first challenge with this intervention. Before meeting with Jessica, I made a lesson plan with detailed goals and objectives to accomplish during our first meeting. My plan for our first meeting was to first explain the concept of Digital Storytelling, encourage her to choose a topic, then to gradually promote more independence as she developed her story. A scaffolded approach, similar to the one planned for this meeting, was a familiar instructional approach that I frequently use in my classroom. This intervention was new to both Jessica and me, therefore explicit instruction was the instructional approach I chose to use as a way to give Jessica more background and overview of our goals for this intervention.

Although I planned for Jessica to choose the topic she would develop into a Digital Story, my expectation was that her story would most likely describe an aspect of living with Autism. This idea, in part, was based on the openness Jessica and her family have towards this issue. Jessica and her family are members of the local Autism community and participate in various campaigns and advocacy efforts to educate the public about issues that face this population. A Digital Story that highlighted her experience and knowledge of Autism, I believed, would be an excellent medium to share her story and contribute to a better understanding of ASD. A

Digital Story could show the range of diversity that exists within this group. Her recent success

in school is an example of a likely topic for Jessica to develop into a Digital Story.

I devoted a significant amount of time planning our first session. I made an outline of the

goals and objectives I wanted to accomplish in our first meeting. My outline was sequential and

linear; first give a definition of Digital Storytelling, then explain each of the seven elements that

characterize an effective Digital Story, and finally, if time allowed, show examples of Digital

Stories to reinforce the concepts discussed in this lesson (see Appendix A for lesson plan of

session 1).

The following transcript represents a portion of our first meeting.

[Brent]: ...the next part of a Digital Story is the dramatic question. Any idea what

that means?

[Jessica]: Like maybe when you write questions down?

[Brent]: Well, kind of. I think the best way to describe it is to say... suspense.

What that means is that your story will have a build up; It will make people want

to continue to listen.

[Jessica]: Wow that sounds kinda neat; I like mystery movies but not scary ones.

[Brent]: Well, I think you've got the right idea.

[Brent]: The next part of a digital story is emotional content. – That is *w-h-a-t* we

feel; It explains our good feelings and our bad ones.

[Jessica]: (*pulling at hair, fidgeting, looking around the room*)

[Jessica]: Emotions? That means curious.

[Brent]: Ok (*unsure of context*)

[Jessica]: ...um…sad, mad (*clarifying answer*)

[Brent]: Very good, very good.

[Jessica]: Faithfulness

[Brent]: The voice of a story is the expression...

[Jessica]: I'm bored.

[Brent]: (*pause, sigh*) you're bored?

[Brent]: (*pause ... continue with definitions*)

[Brent]: ...we use to tell a story – it is how we tell a story.

At the conclusion of our first session I asked her to think about a topic to later develop into a Digital Story. I reminded her that a Digital Story is personal in nature. It evokes an emotional response because the experience or situation affects the writer on an intimate level. The experience of living with Autism, I suggested, may be an ideal choice.

As we discussed possible ideas for a topic, Jessica became visibly withdrawn from the conversation. Instead of participating in the discussion, , she looked at the nearby window and nervously ran her fingers through her hair. As our first session came to an end, I asked her if she would like to write and develop a Digital Story that describes the success and barriers she has overcome. Jessica looked at me, still saying nothing, and shook her head "no". This first session, I felt, was a disaster. I recognized three things from our first meeting; (a) advanced planning, with detailed outlines, guides, and scripts hinder the authenticity of a Digital Story, (b) problem-solving is a core feature of the social skills needed to carry our a Digital Story, and (c) I negated the notion of choice, critical to any student writing (Ray & Laminack, 2001).

I came to the second session with the realization that success from this intervention will be possible if Jessica had more choice and thus, more ownership and control over the process, as advocated by many writing researchers (Graves, 1983; Murray, 1991; Wood, 1999). Although I had a general idea of what I wanted to accomplish, I chose not to prepare a detailed lesson plan

of objectives and goals for our second session. Instead, I wanted to promote a learning environment with less rigidity and formal qualities than the previous, initial session.

Initially, this approach seemed to have little effect. Jessica remained disengaged with any aspect of our session. She sat and listened while I showed examples and talked about ideas for her story. There was little conversation with her during our second session, instead she would nod her head in a response to my questions. Perplexed, I shared this with Ms. Hill, her reading teacher, who reminded me of the introversion, anxiety, and fear that Jessica exhibits when she encounters a new experience. The first day Jessica attended her reading class, Ms. Hill recalls, "she came to my classroom and was very reluctant. I think she was kind of intimidated by the 6th graders because she wasn't used to the atmosphere" (Hill interview). I had failed to recognize that Digital Storytelling was a significantly new atmosphere for Jessica. Similar to her reading class, I felt that she may become more comfortable and open to this activity as she becomes more familiar with the goals and purpose of this intervention.

Slowly, Jessica began to demonstrate a new level of enthusiasm and interest. As we began our third session, Jessica excitedly told me that she has chosen a topic for this project. The following except illustrates how Jessica came to embrace the use of Digital Storytelling.

> [Jessica]: Mr. Daigle, I know what I want to make a movie about.
>
> [Brent]: You do? So, what do you want to write about?
>
> [Jessica]: The fire and my animals.
>
> [Brent]: Why?
>
> [Jessica]: Because I want to show about everything I've been through and everything I have and stuff like that.
>
> [Brent]: Jessica, I think that would be an excellent story. Now, you know this is a

lot of work, and will take some time, but I think that together we will create a

very nice Digital Story.

In the summer of 2007, a fire destroyed her home. Her family escaped the home, however her mother was hospitalized for several days due to smoke inhalation. Unfortunately, none of her animals survived the fire. We began by writing a timeline of the events from that day as a way to organize the structure and goals of her story.

Our session this day made the previous two sessions worthwhile. She was eager to tell me about the fire, its affect on their family, and even the loss she suffered as a result of this tragedy. Instead of simply nodding her head in response to questions, she participated in the dialog and was willing to work on a timeline to better organize her story. Analysis of field notes yielded the following shift. Near the end of our session, as I was saving the work she completed, she quietly said to herself, "this is fun" (field notes). I realized Jessica had assumed ownership over her story, partly due to allowing her topic choice. Allowing her to decide the story she wanted to tell had a lasting and positive affect on her overall social disposition; she now had a sense of agency with this effort.

Active participation is a core feature of the Digital Storytelling process. Once she chose her story, Jessica was no longer uninterested and passive. This energy and dedication to her story impacted multiple areas of social functioning. Decision making and problem solving, patience with technology, and seeing outside of self are examples of the range of social skills Jessica exhibited through the Digital Storytelling process.

Social Skill Strengths, Audience and Writing

One specific social skill area impacted by this intervention is her awareness of the audience for her story. Considering the emotions and feelings of others is often a challenge for students with ASD, and especially for Jessica. To write a story with a larger audience in mind

required her to use ongoing problem and decision making competencies that challenged her ability to empathize and relate to others. Through Digital Storytelling, she was able to see past herself and consider the elements of her story that appeal a larger public.

Engagement

Academic based skills were embedded throughout our Digital Storytelling experience. After Jessica chose to write about her fire, our next step was to consider the events of that day and to present the story as factually possible. Jessica relied on her own research to tell her story. While attention to a sustained task is a persistent challenge for her, the powerful personal connection to this story kept her engaged and interested throughout the entire process. She especially enjoyed using the information she obtained through discussions with family members and friends to give more background and depth to her story.

During successive sessions I stressed the importance of telling a story that is as accurate as possible. Jessica was concerned about this issue because a large part of the story came from her own memory. Although the events were as she remembered, she was "worried that I'll forget something" (Field notes). To address this concern, I suggested that she discuss with her family their version of this story; thus confirming her recollection. The following session, Jessica explained to me that she "talked to daddy, mama, and Megan to make sure [that she] wasn't forgetting something" (field notes).

This attention to each detail of her story was evident when she began to write about the arrival of the firefighters. Her final version explains how firefighters rescued her mother from the house. A retired firefighter, however, was the first responder to her house. She had never mentioned this in previous sessions, and she now wanted to make sure we considered the placement of this information into her story. Such attention to detail and accuracy confirmed her

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ownership and engagement. As we discussed the role of the local fire department, and their

efforts to save her mother, the following conversation occurred:

[Jessica]: ...[we] pulled mama into the kitchen

[Jessica]: no, no, No, NO!!!

[Me]: What's wrong?

[Jessica]: It was a retired fireman who came first, so just put that (pointing at

rough draft) before that (the part where the firemen came)

This particular firefighter was unable to enter the home because he had no equipment.

I noted that ultimately, this aspect of the story was not in her final version.

This example, however, provides evidence of the attention and level of detail she gave to

her story. The interactive format of Digital Storytelling allowed Jessica to integrate creativity,

self expression, and prior knowledge to construct a story that engaged her interest and

commitment. Digital Storytelling was an effective pedagogical tool for her because it relied on a

multi-disciplinary approach that supported, reinforced, and built upon a diverse set of academic

and social skill related areas. Engagement through the research process, writing stages, and

ongoing analysis and revisions to the story was specific areas targeted throughout this

intervention.
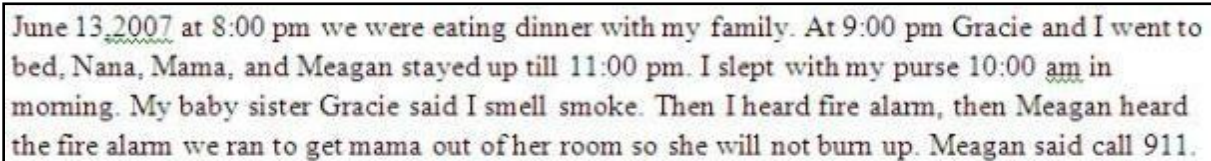
Such a story (she wrote one complete story) epitomized the appropriateness of this

strategy with a child like Jessica with ASD who needs to improve literacy. With each act of

writing, Jessica was also engaged in reflection (thinking) and discussion (oral language). And, as

she revised, she was constantly reading what she'd written, powerful, integrated, active

instruction. Complimenting the engaged literacy practices throughout each session was the

added benefit of increased socialization and enhanced self-esteem.

