Preface

In our book, Technology and Young Children: Bridging the Digital Communication – Generation Gap, we write about the socio-cultural gap between educational environments, teachers, and children as influenced by technology. A generation gap implies a vast difference in cultural norms between a younger generation and their elders. A generation gap is a frustrating lack of communication between young and old, a stretch of time that separates cultures within a society, allowing each to develop their own character (Safire, 2008). The popularization of the term generation gap is attributed to the 1960’s era in the United States when socio-cultural changes diversified the behavior and values between generations at an unprecedented rate. This, in part has been explained by the size of the young generation during the 1960s, which gave it unprecedented power and willingness to rebel against societal norms. We believe this gap was intensified through the evolving cultural changes influenced by technology communication systems during that time. The current gap, referred to as the digital communication-generation gap is different from others as the rapid development and acceptance of technological tools have changed the interactions and relationships across four generations and is exponential. Technology has shifted the traditional generational power roles from the adult as the expert to children as experts and is an important component of the current generation gap, a change that redefines the role of teachers and education and what learning means to the citizen of this generation. The keepers of knowledge, the schools, have lost their place at the head of the line as researchers have not found the innovations of technology in classrooms. Instead technology innovation is breaking out of the administrative office leaving teachers behind to maintain their traditional classroom practices (Collins & Halverson 2009). The concept of taking courses in schools to learn is becoming antiquated as the goal of life-long learning becomes a reality when learners negotiate their own learning through a variety of experiences not available in schools.

The chapters in this book present the view that beliefs, history, research, and policy are essential to changing the relationships of the social, cultural educational system with technology. The content should help teachers reflect on what is happening as the center of learning power moves outside a classroom. The suggestions for use of technology are designed to help educators ease into the use of technology rather than leap off the cliff of innovation, developing confidence and competence in their teaching. We do not try to push educators into the future world of technology but give them ideas for the here and now. The book is organized into four sections related to the digital generation gap. Our book describes how technology has impacted and can impact the learning of young children through formal and informal environments. This includes ways technology has dramatically changed research of children and their capabilities for academic success, the power structure of schools, the access to information, and social networking interactions.
The new generation of children comes to early childhood programs with many informal experiences in technology and as members of the social communication (millennium) generation. There is much written about this gap between the children and the teachers of children in the comfort levels of technology acceptance and use. Bridging the communication/generation gap has become a concern because with today’s technology, that generation gap is getting fairly wide and continues to grow across all levels of education. We hope to help teachers and educators start building the bridges to connect the gap between generations as they read the contents of this book. The future of schools will depend on the acceptance of how this new generation learns, not how we think children should act and learn.

Teachers of young children are the technology gatekeepers in childcare programs. They are vital to the appropriate use of technology, yet little is documented concerning training and understanding of teachers’ use in classrooms. Teachers need to understand how to develop learning, what types of learning should be facilitated, and how to serve the needs of diverse populations using technology. Computers are more than tools for bringing efficiency to traditional approaches; they can open new and unforeseen avenues for learning.

**Audience**

The proposed audience for this book includes university faculty for use in early childhood courses, Head Start and child care center teachers and professional development personnel, and public school teachers and administrators working with young children. The book will assist parents and families to better understand how technology influences the lives of young children. We propose an international market also for similar childhood programs.

College students and college educators are our target audience. This book will be highly suitable as a personal reference for early childhood practitioners, for administrators, and for parents of young children. Early childhood educational organizations such as Head Start programs and the National Association for the Education of Young Children, childcare centers, preschools, kindergartens, and primary schools (1st through 3rd grades) might find this book useful. As a secondary market, both public and university libraries, book stores, book clubs, as well as educators, school personnel, educators, and university libraries may find this writing of interest. There is inclusion of international authors for use in multiple countries. We anticipate this book will be also important for parents of young children to help them better understand how technology will be used and impact their children’s development and education and more important their changing roles in learning.