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Review and Reflection

The iterative nature of Digital Storytelling emphasizes ongoing review and critical reflection. Digital Storytelling was beneficial to Jessica because it allowed her to construct a narrative with personal meaning in a setting that was collaborative and informal. Under these conditions, Jessica took an active role in the construction of her own knowledge. Her final version is demonstrates the reflective nature of this intervention.

Although the story Jessica wrote occurred at a specific point in time, the process of story development was not static. Changes to her story from the first to the final draft demonstrate the critical role of reflection and analysis that occurs within the Digital Storytelling process. In many ways, Jessica was more critical of her writing with this intervention than similar activities in a classroom setting.

The following excerpts show the transformation of her writing that occurred over time. Through the dialogic and reflective process of Digital Storytelling, Jessica wrote and developed a story that gradually evolved into one with significant emotion, depth, and meaning. Figure 4.1 is a copy of her first draft.

June 13, 2007 at 8:00 pm we were eating dinner with my family. At 9:00 pm Gracie and I went to bed, Nana, Mama, and Meagan stayed up till 11:00 pm. I slept with my purse 10:00 am in morning. My baby sister Gracie said I smell smoke. Then I heard fire alarm, then Meagan heard the fire alarm we ran to get mama out of her room so she will not burn up. Meagan said call 911.

Figure 4.1. First Draft of Story Written by Jessica

The first draft (figure 4.1) is consistent with the level and depth of writing Jessica demonstrates in my classroom and in her sixth grade reading class. Descriptive writing is a difficult concept for Jessica, in part because she appears to process information in a way that is concrete, linear, and absolute. Ms. Epps observed this characteristic each week in speech therapy sessions with Jessica.

[Epps]: [With] reading, the problem was comprehension. But over a period of time we worked on different strategies so therefore her comprehension skills have improved.

[Brent]: Tell me about early on. When you did see the problem? I want to know more about the problems with reading.

[Epps]: As I said, it was comprehension reading and not really understanding what she read, answering short questions, using a technique -- using a highlighter where she would go back and highlight the important details. That helped her as well.

[Brent]: So, tell me, why would ya'll use the highlighter when ya'll do the reading?

[Epps]: Because it keeps her interest.

[Brent]: Did you find that she would stray a lot?

[Epps]: Sometimes she would, but it wouldn't take much to get her to get back on task.

[Brent]: You had to work actively though to keep her involved?

[Epps]: Yes...at times... and that has improved to...as well.

Digital Storytelling evolved as an effective and powerful instructional tool for reading comprehension. Based on my interview with Ms. Epps, I decided to use a highlighter during one of our sessions to help Jessica focus on a particular part of her story that needed more description. This strategy was helpful on this day as she had difficulty maintaining focus on a particular section of her story.

Digital Storytelling gave Jessica an opportunity to interact with story elements that contained ambiguous terms, double meanings, and imprecise language. An analysis of the second draft demonstrates how reflection can benefit the level of descriptive writing in a Digital Story. The second draft provides evidence of the transformation and growth that occur to the story after a period of review, collaboration, and analysis of the story. A comparison of her first draft to the second reveals the linear processing that is common for individuals with ASD. Her initial draft was a timeline written in expanded form; "At 8:00 pm we...At 9:00 pm Gracie and I went ...stayed up till 11:00 pm...slept with my purse 10:00 am in morning..."(draft). Her second draft contains more information and details of the events of that day. Figure 4.2 indicates a higher level of writing present in the second draft.

July 13,2007 at 8:00 pm we were eating dinner with my family. At 9:00 pm, Gracie and I went to bed, Nana, Mama, and Meagan stayed up till 11:00 pm. I slept with my purse 10:00 am in morning. My baby sister Gracie said I smell smoke. Then I heard fire alarm, then Meagan heard the fire alarm we ran to get mama out of her room so she will not burn up. We pulled mama in to the kitchen. Meagan said call 911. I said there's a fire in my, the officer said give me your address please, she said, I said, okay ███████████. Meagan said, give me the phone. Then she drop the phone. We ran to the door I unlocked the door and ran out. After we got the fire men came Whitney's mom came to pick us up to go to her house. My mom was in the hospital. All of my pets died in the fire, but one lived his name is coco, he is not my dog though. July 14, 2007 was the saddest day. My dad bought my sister's and I some clothes, then we went to see mama at the hospital to say hi and all that to see how she's doing. March 9, 2008 we started a new life together as a family. We got a horse, cat, and 2 puppies. My horse name is Bale. My dogs name's are Jada and Bandit. The cat name is Jack. My nana lives by my house. We are family.

Figure 4.2. Second Draft of Story Written by Jessica

Deficits in the area of expressive communication are a core feature of ASD. Ms. Epps explains that a focus of each speech therapy session has been to help Jessica improve her expressive and receptive communication skills. Limitations in this area, I believe, explain the difference between the first two drafts of her story.

Little direction was given to Jessica for the first draft. After she completed the initial timeline for her story, the following conversation occurred:

[Brent]: Ok, I'm gonna put your stuff over here. Ok ..look ..what I want you to do is, don't copy... don't copy this timeline. This is just a timeline; I want you to write a story about what happened. This is just to show you, to keep you on track. Ok?

[Jessica]: (*nodding yes*)

[Brent]: So, you can tell the whole story ok? You know you're gonna write in complete sentences? Do you have any questions about it?

[Jessica]: uh uh (no)

[Brent]: Ok, you start off and I'll come check on you and we'll just go from there, ok?

[Jessica]: Ok

[Brent]: Ok, go ahead and get started. There's no rush ok? There's no wrong way or right way to do it, ok?

[Jessica]:(Begins to type)

[Brent]: I'll leave you alone. I'll come back and check on you -

[Jessica]: (Types for 40 minutes) (Field notes)

Analysis of this exchange suggests Jessica thoroughly enjoyed the opportunity to type. She spent a considerable amount of time (forty minutes) typing her first draft. At the end of this session, I asked her what aspect she enjoys best. Jessica could only focus on the joy she had with typing her story, one of the sensory aspects of Digital Storytelling.

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[Brent]: What did you like about what we did today?

[Jessica]: Typing my story.

[Brent]: Typing? Why?

[Jessica]: Because I've been trying to practice typing faster

[Brent]: Typing faster? ...why's that?

[Jessica]: Because I *hate* typing slow!

[Brent]: (chuckle)

[Brent]: What did you not like about today?

[Jessica]: Nothing.

[Brent]: Nothing you can think of? It's not gonna hurt my feelings. I'm like you...I

agree...I think typing was a lot of fun, and you did a good job to! You're a great

writer. How can we make this better tomorrow?

[Jessica]: I don't know...um...keep on typing (*smiling*)

[Brent]: You just want to type tomorrow?

[Jessica]: (N*odding head yes*)

[Brent: Do you have any questions about it (i.e., tomorrow)?

[Jessica]: Nope.

(Session documentation)

While it is difficult to adequately describe the transformative nature of Digital

Storytelling, over time, field notes indicate clearly Jessica became more trusting, more engaged,

more thoughtful, and more aware of the importance of her story. What began as a slow and

unproductive introduction to this intervention slowly became more than a new instructional

approach for students with ASD. It somehow transcended the academic and social purpose and

became personal and therapeutic as writing in general can be for individuals. Jessica was able to reconceptualize the need for improved literacy outcomes because of its direct benefit to the story she was writing.

During one particular meeting, between the first and second draft, Jessica was upset with her handwriting. We discussed writing strategies to give her narrative more descriptive qualities. In the course of this session she began to rephrase and change a particular part of the story. After she was writing for awhile, I offered to help write while she dictated the changes to me. Jessica looked to the ground and quietly said:

> [Jessica]: Thank you.
>
> [Brent]: What?
>
> [Jessica]: I stink at writing.
>
> [Brent]: You don't stink at writing.
>
> [Jessica]: My handwriting sucks.
>
> [Brent]: No it doesn't. (Session notes)

I was at a loss for words. Her statement came unexpected. We were, at that point, working together on the story, laughing, making changes, and enjoying the time together. Later, as I received session notes and tapes, I spent time reflecting more about the perception she has of her own writing. The document analysis and interviews with family members, teachers, and therapist who have worked with Jessica confirmed her own self descriptions of the limitations she experiences in reading comprehension, communication, and handwriting.

In the area of reading comprehension, Jessica was , "weak, she didn't want to do it. She would always try to avoid from doing it, looking the other way [Asking] let's do something else to avoid from reading" (Harold, personal communication, April 24, 2008). Document analysis of

school records indicate a recommendation by The Educational Diagnostician for the school district recommended to provide services for Jessica that will address "receptive/expressive language development." Her third grade teacher wrote the following description of the challenges Jessica faces on a regular basis:

> Communication problem affects [Jessica's] educational performance in her communicative interaction, classroom participation, [and] academic achievement in the area of reading recognition (sound blending, letter/sound association), reading comprehension, and written language (School documentation).

Similar observations were made at home. The historical data for Jessica refers to an interview with her mother about the efforts she has made to help Jessica in this area. In the second grade, her mother explains, Jessica was enrolled at Sylvan Learning Center to, "improve her reading skills and help with her handwriting" (School documentation).

While multiple standardized tests were able to verify and confirm the weakness she exhibited in these areas, perhaps her own perception of ability is a factor that contributed to the sustained deficits in writing, reading, and communication. Over time, Jessica became more comfortable with Digital Storytelling. It was important to help her improve writing with assistance and correction that was non-judgmental. Improvement in this area came through the ongoing dialog and reflection to the entire process; her story, writing, edits, images, and recording.

There were five drafts made prior to the audio and visual production of the Digital Story. Jessica made significant changes to her story between the first and final draft. The process did not end at the final draft. As she began to record her story, she noticed parts that did not give the same meaning when it was read aloud compared to the way it read on paper. She and I became immersed in each aspect of this story. Changes, edits, and additions were made to until the last day we met.

Descriptive techniques and elements of her writing improved with each session. Digital Storytelling promoted reflective practice of the writing process through collaboration and dialog in a naturalistic format that encouraged Jessica to expand and strengthen her story using narrative conventions, such as point of view, selection of detail, and descriptive language. In each session, her story became more dynamic, complex, and sophisticated (field notes).

As with all best practices, writing instruction, reflection and revision is a critical part of the Digital Storytelling process (Graves, 1983; Wood, 1999, 2001). Through reflection and revision, we realized that a Digital Story is never a final version. Even today, we could meet again, review her current version, and continue with changes to make it better. A review of the drafts to her story provides an example of the iterative nature of this intervention.

The initial draft reveals a limited and inconsistent use of descriptive language. A comparison of the meal her family ate the night before the fire is one example of the descriptive richness and depth observed in her writing over time. In the first draft, Jessica was more interested in telling about the fire. Regarding the meal her family ate the night before, Jessica wrote, "I was eating dinner with my family" (Field notes). In later sessions, she reviewed this part of her story and chose to add more details about the meal her family shared, "That evening, our family ate chicken nuggets, French fries, and cheeseburgers with pickles" (Field notes).

Analysis of each version contains better description and improved narrative structure than the previous draft. The benefit of this intervention is particularly revealing in the comparisons of each draft. Over time, Jessica demonstrated improvement in her use of narrative elements, voice, and structure. Her story began with a rudimentary timeline, with a narrow subject focus. Her final draft fully integrated the elements of narrative structure, cohesion, and point of view to tell

a story that was both universal and unique. Figures 4.3, 4.4, and 4.5 are successive drafts of her story.

July 13, 2007, at 8:00 pm I was eating dinner with my family. Around 9:00 o'clock, Gracie and I went to bed while Nana, Mama, Daddy, and Meagan stayed up till 11:00. Daddy told Gracie and I to go to bed. I took my purse and went to bed (I have to sleep with my purse because if t don't my stinky sisters will take it.) My baby sister Gracie said I smell smoke. Then I heard fire alarm, then Meagan heard the fire alarm we ran to get mama out of her room so she will not burn up. We pulled mama in to the kitchen. Meagan said call 911. I said there's a fire in my, the officer said give me your address please, she said, I said, okay ████████████████. Meagan said, give me the phone. Then she drop the phone. We ran to the door I unlocked the door and ran out. After we got the fire men came Whitney's mom came to pick us up to go to her house. My mom was in the hospital. All of my pets died in the fire, but one lived his name is coco, he is not my dog though. July 14, 2007 was the saddest day. My dad bought my sister's and I some clothes, then we went to see mama at the hospital to say hi and all that to see how she's doing. March 9, 2008 we started a new life together as a family. We got a horse, cat, and 2 puppies. My horse name is Bale. My dogs name's are Jada and Bandit. The cat name is Jack. My nana lives by my house. We are family.

The end

Figure 4.3. Third Draft of Story Written by Jessica

July 13, 2007, began as a great day. Since it was a Saturday, I couldn't wait to sleep in, watch cartoons and play with my video games and my dolls. At 8:00 pm I was eating dinner with my family. Around 9:00 o'clock, Gracie and I went to bed while Nana, Mama, Daddy, and Meagan stayed up till 11:00. Daddy told Gracie and I to go to bed. I took my purse and went to bed (I have to sleep with my purse because if t don't my stinky sisters will take it.) My baby sister Gracie said I smell smoke. Then I heard fire alarm, then Meagan heard the fire alarm we ran to get mama out of her room so she will not burn up. We pulled mama in to the kitchen. Meagan said call 911. I said there's a fire in my, the officer said give me your address please, she said, I said, okay ███████████ ███████ Meagan said, give me the phone. Then she drop the phone. We ran to the door I unlocked the door and ran out. After we got the fire men came Whitney's mom came to pick us up to go to her house. My mom was in the hospital. All of my pets died in the fire, but one lived his name is coco, he is not my dog though. July 14, 2007 was the saddest day. My dad bought my sister's and I some clothes, then we went to see mama at the hospital to say hi and all that to see how she's doing. March 9, 2008 we started a new life together as a family. We got a horse, cat, and 2 puppies. My horse name is Bale. My dogs name's are Jada and Bandit. The cat name is Jack. My nana lives by my house. We are family.

The end

Figure 4.4. Fourth Draft of Story Written by Jessica.

Hi, my name is Jessica and I am going to tell you about the day that a fire destroyed my home. Saturday, July 13, 2007, began as a great day; I could not wait to sleep in, watch cartoons and play with my video games and Bratz dolls. That evening, our family ate chicken nuggets, French fries, and cheeseburgers with pickles. Around nine o'clock, Gracie and I went to bed while Nana, Mama, Daddy, and Meagan stayed up to play Monopoly. I took my purse and went to bed (I have to sleep with my purse because if I don't my stinky sisters will take it.)

The next morning, around ten o'clock, I heard Gracie in the living room saying, "I smell smoke." When Meagan and I heard the fire alarm we ran to get mama out of her room so she would not burn up. At first, I tried to put the fire out with a towel, but I dropped it because I was scared. Meagan said, "call 911." I called 911 and said "there's a fire in my house!" I gave them my address so the Fire Department could find us.

Next, Meagan and I ran to Mama's bedroom to help. She was sleeping and would not wake up. Meagan pulled Mama into the kitchen. I remember Mama screaming for us to help. It was too dark for us to see her. We ran to the front door and ran outside. After we got outside the firefighters came, rescued mom, and put out the fire.

Mama was taken to the hospital in the ambulance and Whitney's mom came to pick us up to go to her house. All of my pets died in the fire. The next day, July 14, 2007, was the saddest day of my life. My dad bought us some clothes, and then we went to see mama at the hospital to see how she was doing.

After the fire, we lived at MaMa's house for five months. We now have a new home, a horse, two dogs, and a cat. My horse's name is Bailey. My dog's names are Jada and Bandit. The cat's name is Jack. Nana moved into the house next to our house. Things are much better now, we are family.

The end

Figure 4.5. Final Draft of Story Written by Jessica

Conclusion

Through analysis of data, three important themes emerge in this study related to the academic and social benefit of Digital Storytelling for a student with ASD. Those themes were labeled as participation, engagement and ownership, and reflection. Within the larger context of Narrative Theory, each of these factors contributed to the outcomes Jessica experienced through the Digital Storytelling process (Fisher, 1984).

First, this intervention promoted active participation of each person involved in the process. As a participant observer, I found myself drawn to the events and descriptions that told each part of her story. In many ways, Digital Storytelling required more than casual observation. It functions in a unique way to use the collective efforts and strengths of everyone in creating a story that is both compelling and aesthetically pleasing. The final version reveals the dynamic interchange of systematic problem-solving, decision making, and revision that is the result of active learning and participation throughout the Digital Storytelling experience.

Second, Jessica exhibited a deep level of engagement to Digital Storytelling because of the user-generated nature of this intervention. Student choice was a determinant to the success of this intervention. Jessica showed higher engagement when the outcome was clear and valuable. She chose to tell a story about an emotional and very personal experience in her life. Choice led to ownership. Through this ownership came a high level of engagement, in part because of the familiarity and personalization of the content.

Jessica chose to write an autobiographical nonfiction account of a recent experience that was traumatic and personal. The genre she chose for her story is insightful, and seems to support the observations made by Snow, Burns, and Griffn (1998) that students who struggle with literacy development seem to prefer literacy interactions with informational texts. Stanovich

(2000) posits that students in this population struggle with fictional writing because of their limited acquisition of vocabulary. Rupley and Nicols (2005) add, "struggling readers often lack the experiences associated with texts encountered in schools; thus, context is an inadequate means for them to infer the meanings of unknown words" (p.242).

Finally, the reflection that occurs throughout this intervention lead to improved academic and social outcomes for Jessica. As evidenced by changes previously discussed between figures 4.3, 4.4, and 4.5, through the process of critical reflection, Jessica assumed more ownership of the narrative. Over time, her writing lengthened, became much more descriptive as her story began to integrate the changes she made through this reflection, and her piece became more detailed and accurate. She wrote a final narrative that was authentically representative of her progress through this intervention.

The data collected throughout this study confirms the potential academic and social benefit of Digital Storytelling for Jessica and students with similar autistic tendencies. Her learning preference for tactile support, strong visual aids, and use of interactive technology was evident in the level of motivation and sustained interest she exhibited throughout this intervention. Ultimately, Jessica was able to reflect on the literacy based skills that often create barriers to a successful integration into the regular education setting. Likewise, the emphasis on social and interpersonal skill development throughout the Digital Storytelling process gave her opportunities to address the broad set of academic, social, and behavioral skills that are needed for success in more inclusive educational settings. Perhaps the eventual use and value of this intervention can be found serve as a framework to provide Jessica with meaningful inclusive experiences with the general population of students.

Research Question 2: What Factors Contribute to the Use of Digital Storytelling as an Approach to Literacy Instruction for a Student with ASD?

Emerging and continuous literacy development is embedded throughout the Digital Storytelling experience. Over time, data indicated Jessica began to write with improved print clarity, more accurate grammatical structure, and enhanced detail. As she began to immerse herself in the narrative process, her focus shifted from the desire to tell the story of a single event in time to eventually reconceptualizing the components of an effective narrative. Specifically, she identified the need to focus on handwriting, reading comprehension, and narrative text structure.

Writing

Writing the narrative for a Digital Story requires a broad set of communication skills. Although Jessica wanted to write about the fire, she did not know where to begin the story. The approach to writing we used was somewhat different than strategies taught in her reading class.

The statewide, mandated writing composition assessment administered to students each year delineates specific criteria to satisfy the requirements of this section. The student is first given a writing topic. Three blank pages follow the topic; the first for brainstorming, the second for a rough draft, and the last page is turned in as a final draft. The student is directed to, "write a well-organized composition of at lease 100-150 words" (http://xrl.us/LEAPwritingANDcomposition). The final draft, "...should have at least two paragraphs,...a beginning, a middle, and an end,...correct spelling, punctuation, and grammar" (http://xrl.us/LEAPwritingANDcomposition). See Appendix B for an example of the directions found in the writing and composition section of the state-wide assessment.