**Section 1. Understanding the Digital Communication Generation Gap: Values, Beliefs, Social Cultural Systems that Influence Teaching Practice**

Our first section explores how technology and the beliefs about technology influence and change the world view of educational environments, children and teachers. This section includes six chapters that discuss the binary oppositions of adult-child, self-other, and artificial-real, the cultural history of technology, the changing social cultural power structures of education influenced by technological advances, and how the epistemology of teachers guides instructional decisions and classroom environments.
Chapter 1: The Impact on Technology on Early Childhood Education: Where the Child Things are? Adults, Children, Digital Monsters and the Spaces in Between

In our first chapter Andrew Neil Gibbons discusses bridging the communication-generation gap through an analysis of the child’s play with hi-tech toys. Through early play experiences with the range of toys, whether digital or not, the child plays with the symbols, themes and values associating real products with their fictional source, and with the other multimedia manifestations that offer children the opportunity to engage with the questions of the nature of real, artificial, conscious, alive, dead, adult, and child. He illustrates the gaps that appear between technological generations through the show Digimon, a term that means “Digital Monsters,” and is a media franchise encompassing anime, manga, toys, video games, trading card games, and other media. This chapter explores the complexity of the toy and of the toys contemporary troubling of adulthood and has regarded the latest hi-tech shows as productive in supporting such exploration of a set of binary oppositions. These themes highlight challenges to binary oppositions of adult-child, self-other, and artificial-real. Andrew writes about different ways of both understanding and analyzing gaps between child and adult through the symbol of the toy and writes about the importance of preparing an ICT-rich environment.

Chapter 2: Enculturation of Young Children and Technology

The second chapter talks about the enculturation of children through technology. Alex Spatariu, Andrea Peach, and Susan Bell discuss key points about how social institutions and informal experiences shape the world of the young child. They use the term technology to encompass more than just computers but include many experiences that young children bring to the classroom. The chapter is divided into three main discussion sections. The first section discusses various types of technology used by children in non-school settings. Parental issues and developmental considerations are included to give the reader a more comprehensive understanding of how the digital age touches all parts of children’s lives. The second section examines the use of technologies with young children from a developmental perspective. The authors also address concerns with the uses of these technologies in relationship to teaching and learning. Authors also hope to dispel some of the technology myths that teachers of young children have about technology and learning in the early childhood classroom. The concept of the digital divide is addressed in this section as well. The last section of this chapter discusses technology evaluation issues and concrete use of technology by educators of young children.

Chapter 3: Children’s Power for Learning in the Age of Technology

In chapter 3 Julie McLeod, Lin Lin, and Sheri Vasinda discuss children’s power through technology in relation to education and educational environments. Technology has changed the power structures of education, a change many adults may find uncomfortable. Children are now experts in something that is truly important in the adult world, which dramatically changes the interactions and roles in educational environments. The authors believe that current power structure of classrooms inhibits children from exerting their power and motivation for learning. As schools move from an outdated model based on the need for obedient workers during the Industrial Age into the Digital Age, teachers need to reflect on the needs of today’s citizenship, life-style, and skills for the future work force. Their view of social power as the capacity for action is especially compelling, particularly because technology has enabled even very
young children to take action in society in ways that are important, public, and inconceivable without the technology. The identification of types of power should allow educators to identify beliefs about their changing roles in classrooms and the commitment and liberation for their own and children’s learning.

**Chapter 4: Technology in Three American Preschools: Technological Influences on Ideology and Social Class**

Chapter 4 is an ethnography: *Technological Influences on Ideology and Social Class*. This chapter explores the marriage of popular culture and technology in preschool settings, specifically the manner in which social class and preschool ideology contribute to or detract from children’s access to popular culture technology. It stems from a comparative ethnographic study of popular culture in three preschools that differ socio-economically and ideologically. After reading this chapter the reader should develop a better understanding of the connection of ideology and social class in the acceptance or rejection of technology as a pedagogical tool. It attempts to call into question practices that are seen as natural or “appropriate” as specific to a cultural group. By examining this topic from a critical perspective it is the intent to clarify curricular and pedagogical tools as not without class biases and intentions. This chapter discusses class discrimination as well as religious and theoretical beliefs in the appearance of technology in both educational programs and the home lives of preschoolers. Allison writes about the emerging technological age, and in the era of accountability, preschools are dealing with technology in very different manners. This chapter shows that in early childhood sectors, the embracing of technology is not universal, and if it is, depends heavily on the context in which it is used. Media images, viewed in some settings as fancifully benign are the same images that are rejected for their questionable morals or influence from mass marketing. Furthermore, this ethnography demonstrates that within preschool sectors ideology and social class plays a major role for the type of popular culture technology that children in the United States will interact with in various preschools, and this context often contributes to the meaning that they make out of these images.