According to Ms. Hill, writing a composition in class modeled after the criteria used on the statewide assessment was problematic for Jessica. The unit on Asian culture is one example

of the challenge Jessica experienced with a typical writing activity. The assignment was to choose one aspect of Asian society, write a four paragraph essay about the topic, and then make a PowerPoint presentation about the new ideas discovered as a result of this activity. Jessica wanted to only make a PowerPoint. She was, "very reluctant" (Hill, personal communication, April 28, 2008) to complete the other requirements of this activity. At one point Ms. Hill asked Jessica to return to my classroom because she was unwilling to participate in the writing that came prior to the technology component.

The students were given two weeks to complete this activity and present it to the class. Jessica, however, took slightly more than one month to finish because of her reticence in the beginning to complete the writing section; "you helped her...as well as her classmates helping her" (Hill, personal communication, April 28, 2008). Eventually, she completed the activity and made her presentation to the class. The topic she chose was the Wall of China and, "she did a wonderful job. Even the class was amazed and they gave her a clap, to let her know that she'd done a good job" (Hill, personal communication, April 28, 2008).

An analysis of the historical data for Jessica provides insight into the possible reason she had difficulty with this particular classroom activity. Jessica, "requires slow, sequential, substantially broken down presentation of concepts" (Document review). Her previous teachers, in an interview with the Educational Diagnostician for the school district, noted that, "identifying main ideas and applying critical thinking, and predicting events and outcomes is a weakness for [Jessica] "(Educational Diagnostician notes). The assessment notes also indicate that Jessica has, "trouble with conceptual development, particularly with regard to WH- questions; what, when, where, why, and how" (Educational Diagnostician notes).

The academic benefits associated with writing improvement through Digital Storytelling became evident as we began to consider how to present and share the story of her fire. Unlike the statewide writing assessment, there were no word number or paragraph requirements for Jessica to meet. She was not told to first write a brainstorming page, then a rough draft, then a final draft. Rather, she initially became engaged and motivated to write this story because she wanted to begin to work on the technology part as soon as possible.

The story Jessica wrote did not occur along a linear continuum. It was not written in three separate drafts. Rather, her story was an ongoing series of edits. We began to organize her thoughts and the details of her story by first writing it in a shorthand version of a timeline. Then she used the information and details of the timeline as a foundation to the narrative form of her story. After the initial story was written, then we discussed details, such as the mechanics and style of her writing. Eventually, the story evolved to a final version that integrated the multimedia aspects of this intervention. Unfortunately, the statewide, mandated assessment punishes a child like Jessica.

The informal environment of Digital Storytelling fosters conversation in a relaxed and unassuming manner where Jessica felt comfortable taking risks. I knew, from my own experience as her teacher, in addition to the conversation and interviews with family members, therapists, and other teachers who have worked with Jessica that a too-harsh critique of her work can cause her to respond in a negative way. She was more receptive to discuss letter formation with me because it was within the context of improving her Digital Story.

Through Digital Storytelling, I was able to address a specific aspect of her story (i.e., handwriting) in a way that was not overly critical, confrontational or judgmental. The motivation

to improve her own story was the catalyst for initiating dialog about sentence choice, structure, and length.

Jessica usually does not respond well to a critique of her work. When she makes a poor test grade or is given a specific task without input or choice, it is typical for her to become withdrawn and choose not to participate. One example of this occurred in the writing and PowerPoint activity Ms. Hill described.

The cooperation and sense of achievement that Jessica experienced through this Digital Story lends itself to a framework for greater progress in the area of communication and literacy development. Digital Storytelling revolves around an informal process that encourages ongoing edits and review of the story. Under this paradigm, Jessica, and possibly other students with ASD, seems more receptive to an ongoing analysis and discussion of strategies or approaches to improve their story.

Reading Comprehension

Interview notes recorded by the school district educational diagnostician contained the following observation of the behavioral Jessica exhibited during the assessment carried out during the second grade:

> Weakness: General Attitude. Not easily motivated by rewards. Needs drill and practice. Reluctant to try new tasks (Educational Diagnostician documentation).

READ 180

READ 180, a commercial reading intervention published by Scholastic Press, uses a computer-driven program to help students who struggle with reading fluency and comprehension. This program is "designed for older students, specifically those in grades 4-12. The program provides individualized instruction on the basis of each students ability level and specific needs" (Hasselbring & Bausch, 2006). READ 180 is mandated by WCSD for students

who struggle in reading. Funding by the school district places a READ 180 teacher in each

elementary school.

The READ 180 teacher, Ms. Jones, experienced similar challenges with Jessica. The

format of the class, she explains, was based on timed intervals; students read independently for

twenty minutes, then in a group setting for twenty minutes. The last twenty minute interval is

designated for students to answer questions related to the reading using computer-based

software.

Ms. Jones explains the aversion Jessica exhibited toward reading-based activities in her class:

> She's a sweet child but has a way , you know ... you could ask her a question and
> she may tell you something way out of the ordinary,[she would] come back with
> something way out of the ordinary. I [noticed that] I have to just get down to the
> ballpoint...ballpark... with her and say, 'well look Jessica, this is what I'm talking
> about-- such and such a thing-- not about' (makes hand gesture). You had to be
> very direct. I noticed that she will wander off and not stay on task if I don't just sit
> right there by her and supervise her. I told her she's gettin' too old for that. She
> needs to pull outta that and 'cause I can't stay with her at all times. I have other
> students... I have to walk around and supervise and help with. (Jones, personal
> communication, May 6, 2008)

Near the end of the 2007-2008 school year, Ms. Jones reports an improvement in

Jessica's reading skill level. She explains that when Jessica first came to her class, the

distractions and inattention prevented her from making progress with the reading curriculum. I

asked Ms. Jones to describe the literacy related skills Jessica demonstrated when she first came

to her class.

> They were low, kinda low. Maybe average I'm gonna say, but she really has
> improved you know. She's got to stay on task first now (*emphatic*). But when she
> stays on task...the main issue [is] keeping her on task.[She was]not an energized
> reader, for example she would read but s-l-o-w and pause a lot as if she doesn't
> know [what] the word is... and she gotta think about what the word is [to improve
> her] fluency in reading. (Jones, personal communication, May 20, 2008)

After she chose the topic for her Digital Story, Jessica was engaged throughout each

session. The times that she was distracted by the environment often occurred when she was not

engaged in her story. Usually when I was opening a file on the computer, or setting up the work area, for example, were the times that her attention would focus on environmental stimuli.

The literacy component of Digital Storytelling leads to positive outcomes for Jessica because it was a short activity that allowed us to focus on specific literacy-based skills that directly related to her story. These were not "writing lessons" or "grammar exercises," but rather a natural progression of the story with attention to the mechanics of writing such as grammar, spelling and word choice embedded in instruction.

With each session, I noted a strengthening of her confidence with reading. As her story improved, and she read and reread what she had written, she also was more critical and analytical of the changes and edits that were made. The process was fluid. At times she would dictate while I would type. Other times during the session, however, our roles may change as she would type and I would suggest areas for review and clarification. Jessica exhibited active levels of cognitive processing. She would discuss changes with me while simultaneously reviewing prior edits made to her story. It seemed that her metacognitive skills improved as a result of this intervention.

One example of the deep level of thinking that was characteristic of this intervention occurred during one of our final sessions. While reading a particular part of her story, I inadvertently used the present tense. Jessica, after reading the sentence structure in her draft, quickly recognized this mistake. The bold and italicized words in the following passages are for emphasis.

[Brent]: ...and we went to see mom to see how she's doing.

[Jessica]: She *was*... to see how ***she was doing.***

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Through the use of Digital Storytelling, Jessica became more independent and self-reliant regarding handwriting. She learned to self-criticize work and was confident enough to correct me.

We continued with the story. This section of her story explained the help that others gave to her family during this time, the concern they had for their mother, and eventually how they moved into a new home next door to her grandmother. Near the end of this session I observed the level of critical analysis Jessica gave to her story. As we finished, she did not want to leave until a different correction was made. In the above conversation, notice that I used the word "mom". Thirty minutes later, as we finished, Jessica and I had the following discussion (bold and italicized words in the following passages are for emphasis):

> [Brent]: I think we're done.
>
> [Jessica]: I like it a lot.
>
> [Brent]: Did you like it though?
>
> [Jessica]: Uh huh, but now I get to take pictures. Oh... my back ...gosh ...did you hear it crack?
>
> [Brent]: uh huh.
>
> [Jessica]: That was my back.
>
> [Brent]: Wow. Ok ... just keep on with...
>
> [Jessica]: *That's not how you spell it!*
>
> [Brent]: How do you spell what?
>
> [Jessica]: (pointing at higher section, spelling each letter slowly) ***m-a-m-a ...***
>
> [Brent]:Mama. Ok.
>
> [Brent]: (Reading story aloud) My horse's name is......is it Bale?

[Jessica]: Bailey!

[Brent]: (Prior session we did not know how to spell 'Bailey') Oh, you know how to spell it now (*smiling*)?

[Jessica]: Uh huh (smiling).

The above passage is just one small instance of the analysis and attention to reading that Jessica displayed. While some view it as insignificant, to a child like Jessica, it reveals much. She made changes to her story each day. As she read, and re-read each part, the changes were sometimes minor (e.g., spelling), or substantial (to include music only at the end). Reading comprehension improved significantly as a result of constant revision and the increased level of personalization that is a core feature of this intervention. The motivation to create a well written story lead her to read, think, and write at a critical and active level.

Narrative Structure

Jessica began this intervention with a lack of narrative sophistication. We first used a timeline as a strategy to visually organize sequential events of her story. Over time, her writing became more confident and focused. She began to form basic sentences, and eventually paragraphs, around the central themes outlined in the prewriting stage. This intervention involved both the cyclical and reflective aspects of literacy development. Digital Storytelling enabled Jessica to evaluate literacy with a focus on its wider meaning and acceptance by the reader.

Contractions used in her writing provide one example of the dynamic process involved with Digital Storytelling. Jessica wrote the following sentence in the fourth draft of her story; "I couldn't wait to sleep in, watch cartoons and play with my video games and my dolls" (Fourth

draft). Jessica explained, during our analysis of this draft, that she wanted to remove all contractions from her story.

> [Brent]: (*reading draft*) I couldn't wait to sleep in, watch cartoons and play with my video games and...
>
> [Jessica]: My Bratz dolls....(*pause*)...lets put could not. Let's not put couldn't.
>
> [Brent]: You want could not?
>
> [Jessica]: Yeah, pretty much. No contractions.
>
> [Brent]: So you want I am?
>
> [Jessica]: (*nodding yes*).

We examined the draft again with a focus on contractions. Each contraction in her story was removed. After the fifth draft, we began the digital aspect of this intervention. She made drawings, took pictures, chose music, and began to record her story.

I noticed a subtle difference between her final written draft and the first recording of this story. The following is a section from the first recording of her Digital Story.

> Hi, my name is Jessica. I'm gonna tell you the story about the day a fire destroyed my home. It began as a great day. I couldn't wait to sleep in, watch cartoons, play with my video games... and…

She read her story with the conventions of natural spoken language. Without contractions her story was too formal and stilted. Jessica considered each narrative version, but ultimately made the editorial choice to use natural language patterns to tell her story.

Digital Storytelling was particularly beneficial to Jessica because it relied on the strengths of her learning style to help with the application of literacy related skills. Her challenges in a learning environment are typical for students with ASD. The distractions in a classroom are difficult for her to overcome. Independent work, task completion, and self-regulation are complex skills she struggles with in a regular education classroom environment. Digital

Storytelling allowed her to benefit from the advantages of a learning environment that fosters curiosity, motivation, and self-awareness.

Summary

The potential for meaningful outcomes in the area of literacy develop for students with high-functioning ASD exists with Digital Storytelling. Students with Autism often struggle with group participation, joint attention, and expressive language development. Literacy development was enhanced through Digital Storytelling because it allowed Jessica to use an alternative visual and audio format to tell an authentic story she selected that was significant and meaningful to her own life experience. I observed a deep level of motivation, commitment, and pride throughout this study. Literacy outcomes improved for Jessica because this intervention promotes a high level of communicative interaction between the student and teacher with a format and structure that is particularly helpful to students with ASD.

Research Question 3: How Does Prior Knowledge of Technology Contribute to the Implementation of Digital Storytelling for a Student with ASD?

Digital Storytelling is a viable instructional tool for Jessica. The benefits associated with student engagement, literacy development, and experiential learning outweighs the technical limitations that may occur with Digital Storytelling. Although this tool seems promising for students like Jessica, a basic level of technology and computer based skills are required for Digital Storytelling to be meaningful and beneficial.

Reciprocal interactions are vital to the Digital Storytelling process. The success of this intervention relies on the level of prior knowledge each participant collectively shares with regard to technology and computer use. The primary and secondary data collected throughout this study confirms the need for a basic level of knowledge specific to multi-media applications.

Historical records indicate the progressive orientation Jessica has exhibited towards auditive and visual learning preferences. On a daily basis she draws (usually pictures of horses), completes crossword puzzles, or uses her computer to watch cartoons or movies. Although I later realized how advanced her skills were in the area of computer and technology use, I initially chose this intervention because I was confident that she and I both possessed a basic level of computer literacy and knowledge.

Ms. Smith provided more background to the extent technology is used by Jessica in the home. During our interview, I inquired about the impression I had of her computer skills.

[Brent]: Her computer skills seemed to be more advanced than a lot of kids her age. What are the strengths that you see with technology? Am I right about that? Is that one of her...(?)

[Smith]: (interrupting) oooooooooooohhhhhhhh, you're 100 % correct! (laughing) Let me tell you about [Jessica] when it comes to, like technology. Now, grandma's a bit challenged you know...(laughing)

[Brent]: (laughing)

[Smith]: ...with the cell phone and everything. Now this child, now she just comes up with and does things. Even with the TV. Now, I don't have cable out here you know...all I have is tv. Well [Jessica] recently [figured out how to get] four channels out here. How she does what she does, you know with like tv, the antenna, I don't understand . She's got those switches. I mean she does things that boggle my mind. (Like the) cell phone, geez, I can only imagine if I let her have access 24/7 to her computer what this child could do ...she might be hacking into something (laughing)

[Brent]: (laughing)

[Smith]: But I'm serious,... I'm serious, she's just like, she is just that advanced.

Her teachers and speech therapists have each recognized the possibility for improved learning outcomes through increased opportunities for technology use to visually appeal in their classroom. Ms. Harold, who provided speech therapy to Jessica during her transition to a new school and a new educational (self-contained) setting, revealed that Jessica, during this time, initially refused to the leave the classroom for speech therapy. This behavior continued for several weeks until she was more familiar with Ms. Harold. Once in the speech therapy setting, Jessica would not participate with any part of the session. She sat and waited to return to her classroom.

Ms. Harold explains that computers in her classroom helped reinforce the goals of each therapy session. With Jessica, she concentrated her efforts on addressing deficits with language and reading comprehension.

> [Harold]: She didn't want to do it (i.e., the lesson). She would always try to avoid from doing it. Looking the other way, (asking)"lets do something else." Trying to get away to the computer, to avoid from reading.
>
> [Brent]: How did you move from that point -- to when you left her at the end of that year? Or was there even a change?
>
> [Harold]: It was some change. Since she wanted to work on the computer I did incorporate the computer into her lesson. I tried to find some easy... easy reading material below her grade level so that she would feel comfortable doing it.
>
> [Brent]: Did she actually do it then?
>
> [Harold]: She actually did.

[Brent]: Why do you think...why would she do reading then if she didn't like to read?

[Harold]: Because she did it on the computer. I think it was because of the computer. She always -- she wanted -- (more emphatic) she wanted to play games on the computer. So i told her, "we'll do reading on the computer first," which was *very* easy, then we would move and let her play some games on the computer.

[Brent]: I see. So you'd use it as a reward...both teaching and as a reward.

[Harold]: Exactly...exactly.

Subsequent teachers used similar instructional activities to support communication and literacy development. Her current speech therapist explains how computer based activities promote the goals and objectives of each therapy session.

[Brent]: Do you use any other strategies or interventions or approaches to try to help her with literacy or with articulation?

[Epps]: We use the computer.

[Brent]: The computer? How long have ya'll been using this?

[Epps]: Since we started. It would be off and on. Maybe one day she would come in one-on-one we'd use a worksheet. The next session it'd be computer. We have interactive websites (speech).

[Brent]: Then why the computer?

[Epps]: Because she really enjoys doing that.

[Brent]: So would you get more done?

[Epps]: Yes. From the computer she really stays engaged.

[Brent]: If I were to tell her future teacher what kind of approaches (to) use to

address literacy with her, what would you say?

[Epps]: Most definitely say use the computer. Also working one-on-one in between reviewing the strategies she's learned. So she will continue to use those strategies.

The technology component of Digital Storytelling required familiarity with word processing, photography, and audio recording skills. Jessica used the software applications that come standard with Windows XP. She typed her story with Microsoft Word 2007, Digital images were taken with Cannon Powershot A580, voice recordings were made with Audacity, and the Digital Story was made with Microsoft MovieMaker 2.1.

Although prior to this study I was familiar with the concept of Digital Storytelling, this was my first opportunity to observe the dynamics of this process. As a full participant observer throughout this study, it was critical to understand the range of computer stills and digital literacy that existed between Jessica and I. Ultimately, this difference affected the overall artistic quality of the Digital Story.

The first attempt to integrate the story with her pictures, music, and voice recording illustrates the range of technical ability and artistic interpretation that existed between us. Jessica wanted music to begin with her title and play quietly throughout the entire story. Both Jessica and I have never used Microsoft MovieMaker prior to this study. The format of this software, however, is similar to other Microsoft applications. File viewing, selection, and edit options are closely aligned to Microsoft PowerPoint and Word. Jessica selected three separate songs to play throughout her story. As she inserted them into her Digital Story, we realized that the music volume was too loud to hear her voice. I made a few suggestions to correct this problem;

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however the balance could not be met. She decided to read the story and have music play at the end during the final credits.

This decision highlights an important aspect of Digital Storytelling. Learning experiences occur throughout this intervention because of the collaboration that is possible within the context of an environment that is less formal and unstructured. My role was to help Jessica think deeply about the narrative process, the choice of images to adequately communicate her ideas, and the music to best summarize the message she wanted to tell. This was her story to write and edit. As a participant in this process, it is imperative that teachers recognize the boundary between reasonable guidance and direct control over each step of the process.

Summary

Technology based skills are a fundamental aspect of Digital Storytelling. The quality of the story relies on the existing knowledge of basic computer applications. The attractive feature of this intervention is the integration of existing computer skills with technologies that currently exist on most computers today. Digital Storytelling is a viable intervention if the student and teacher have a working knowledge of basic word processing applications (e.g., Microsoft Word, Microsoft PowerPoint, Microsoft Movie Maker), digital image processing, and voice recording programs. It requires little cost and minimal level of digital literacy. The benefit of Digital Storytelling is found in the portability of this intervention and the independent student learning that occurs throughout the process.

Synthesis of the Findings

The objective of this case study was to obtain greater insight into the processes, challenges, and literacy-based outcomes of Digital Storytelling for a high functioning student with ASD. In addition to examining the prior knowledge required for this intervention, this study offers new information on the academic, social, and literacy benefits of Digital Storytelling. This

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synthesis of findings identifies the common challenges and potential benefits associated with this instructional tool.

Investigating the dynamics and viability of Digital Storytelling revealed the distinctive features of this pedagogic approach for students with ASD who function at a similar level as Jessica. Digital Storytelling was both an effective academic and social skills intervention because it offered multi-sensory learning experiences and deep reflection of narrative prose to support inquiry-based, literacy development. Through collaboration, support, and critical analysis of her writing, Jessica began to demonstrate improved writing proficiency and overall interest in the narrative process.

This study also examined the relationship between Digital Storytelling and literacy instruction. One of the salient aspects of this intervention was its contribution to literacy development and overall communicative competence. Over time, the persistent struggles Jessica experienced with language deficits and literacy acquisition has led to negative perceptions of self-efficacy and academic confidence (Smith interview, Hill interview). The deep level of personal satisfaction and motivation evident during each session seemed to enhance the overall responsiveness and commitment to the success of her story. Positive literacy improvement and outcomes were noted through informal assessment measures and participant observations.