**Section 2. Bridging the Gap between Technology-Based Educational Research Methods and Child Development**

The second section, *Bridging the Gap between Technology-based Educational Research Methods and Child Development*, explores how technology has changed research of young children. The two chapters in this section discuss the role of technology in child development research and how technology has enhanced the power of observational data. The new understanding of children’s potential due to technological advances has dramatically changed what we once accepted as guides and limitations for child study. This information is important for teachers as they are the key to implementing research implications in classrooms.

**Chapter 5: Technology: Changing the Research Base on Young Children**

In chapter 5, Shannon Audley-Piotorwksi, Neha Kumar, Yeh Hsueh, and Melanie Sumner discuss how technology has changed the understanding of child development and learning. The writing team for this chapter is unique as it includes a member of the millennium generation who is already engaged in research using technology. Neha is an example of how this generation comes to educational environments with
competence and confidence in the tools of technology. Understanding the role of technology and the evidence of children’s development has opened new ideas about the capabilities of children. Teachers need to understand how these technologies are being used and how researchers support learning and development based on this new approach to information collection with young children. What we know about young children’s development is dependent upon the availability of technology. The discussion informs teachers about common technologies, and how these technologies are used in research on the development of young children. The writing helps teachers understand how technology has helped advance knowledge about older issues, such as literacy development, in research, and how these findings indirectly inform pedagogy. Some major implications for teachers include that children’s emotional and behavior regulation is not simply a reflection of the child’s will, but is based on individual differences in the child’s nervous system, as measured by heart rate and cortisol levels. It can be seen how factors outside of the child’s control, such as poverty, can literally reshape a child’s memory and change the brain’s ability to think critically. Likewise, brain imaging technologies, such as fMRI, have also suggested that emotions can influence what information a child learns, and how that knowledge can be applied. The availability of new technology allows researchers to continuously refine their understanding of young children’s development. It is important for educators and parents to be aware of the current technologies that researchers use, and how these technologies advance knowledge about young children’s development. If educators understand the current technology and trends in research on child development, they are one step closer to merging research with classroom pedagogy.

Chapter 6: The Role of Video in the Preschool in Three Cultures Method

The sixth chapter written by Yeh Hsueh and Joseph Tobin illustrates the influence technology is having on approaches to research and study of children and teachers. Yeh and Joseph discuss the use of video as an ethnographic research tool for studying preschool education and offers insight into how video can be used to inform researchers, practitioners, and parents of young children. The approach referred to as video-cued multivocal ethnography is intended to highlight differences across cultures, and to reveal continuity and change in preschool education. The study described in this chapter investigated preschool programs in three countries over the course of a generation. As the researchers worked through their study, they discovered the videos were also valuable for promoting teachers’ reflections and development of cross-cultural understandings. The authors discuss this innovative approach to using video in early childhood education research, an approach that uses video not as data, but rather as a stimulus or cue for getting teachers and directors in different cultures to reflect on the thinking behind their practices. While technology may seem to collapse and shorten the ethnography’s traditional period of extended fieldwork there have been other benefits. Video produces rich insights not evident through traditional observations. By reviewing the data researchers can see new nuances of interactions on video which open new doors to investigation. This question-generating aspect of the video-cued interviews, especially in the repeated interviews with key informants, is also conducive to capturing features of dynamic reforms in early childhood education. The reflection of the authors on their research gave them new insight into technology and ways to adapt their work for use with pre-service and in-service professional development of teachers.

The Preschool in Three Cultures chapter address the concerns of quality research design as it continues to add to a growing scientific knowledge base of what influences preschool environments from multiple dimensions and diverse perspectives. The community of practitioners and researchers is one
of the powerful ideas from this method. The researchers join teachers, administrators and parents in grappling with their own taken-for-granted beliefs and practices in a new light, as well as to widen their horizons of what is possible by being exposed to approaches used in other places in their own culture and in other cultures.

Section 3. Bridging the Gap between Pedagogy and Technology

The third section, Bridging the Gap between Pedagogy and Technology, discusses how technology can support the educational environment through five domains. These are teacher training, second language learners, science, mathematics, and special needs children. The integration of technology must go beyond placing a computer in a classroom. These chapters give specific examples of how to use technology to support instruction and how technology supports domain specific learning for teachers and children. The technology myths associated with early childhood education and learning are challenged in these chapters to help teachers better understand how technology supports instructional practice.

Chapter 7: Early Childhood Teachers: Closing the Digital –Divide

In Chapter 7, Kevin Thomas and Kathleen Spencer Cooter argue that teachers and others working in the world of education at both the practitioner and preservice levels have been slow to respond to the tremendous and irreversible cultural shift, thus creating a second and even more inequitable digital divide, the divide of technological opportunity. They discuss appropriate change for teacher training programs in early childhood education to close the digital divide through both social cultural change and practical classroom applications. This chapter reviews the state of technology training for early childhood educators in teacher preparation institutions across the country. Using NCATE and NAEYC standards as benchmarks of practice, the chapter outlines some current issues and research on technology training at the preservice level - such as course sequence, textbook choice, content infusion, field experiences, et cetera. The chapter also identifies three technologies for use by teachers: Web 2.0, Google Earth, and the Virtual Manipulatives that are accessible, free to users, require little teacher training, and have evidence to support their instructional benefits. These three well-developed technologies can easily be introduced to students and teachers as exemplars of constructivist pedagogical technology in early childhood science and mathematics classrooms. Suggested activities for teachers using these tools and resources are included to help teachers start or increase their use of technology.

Chapter 8: Technology and Second Language Learning: Developmental Recommendations for Early-Childhood Education

The eighth chapter, by Nathan E. Ziegler and Florian C. Feucht, addresses the growing population of second language learners in classrooms and how language and technology can be mutually supportive. Nathan and Florian write about second language classrooms from a developmental and methodological perspective. They establish a theoretical framework that looks at the relationship between cognitive development, second language teaching methods, and technology. More specifically, the framework aligns the different teaching methods and technology with Piaget’s four levels of cognitive development. Second language learners at the sensory motor, preoperational, and concrete level of cognitive development should be using technology that presents communication in a second language in real-
world contexts. This is even true for the learner at the formal operations; however, if technology is too abstract, the learners will not be able to comprehend meaning behind the sounds and the texts. As the second language learner develops, they are able to understand more abstract aspects of communication and can use technology that facilitates their second language abilities at the formal operations and meta-cognitive level. They provide a rubric to assist second language teachers in an early-childhood classroom in designing developmentally appropriate lesson plans with technology. Nathan and Florian use a lesson as the thread that binds this chapter together so teachers can see how even good planning may not be age appropriate for second language learners. This chapter bridges the fields of technology, second language learning, and cognitive development in childhood. The authors try to help teachers better understand how their teaching methods correspond with the learners’ cognitive stage of development and the technology that is chosen to assist in instruction. The authors give suggestions and rationale for different types of technology to support teachers as they work with second language learners in their classrooms. The chapter concludes with educational, conceptual, and methodological implications as they pertain to technology research and development in early second language classrooms.

Chapter 9: Science Technology and Young Children

In Chapter 9, Brian Giza provides a framework for evaluating and applying tools for science in all classrooms. Teachers of young children have access to an ever increasing diversity of technology tools. Brian includes a series of vignettes that illustrate the application of technology in the context of a tools-task-strategy approach. Early childhood and primary level science teachers, especially novice science teachers, are confronted with a number of challenges when they try to integrate technology into the classroom. Sometimes the tools that they have are not appropriate for young children. Sometimes the tools that they have are not appropriate for anyone - they are obsolete hand-me-downs, computers and software passed from upper grades to the earlier ones. Fortunately, partly due to the reduction of costs of computers, school districts are beginning to equip early grades with computers that are of recent vintage. Even when the computers or other technology tools available are modern and grade-level appropriate, teacher may not realize how best to use them in their teaching. Brian writes about ways to develop and assist an engaged and active campus planning team and provides advice and suggestions for the individual teacher who may or may not benefit from the resources that an effective support structure may give. To help users assess and integrate technology in pedagogically sound ways, he frames the use of technology in terms of tools, tasks, and strategies. We recommend that the user is best served when they first consider the task that they want to accomplish before they select the tool - and that they should consider the strategy (pedagogy) that they wish to use before they proceed into the using a particular tool for a task.