One possible limitation of this study relates to the knowledge and experience level a person demonstrates in the area of computer applications and software. Both the teacher and student should have familiarity with basic word processing technologies and the necessary competencies in digital and media based technologies to successfully carry out this activity. The technology component within Digital Storytelling supports the academic and social demands of

this intervention. The versatility and portable design of Digital Storytelling leads to greater levels of independent student learning within the context of a familiar environment.

The triangulation of data in this study revealed how the struggle Jessica experienced with literacy and language acquisition has affected her school performance, behavior, and motivation. Examining the utility and appropriateness of Digital Storytelling clarified the potential benefit and impact of using this model to improve social outcomes and overall literacy development for Jessica, and students with similar characteristics. Implications from this study are presented in the following chapter.

CHAPTER 5.

SUMMARY AND CONCLUSION

Introduction

In this chapter, I will offer a brief summary of this case study. Also, I will discuss implications of using Digital Storytelling with students with ASD as well as discuss appropriateness and feasibility of Digital Storytelling. Finally, I will put forth recommendations for this approach as a way to improve the literacy skills of a child with ASD.

This case study examined Digital Storytelling as a multi-sensory instructional approach to enhancing literacy development for a high functioning, sixth grade student with ASD. The design of this qualitative investigation relied on Grounded Theory to guide the collection, analysis, and interpretation of data in response to each research question. Implications for using Digital Storytelling as an approach to increasing both literacy and social skills outcomes for students with ASD in both classroom and home settings and suggestions and recommendations for the use of Digital Storytelling are advocated as a viable means of improving literacy skills. I conclude this study with future directions for research and practice.

Characteristics of ASD

As aforementioned, Autism Spectrum Disorder (ASD) refers to a range of pervasive developmental disorders characterized by poor social functioning, stereotyped behaviors, and impaired language development (Nicholas et al., 2008). Autism, Asperger Syndrome, Pervasive Developmental Disorder-not otherwise specified, Child Disintegrative Disorder, and Rett's Disorder are generally included under the ASD umbrella category (Ozonoff, Goodlin-Jones, & Solomon, 2007). ASD is a lifelong condition with a considerable degree of variability and functioning between individuals (Frith, 1989).

ASD is generally diagnosed by age three (Stephan, 2008). A steady rise in prevalence rate of these disorders has occurred within the past thirty years (Jick, Beach & Kaye, 2006). The Centers for Disease Control and Prevention now estimate that 1 in 150 children born today will have Autism (2007).

Competing theories exist regarding the cause of this increase. Some researchers believe that environmental toxins and chemicals such as childhood inoculations contribute to this alarming rate (London & Etzel, 2000). Others maintain that expanded methods for diagnosis and identification have lead to the current level of students identified in this population (Yeargin-Allsopp et al., 2003). While consensus may not yet explain the reasons for this increase, there is little dispute that the academic, social, and behavioral needs of this population are relevant and timely. The number of students today identified with ASD greatly underscores the need for effective and practical interventions in educational settings.

Social impairments are reflected in the core diagnostic criteria for ASD (Sukhodolsky, 2007). Individuals in this population often experience significant challenges with social interaction and adaptive behavior (Ivers, Hill, Agnew, & McNeill, 2007). Social cues, such as facial expressions, eye contact, and shared attention are important aspects of interpersonal functioning that remain an ongoing and fundamental challenge to this group (Bumiller , 2008).

Likewise, and of special interest to the educational community at large, students with ASD often struggle with communication and literacy development (Lanter & Watson, 2008). Early intervention efforts appear to contribute significantly to improved outcomes in this area (Hume, Bellini, & Pratt, 2005). Instructional approaches that improve writing systems and literacy acquisition remain an urgent and immediate need for this population (Delano, 2007).

Review of Current Study

Current research efforts on the educational use of Digital Storytelling are primarily limited to the general population of students (Robin, 2008). Prior to this study, there was no direct empirical evidence to support the benefit and use of Digital Storytelling as an instructional approach for high functioning students with ASD. This study extends the literature on Digital Storytelling as an authentic learning experience for individuals in this population as an additional and viable strategy to address literacy efforts in reading, writing, listening, and speaking. This study both explored and evaluated the effect of Digital Storytelling in other areas of functioning, such social and behavioral interactions.

This case study provides exploratory evidence of an increase in literacy outcomes, engaged learning, and social skills associated with Digital Storytelling for a high-functioning student with ASD. Jessica and I met over a three week period at a local public library to write, design, and create a Digital Story. Each session was approximately 45 minutes, or a total of 11.25 hours. This is an important consideration for classroom instruction, as students with ASD demonstrate varying levels of functioning and ability.

Triangulated measures that relied on iterative processes to guide key informant interviews, analyze relevant background documents, and conduct participant observations gave insight, depth, breath, and perspective to the benefits of this intervention with Jessica. Participant observation was particularly useful in this study because it provided an in-depth and holistic view of the literacy and social outcomes Jessica experienced across each Digital Storytelling session and throughout the duration of the study.

This study yielded three significant conclusions. First, Digital Storytelling can lead to improved outcomes in the areas of social, behavioral, and literacy development. Second, Digital

Storytelling demonstrates promise as an instructional strategy that provides ongoing literacy development and support for students with ASD. Third, prior knowledge of basic multimedia and computer related skills added to the implementation and overall contribution of Digital Storytelling as a meaningful, shared learning experience for students with ASD.

Implications of Digital Storytelling

The purpose of this investigation was to evaluate Digital Storytelling as an intervention to improve the literacy and social outcomes of a high functioning 6th grade student diagnosed with ASD. A theoretical framework that promoted individualized instruction, opportunities for creativity, and ongoing development of critical thinking skills guided the rationale for this case study. Findings in the present study support previous research on the benefit of Digital Storytelling and extended this instructional tool to students with ASD.

The review of literature, analysis of multiple data sources, and use of ethnographic participant observation methods lead to broad theoretical and practical implications. This case study demonstrated the benefit of Digital Storytelling as an appropriate method to promote literacy development and social interactions for students with ASD. The unique visual and interactive features of this intervention enabled Jessica to improve literacy outcomes through engaged learning, open collaboration, and active exploration of narrative writing.

Through the specific research questions explored in this study, as an educator I gained considerable insight and understanding about the dynamic nature of Digital Storytelling. The choice of a case design allowed me to closely examine the complex skills and embedded social interactions that support this intervention. Although research in this area is limited, this study confirmed the assertion put forth by Li that, "Digital storytelling is a multifaceted technology tool and its diverse applications in teaching and learning are still being discovered" (2007, p.

6205). Examining the complex interactions in this case study lead to certain applied and theoretical conclusions about implementing and maintaining a quality Digital Storytelling experience for Jessica and students with similar abilities.

Prior Knowledge

A conclusion drawn from this study is the requisite prior knowledge and experience needed in basic computer and multimedia applications. Technology and media-rich interactions are essential components of Digital Storytelling, therefore all participants such as teachers, paraprofessionals, students, and primary caregivers, should be versed in basic computer skills and applications. Existing computer and technology based skills enhance the overall quality and substance of a Digital Story.

The gap in digital literacy between Jessica and me was a limiting factor in the technical aspects of her music choice and editing abilities. Originally, Jessica chose four songs to play in the background of her story. While she knew how to insert songs into her story, she had no success with adjusting the background volume for impact. This became problematic as her voice could not be heard over the music. I offered several ideas to address this problem, but it soon appeared to require a set of skills that Jessica has not yet developed. Rather than offering a quick solution by completing this task for her, I encouraged her to consider alternatives to this aspect of her story. Ultimately, Jessica chose to insert the song for which her story is titled (i.e., Standing Outside the Fire) as the credits for the story were displayed (Brooks, 1993, track 1). The lesson learned during the implementation of this Digital Storytelling project is to recognize the ability levels of each participant in the area of computer and multi-media technologies. Ultimately, the final artistic and aesthetic quality of the Digital Story is determined by these competencies.

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Technology was an essential tool, however it was not an outcome goal of this study. Computer applications and multimedia systems impacted the learning process through its overall appeal and motivation. The technology component associated with Digital Storytelling helped sustain the implementation and effectiveness of this instructional approach. Astute technology use was the conduit to the reflective and evaluative practices within Digital Storytelling.

Appropriateness of Digital Storytelling

A second implication of this study is the appropriateness of using Digital Storytelling to address critical areas of literacy development. The challenges Jessica experiences in reading comprehension and writing performance are common to students in this population (Nation, Clarke, Wright, & Williams, 2006). The flexible and collaborative support within this intervention encourages expressive and receptive language acquisition. With prompting and supportive feedback, Jessica's confidence grew and her writing improved. If one considers this occurred in the writing of just one story, completed in an after-school setting over the course of 3 weeks, it is important then to consider how long development might be impacted over the course of 9 months.

Digital Storytelling emphasized critical writing, reading, and thinking skills in a visually interactive and engaging format. Throughout this intervention, Jessica maintained a high level of sustained attention to the details and quality of her story. Literacy skills are enhanced with this instructional model because of the iterative and incremental approach to improving story concept, plot development, mechanical editing, and overall production.

Lifelong Learning

A third implication of this study is the potential for Digital Storytelling to increase lifelong literacy and social development outcomes for students identified with ASD. The value of

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this intervention is not found in the final version, but rather in the process of revision, editing, and rewriting that ultimately leads to the end product. Digital Storytelling could encourage lifelong social and academic achievement by introducing emergent literacy skills and positive social interactions within the context of a model that capitalizes on the fundamental learning styles of students with ASD.

Within this intervention, the convergence of flexibility, high visual appeal, and student choice lead to higher levels of sustained interest and commitment to the quality of her story. Analysis of interview transcripts, audiotape, and observational field notes collected throughout this study verifies the ongoing struggle Jessica experiences with reading fluency and writing composition. Perhaps, the limited praise and success in this area explains her general aversion to literacy activities and tasks. However, the evidence from this investigation points to the subtle, multi-dimensional nature of Digital Storytelling as a powerful digital platform that encouraged her to interact with text and visual content in a manner that supports collaboration, advocacy, and empowerment. Clearly, Jessica became more willing to engage in certain literacy practices as a direct result of this intervention. The foundation of Digital Storytelling supports principles that lead to sustained outcomes in literacy achievement.