Chapter 10: Mathematics Learning through the Use of Technology

The tenth chapter, written by Amy Smith, Amy Gentry, and Sally Blake, provides a description of how some technological tools, when applied with sound inquiry-based pedagogy and driven by ongoing assessment, can facilitate learning in today’s increasingly technological world. The authors discuss three broad applications of technology for early childhood teachers to support mathematics learning. These are: technology as a teacher resource, technology as a support tool for teaching, and technology as process support for learning. This chapter examines the nature of children’s learning and the associated impacts that technology is making on the young learner. Amy, Amy, and Sally discuss elements of
effective technology-based teaching. They include a discussion of some of the issues surrounding technology and mathematics for young children including the use of Mathematics and Technology Talk for teachers. The identification of technology and mathematics in relation to Bloom’s taxonomy of higher order thinking can guide teachers away from the traditional, memorization-only approach to teaching. The authors talk about age-appropriate use of technology and mathematics including a sample checklist for assessment and a framework for developing assessment tools. Considerations for future research as well as a list of relevant, practical resources for teachers to experiment within their own classrooms are also included to help teachers move towards a more tech-friendly instructional approach and classroom environment. For the sake of brevity, much of the information shared in this chapter is framed around a kindergarten (ages 4-5 in the United States) level; however, with simple modifications, the information can be applied to a range of learning differences. It is the intent of the authors to give examples that focus on the mathematics and technology rather than specific age levels. There are some ideas that would be appropriate across the age levels 3 to 9.

Chapter 11: Technology for Young Children with Special Needs

In Chapter 11, David and Sara Bicard write about the amazing changes technology has made in the lives of special needs learners. The Bicards explain how technology supports children identified with disabilities that qualify for special education, including physical disabilities such as deafness or blindness, mental disabilities, such as Down’s syndrome and autism, medical conditions, such as oxygen dependence or traumatic brain injury, learning deficits, such as dyslexia, and behavioral disorders, such as attention deficit hyperactivity disorder (ADHD) and conduct disorders. These children would have difficulty accessing and participating in the instructional environment in public educational institutions without technology. David and Sara write about how teachers can give special needs children the opportunity to participate and succeed in what is considered the general curriculum for children in schools. The gap in special education is often between curriculum delivery for special needs children and traditional teacher training programs. As inclusion of these children becomes a reality in all classrooms, teachers may feel inadequate to deal with the responsibility of instructional practices to support special needs learning. Too often it is assumed these children are not capable of learning the material required in the high accountability environment of modern schools. This chapter approaches the use of technology in early childhood programs through three types of applications: adaptation of existing computers and other technology (adapt); computer software programs to address particular skill deficits (address); and specialized technology used to assist the functioning of a child with disabilities (assist). The Bicards give specific descriptions of each type of assistive technology devices and how teachers can use these to support learning. They identify possible solutions to financing and finding assistive technology for teachers and suggestions for working with parents. This chapter provides a framework for the use of technology to assist these exceptional children in early childhood and primary level classrooms.

Section 4. Bridging the Gap between Policy and Practice

The fourth section, Bridging the Gap between Policy and Practice, is an abridged case study of what has happened in Mexico, the first country to implement mandatory preschool education for all children. This dramatic mandate brought promise for parents and children as Mexico attempted to provide support for all young children’s educational development. This chapter discusses the issues with policy and
implementation and how technology has evolved in preschool programs in Mexico, Spain, and the Latin American Countries. The lessons learned from this dramatic reform effort will inform teachers about the gap between policy and implementation and help them rethink their role in change.

Chapter 12: Bridging the Gap between Policy and Implementation: Preschool Education in Mexico, Latin America and Spain

The twelth and final chapter in this book explores an abridged case study of the implementation of reform in early childhood education. The dramatic reform in Mexico during the last decade brought international focus to the educational systems as the Law of Mandatory Pre-schooling made Mexico the only country in the world with mandatory education for 3-year olds. The reform policies were influenced by the changing economic policies as Mexico surged forward in development of technology related industries. As Mexico continued to move toward a more technological state, it was vital that the schools keep up by preparing the children of Mexico for global economy. Jorge Lopez, the author of this chapter, discusses the gap between policy and implementation of reform efforts in an attempt to help teachers better realizes the importance of their role in political decisions. The chapter examines the issues when top down reform (decisions about policy made by politicians or governing agencies) is implemented without the counsel of practitioners and how teachers and educational environments address issues to support children’s learning. Jorge also builds a case for the importance of early childhood teachers and programs in the development of thinking and explains the influences that have changed him from a Nuclear Physicist to an advocate for the field of early education. This chapter includes data from Spain, Mexico, and Latin American countries relating to the realities of technology use in these countries. Lessons learned from this chapter can help teachers become stronger advocates for reform, reflect on change and their role, and find solutions to closing the gaps between policy and implementation in their educational institutions.

Summary

The issues discussed in this book are not isolated to early childhood environments but evident across the continuum of education. The university must also rethink their ideas about learning and what students need to succeed in the new digital age.

REFERENCES