Inclusion

The potential for Digital Storytelling to promote instructional opportunities with the general population is the fourth implication of this study. The Individuals with Disabilities Education Improvement Act (IDEiA), or Public Law 94-142, gives an unambiguous directive to school districts and administrators to actively identify opportunities for students with exceptionalities to participate with their peers in the general population. Specifically, section 1412 states:

> To the maximum extent appropriate, handicapped children, including
> those children in public and private institutions or other care
> facilities, are educated with children who are not handicapped,
> and that special classes, separate schooling, or other removal of
> handicapped children from the regular educational environment
> occurs only when the nature or severity of the handicap is such
> that education in regular classes with the use of supplementary
> aids and services cannot be achieved satisfactorily.
> (P.L. 94-142, Section 1412 [5] [B])

Educators in the general population can use Digital Storytelling to promote more inclusive experiences between students with ASD and their peers in regular classroom settings. Ideally, this intervention can be used to foster understanding, student involvement, and shared decision making. With strategic planning and facilitation, Digital Storytelling can provide substantive educational experiences in a framework that promotes improved student outcomes through meaningful inclusive exchanges. While this intervention is adaptable and responsive to student interactions, certain criteria is associated with the successful implementation of this approach in an inclusive classroom environment. Practitioners should consider the following guidelines in the design and implementation of a Digital Storytelling intervention.

a) The classroom environment is arranged in a way that is warm and inviting to students. Digital Storytelling inherently requires a collaborative and participatory effort from each member. Therefore, the setting should be egalitarian in nature and one that reflects an emphasis and value on shared decision-making. The space should be less restrictive and allow freedom of movement to better accommodate the sensory integration needs of students with ASD.

b) Recognize the initial unfamiliarity students may have towards Digital Storytelling. Although the technology and multimedia based tools used to make a Digital Story are commonplace and used widely by

students today, the initial concept is innovative and new. The teacher should consider how to best introduce the concept and give students the information they need to be successful.

c) Through systematic collaboration, discussion, and information exchange, the story will emerge. Each student should understand that Digital Storytelling is not a "writing assignment." It is a story with personal meaning, emotional content, and uniquely identifiable to the writer. Through facilitation of this process, the story soon becomes evident. When the story becomes evident to the student, as evinced in the present case study, student motivation and commitment may follow. This aspect of Digital Storytelling is critical to the success and outcome of this intervention. Instead of the use of prescriptive methods designed to *give* information to students, the teacher should consider an instructional approach that *elicits* active student involvement and higher order thinking skills as a way to guide the learning process and allow students to draw upon, share, and contribute to their own experience with Digital Storytelling.

d) While no formal rules exist for writing the script to a Digital Story, several best-practices have been identified through the literature review and in this study. 250-500 words seem to be the ideal length of a Digital Story. A Digital Story is typically 2-3 minutes in length. Expressive communication is a common challenge for students with ASD. If this intervention is used to promote inclusive practices, the teacher should be

aware of the the challenges that come with this activity. While some students can easily meet the 250-500 word range, others may require differentiated instruction and accommodations to meet the goals of this lesson. Jessica, for example, is easily distracted by environmental stimuli. A modification used in this study was to substantially break down each component of this activity (field notes). Our work area contained only the required materials to complete the task for that day. For example, when Jessica initially wrote her story, her work area contained only the paper and pen for writing. The computer, books, purse, and book sack were put away. Later, as she began to work exclusively on the computer to edit her story, the writing materials were put away to reduce her distractibility. The teacher in a general classroom setting should refer to and use the accommodations and instructional modifications delineated in the Individualized Educational Program (IEP) for each student who receives special education services and participates in a Digital Storytelling activity with the general population.

e) The final product is influenced by the iterative process of student collaboration, ongoing input, and individual creativity. Obsessive, repetitive, and stereotyped behaviors are typical characteristics of students with ASD. Jessica seemed to be especially attentive to decisions made during the final, media and technology intensive stage of this intervention (field notes). Minor differences in grammar, syntax, and usage, were seemingly amplified to Jessica. For example, the written portion of her

story contains no contractions. However, while recording her story, she

reverted to natural patterns of conversation that involved the use of

contractions. She became visibly frustrated with the inability to read the

script verbatim. I explained to her that it sounds more natural with

contractions and assured her that her story benefits from this change. The

final stage of a Digital Story can be especially challenging to students with

ASD. When technology did not quickly conform to her intentions, Jessica

initially wanted to end the session (field notes). If this intervention is used

to promote inclusive practices between students with ASD and the general

population, the teacher should have contingencies in place and a general

awareness of the difficulty associated with this stage of the Digital Story

process.

Portfolio Assessment

Assessment practices are integral to Special Education planning and implementation of

services. Assessment is needed to determine the effectiveness of an intervention (Hutchinson,

1999)**.** Identifying appropriate evaluation methods to measure student performance was an

ongoing challenge in my classroom practice for students with EBD and ASD. The dilemma is

compounded by federal, state, and district requirement to demonstrate that students have access

to the general population and perform on a level equivalent to their age level peers in the general

population. Boyer and Lee (2001) describe the experience of a first year teacher in a self-

contained classroom for six students with ASD. Many educators can relate to the frustration of

this teacher, "These state standards detailed knowledge and skills to be learned at each grade

level and set passing scores on state-developed tests for high school graduation...this heightened

expectation for accountability increased the demand for data collection and alternate forms for reporting progress" (p.78-79).

This case study supports the argument that informal, systematic, and continuous evaluation of writing provides the best approach to measure writing outcomes (Teale, 1988). Observation throughout this study was the strongest indicator of success with this intervention. The writing samples from each session were a reliable way to confirm my observations. Also, a review of writing samples collected at each session allowed Jessica to evaluate and reflect on her progress.

Portfolio Assessments are one way to document student progress through the systematic and ongoing collection of student work samples. Digital Storytelling can be a key component in a student portfolio, as it allows teachers to accumulate a record of improved literacy and social outcomes over time for students with ASD. This study identifies the following benefits of Digital Storytelling as a portfolio assessment strategy for students in an ASD population:

  a) A review of multiple Digital Stories made by one individual allows the teacher to evaluate student learning over time and adjust instructional approaches and strategies to address the needs identified through this formative review.

  b) A portfolio based assessment of Digital Stories is a useful approach to encourage self-monitoring and assessment of writing. Students with ASD who function at a high academic level, like Jessica, may benefit from strategies that teach her to evaluate the strengths and weaknesses in her own writing. This study documents the pride and intrinsic motivation with this intervention, unlike the restiveness she often demonstrates with

standardized writing assessment protocols in a classroom setting. The

inclusion of a Digital Story into a portfolio model could provide the

teacher with more data and evidence of improved literacy and social

outcomes for students in this population.

c) The use of Digital Storytelling as an informal assessment measure

provides evidence of the unique creativity and potential of students with

ASD. The imagery, music choice, and story arrangement will demonstrate

the individual abilities and strengths of each student. Over time, a

portfolio assessment can provide evidence of higher competencies with

digital technologies, artistic expression, and improved social interactions.

Feasibility

A fundamental component of the No Child Left Behind Act of 2001 (NCLB) is the

mandate for schools to implement and utilize research based practices in literacy instruction.

Congress allocated 23.7 billion dollars to fund the requirements in this sweeping legislation.

Specifically, NCLB requires the use of reading programs that support a research-based approach

to improved literacy outcomes:

> To provide assistance to State educational agencies
> and local educational agencies in selecting or developing
> effective instructional materials (including classroom-based
> materials to assist teachers in implementing the essential
> components of reading instruction), programs, learning systems,
> and strategies to implement methods that have been proven to
> prevent or remediate reading failure within a State.
> (20 U. S. C. § 6361)

Thus, such an iterative approach can broaden the programming that addresses this issue.

Few commercial programs that "fit" this description offer improvement in writing, yet every act

of writing is also an act of reading. In 2003, EBR adapted READ 180 to use throughout the

district in an effort to target the needs of students with low reading and writing scores and to both accelerate and improve their performance on the yearly statewide assessment. The school Jessica attends is in its second year of implementing the READ 180 program. The school budget provides funds for READ 180 at an annual cost of $30,000, or $1500.00 per student (http://xrl.us/SchoolImprovePlan08, http://xrl.us/READ180cost). The site's school Improvement Plan lists the following evaluative criteria to assess the effectiveness and benefit of this initiative:

> Teachers will provide READ 180 instruction to students and reflected in lesson plans. Student's work will be reflective of this strategy. Student performance will improve. (http://xrl.us/SchoolImprovePlan08)

Despite the efforts under NCBL to promote the use of research based instructional strategies, teachers continue to experience barriers with the full implementation of these approaches (Gagnon, 2007). Common reasons educators give for a widening gap between research and practice include limited administrative support, infrequent training opportunities, and a frustrating lack of resources (Snell, 2003). In WCSD, these issues have been escalated by high turn over. For example, two administrators have served at Jessica's school since initial implementation of READ 180, the district has had two different individuals charged with overseeing this program, three different elementary assistant superintendents have served, and during this timeframe the district has witnessed the resignation of two superintendents. The current superintendent is scheduled to retire in July 2009. That kind of turnover directly impacts administrative support as each new leader must gain knowledge of progress and properly prioritize needs. In regard to Snell's assertion (2008) of lack of resources, WCSD has inconsistently supported the high tech demand of READ 180 wherein each site requires a designated representative to oversee this program at the school building level. As monies shrink, such support becomes scarce.

Digital Storytelling overcomes these criticisms by using available classroom resources to address literacy and social skills development. In a study of the current availability and use of computers within school settings, Arrowood and Davis (2008) noted the extensive availability of computers in the classroom and school library environment. All classrooms observed in their study had at least one computer. Typically, the teacher had a computer for personal use and two to seven computers were available for student use (Arrowood and Davis, 2008). At a minimum, Digital Storytelling requires only the technology that currently exists on the classroom computer. This intervention requires no additional costs, resources, facilities, or personnel. The feasibility of this intervention is high in its potential to link evidence-based reading instruction to the learning styles of students with ASD.

Recommendations

The following section outlines recommendations to support the development and implementation of Digital Storytelling across multiple settings. Suggestions for practice emerge from the results of this case study, and should serve as working hypotheses. Specifically, recommendations include the use of Digital Storytelling in multiple settings and contexts.

Home Use

Research on literacy instruction continues to advance our understanding of practices that encourage and sustain improved outcomes in reading and writing performance (Nation, Clarke, Wright, & Williams, 2006). The need continues for ongoing, systematic, and comprehensive efforts to develop, evaluate, and implement useful literacy practices. Literacy research should include, "... a variety of interventions of varying complexity" (Pressley, Graham, and Harris, 2006). The flexible and decentralized structure of Digital Storytelling lends itself to ready implementation in multiple settings.

The description Smith gives of her early experiences with Jessica is familiar and understood by many parents in the Autism community:

> [Smith]: What I remember about that time was that there was
>
> very little eye contact ....the eye contact was gone.
>
> [Brent]: ...even when you were playing with her, and holding her and...(?)
>
> [Smith]: [emphatic]...she would *only* look at me if I was D-I-R-E-C-T-L-Y in
>
> front of her...and that didn't even last long.
>
> [Brent]: [silence]
>
> [Smith]: It was just a blank stare. Like I said, she wasn't quiet as huggable...she
>
> seemed indifferent to my affection.

A lifelong struggle with daily social interactions is a hallmark of ASD (Klin et al., 2006). Digital Storytelling provides an opportunity for parents and family members to participate in an activity that fosters communicative, interpersonal, and literacy based skills, yet supports the learner ultimately.

Children with Autism seem to respond better to treatment when it occurs in settings that are familiar and comfortable. Ozonoff and Cathcart, in their report to the American Occupational Therapy Association, suggested, "Mild autism and good language skills predicted greater improvement from the home intervention" (p.26, 1998). The use of Digital Storytelling at home may help involve family members in a positive way to better understand and accommodate the learning style and preferences of their child with ASD. Additionally, Digital Storytelling may lead to a successfully home and school partnership to address ongoing academic, social, and behavioral challenges. The home use of this intervention appropriately extends the academic and social goals addressed by the institution, adding curricular congruence.

Use in a Special Education Classroom

A frustration many teachers experience in a self-contained setting is the ongoing search for creative and meaningful ways to integrate social skills instruction within the larger academic framework. Ideally, interventions used with student in an ASD population can address multiple competencies. The use of Digital Storytelling is recommended in a self contained classroom setting because of its unique ability to link literacy and social skill development across the curriculum. For instance, while this study explored narrative writing, Digital Storytelling could also be used in content areas such as Social Studies and Science. It's adaptability is tremendous. Duke (2000) suggested children do not read adequate amounts of informative text. Digital Storytelling is a means of increasing writing both narrative and expository genres.

Digital Storytelling may be especially beneficial in a Special Education setting as an interactive tool to promote self determination, collective problem solving, and student involvement. Increasing literacy skill development by simultaneously improving social skills can be addressed via this method.

Use with General Population to Promote Inclusion

Likewise, this intervention may provide the opportunity for more inclusive practices in the regular classroom setting. The transition into a classroom setting with the general population can be difficult for students with ASD. Ms. Hill recalls that Jessica "shut down" during the first week she attended the sixth grade reading class. She came into class, "put her head down...and as soon as the bell rang...without me dismissing everyone...ran out the class to [return to] your class" (Hill, personal communication, April 27, 2008).

Digital Storytelling encourages student participation, engagement, and leadership. Like many students with ASD, Jessica has an appreciation for sound and visual quality. She also has

computer skills that seem more advanced than her peer group. If facilitated properly, Digital Storytelling could allow more students in this population to contribute in a meaningful way to the classroom learning experience with their peers in the general population. As technology increases and students access increases, such as texting and IPODS, Digital Storytelling has huge implications for all students. All children can benefit from Digital Storytelling use and thus improve literacy skills.

Future Studies

A review of literature found little empirical research on the use of Digital Storytelling for students in special populations. The literature was especially limited on the use of Digital Storytelling for students with ASD. Anecdotal evidence suggests that many classroom teachers are using Digital Storytelling to enrich student learning experiences. It appears that research has not sufficiently addressed how teachers can use Digital Storytelling to improve the outcomes of individuals with ASD.

This case study is an initial step towards understanding and describing the potential impact of a Digital Storytelling experience for a sixth grade student with high-functioning ASD. The first recommendation calls for ongoing efforts to critically evaluate and contextualize the findings of this case study to the larger challenge of literacy instruction for students with ASD. Consideration to replicate and extend this study may include its use in a classroom setting, increasing the sample size, or examining the sustainability of this intervention over extended periods of time.

Future studies would also benefit from longitudinal designs that clearly trace the relationship between Digital Storytelling and literacy gains, social skills improvement, and language acquisition for students with ASD. Within the framework of a longitudinal study, the

dynamic and interrelated processes of literacy, collaboration, and educational technology could be examined more extensively. This approach may provide more support to the results of this particular exploratory study.

The alarming rate of Autism reported in children has lead to a call for meaningful academic and behavioral interventions that address the complex needs of this population. According to Hyman (2001), "There is increasing evidence that behavioural and educational intervention with young children may significantly improve developmental and behavioural outcomes and that basic deficits in play and communication may be therapeutically modified" (p. 3141). Exploring Digital Storytelling as a platform for more inclusive opportunities with the general population may provide insight into the factors that influence successful experiences in a regular classroom setting.

Personal Implication

As a researcher, teacher, and lifelong learner, this study taught me the importance of recognizing grass root level movements and interventions that have current use and support in classroom settings. Although these interventions may not *yet* be empirically validated, they may have promise for guiding future research efforts. As I began to read and learn more about Digital Storytelling, it soon became evident that this is one such intervention with increased support in many classrooms today.

Discussions about the goals and purpose of this study with my elementary school colleagues was often met with a response similar to one made by Ms. Epps, "....and you wanna know if that [Digital Storytelling]works? Brent, maybe I can save you some time .... *of course it will work!"* (personal communication, April 23, 2008). Although my fellow teachers were interested and supportive of my study, it seemed logical to them that Digital Storytelling would

benefit all students, including mine with ASD. The larger theme to emerge from these conversations was their general frustration with the lack of meaningful research-based interventions that can find immediate use in their classroom practice. However, anecdotal evidence isn't as convincing as the results of this study, where implementation was systematically documented.

As I begin my career in Higher Education, these conversations remain unfinished. I remember the frustration I experienced trying to teach literacy skills with a mandated commercial package that seemed ambivalent to the needs of my students with ASD. I also remember the lack of options to supplement literacy instruction in my classroom. I carry these experiences with me. They color my perspectives.

The true purpose of research in education needs to lead to improved learning and teaching. I am humbled by the realization that I am now in a position to analyze, interpret, and disseminate meaningful information that impacts the effectiveness of instruction in special education settings. My study is only the beginning of a personal endeavor to bring about real change in the way we approach literacy instruction and acquisition for students in special education settings, especially for students with ASD. This study provides a springboard for future research efforts to increase existing knowledge of strategies that target the academic and social outcomes of such students.

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APPENDIX A

LESSON PLAN OF FIRST DIGITAL STORYTELLING SESSION

Lesson Plan:
Digital Storytelling

Date: 4/19/08
Time: 10:30 am
Session: 1

Objective
a) Given multiple examples, Jessica will recognize the components, structure, and organization of a Digital Story.
b) Jessica will use the information in this introductory lesson to help select topic to later research, write, and create her own Digital Story.

Standards
Grades 6-8 NETS standard for Students :
Design, develop, publish, and present products using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.

Anticipatory Set
Questioning/Conversation:
- Current use of Computers / technology
- What makes a good story?
  - From the viewpoint of the story teller?
  - From the viewpoint of the listener?
- Digital Storytelling:
  - Have you heard of this?
  - What do you think it is?

Teaching / Instructional Process
a) Show / discuss the 7 elements of a Digital Storytelling.
  - point of view
  - dramatic question
  - emotional content
  - gift of your voice
  - power of your sound track
  - economy
  - pacing
b) Begin to consider topics that incorporate these 7 elements.
  - Recent academic success (In reading / math class)
  - Inform others about ASD

Guided Practice / Monitoring
Show examples of Digital Stories
  - Big Jim (Face to face with a Bear)
  - The move (From Chicago to rural Kentucky)

Closure
a) Discuss with Jessica her (new) understanding of a Digital Story
b) Summarize the 7 elements of a Digital Story
c) Jessica: Think of a topic to use for the Digital Story

Independent Practice
Return next session with idea / concept for Digital Story

APPENDIX B

DIRECTIONS TO FOURTH GRADE PRE-LEAP
WRITING AND COMPOSITION SECTION

Fourth Grade Pre-LEAP
SECTION 2: WRITING AND COMPOSITION

Writing

Read the topic below and write a well-organized composition of at least 100-150 words. Be sure to follow the suggestions listed under the topic.

Writing Topic

_____

- Your story should have at least two paragraphs.
- Be sure your story has a beginning, a middle, and an end.
- Give specific details and enough information so that your classmates will understand what happened..
- Check your writing for correct spelling, punctuation, and grammar.

.Use the next page for brainstorming , or writing an outline. Write a rough draft on the pages titled **Rough Draft**. Write your final draft on the pages titled **Final Draft.**

Remember: The prewriting activities and the rough draft will not be scored. Only your **Final Draft** will be scored.

VITA

Brent Daigle was born in Port Arthur, Texas, in January 1977 to Ronnie and Roxie Daigle. He graduated from Sulphur High School in 1995 and received a Bachelor of Arts degree, majoring in American history, in 2002, from the University of Missouri–St. Louis. He then began his graduate education at Northwestern State University. In 2004, he earned a Master of Education degree from Northwestern State University, with an emphasis and certification in special education.

Daigle accepted a graduate assistantship from the College of Education at Louisiana State University (LSU) in 2005 and began his doctoral work toward a terminal degree in special education. Following his assistantship, Daigle worked as a special education teacher in the East Baton Rouge Parish School District throughout his time at LSU.

Daigle and his wife, Tiffany, have three children, Aubrie, Claire, and Parker. They all live in Locust Grove, Georgia.