Preface

In writing this book, *Child Development and the Use of Technology: Perspectives, Applications and Experiences*, our intention is: (1) to connect research theoretical perspectives to real world applications to and for young children's teachers, parents, and programs; and (2) to provide advice, tools and resources to support *Technology and Young Children: Bridging the Digital Communication Gap* for all educators who are involved in the lives of young children and who are thinking about how to implement technology in their classrooms. We hope this work helps practitioners examine their beliefs about technology and think about issues that seem relevant across educational domains. This book is for readers across the educational continuum including teacher trainers, university faculty, parents, and classroom practitioners. Our main goal is to address some major issues surrounding technology for young children from multiple perspectives in order to provide a holistic portrait of technology and early childhood education from the views of practitioners in early childhood, instructional design technology, special education, mathematics and science education, and parents.

ORGANIZATION OF THE BOOK

This book consists of fifteen chapters developed by multidisciplinary teams and includes information, advice, and resources from practitioners, professionals, and university faculty. The main text of this book is organized into four sections. Each section was developed in response to input from professionals engaged in the field of early childhood education and instructional design technology.

The foreword of this work is written from the perspective of a practitioner in early childhood education in the United States who is well aware of the need for information about technology, young children, and their teachers. Her insights into the development and acceptance of technology in an ECE environment help the reader see how technology has influenced her work and why this book supports professionals in this field. She shares her personal experiences with technology and why this book is important for educators of young children.

Section 1: Beliefs, Historical Development, Perceptions and Social Cultural Systems that Influence Technology and Teaching Practice in Early Childhood Environments

In this section we explore how beliefs, historic development, professional perceptions, and social norms influence the relationship between technology and early childhood education. There is a growing in-

terest in the role of epistemic beliefs in learning and academic achievement. Epistemic beliefs refer to beliefs about knowledge (including IDTs structure and certainty) and knowing (including sources and justification of knowledge) (Buehl & Alexander, 2001; Duell & Schommer-Aikins, 2001; Hofer, 2000; Hofer & Pintrich, 1997). In particular, these can include beliefs about "the definition of knowledge, how knowledge is constructed, how knowledge is evaluated, where knowledge resides, and how knowing occurs" (Hofer, 2001, p. 355). Research supports that teachers develop their instructional decisions through knowledge, skills, attitudes, and values they agree are important and this influences what they nurture in their students. With increased recognition of the intellectual capacities of young children (3- and 4-year-olds), as well as a growing understanding of how these capacities develop can be fostered, has come a growing recognition that early childhood education, in both formal and informal settings, may not be helping children maximize their cognitive capacities (NRC, 2005). This may be influenced by how professionals view technology in relation to their world views.

To better understand the current changes in the world view of the child and technology we need to explore the evolution of and influences on these interactions and relationships. It is uncontested that modern technology has a major impact on the global socio-cultural environment. We contend that technology has always influenced culture and often been viewed as threatening to accepted social norms. In a similar manner the social norms and cultural environments influences the evolution of technology as we, as humans, continue to seek ways to improve our living conditions.

In this section we include six chapters about beliefs, perceptions, and social norms we believe either influence or are influenced by technology. The information is important because we, as professionals, must reflect on how our instructional decisions are made if we are to move away from traditional educational environments into the digital age of learning.

Chapter 1. Beliefs - *Socrates and Descartes meet the E*Trade Baby: The Impact of Early Technology on Children' Developing Beliefs about Knowledge and Knowing* aims to integrate how children interact with technology and broaden perspectives regarding how children think and learn now that they have a whole buffet of gadgets. The chapter also seeks to demonstrate how teachers and parents can promote learning opportunities. One purpose of this chapter is to identify how fostering appropriate knowledge and beliefs about knowledge within powerful learning environments that support technology is important to the future development and learning of young children. This chapter attempts to build a deeper understanding of the value and importance of knowledge in early childhood, and build awareness about children's developing beliefs about knowledge and the process of knowing, in light of the shift from the Industrial Age to an Information Communication Technology Age. Further, this chapter aims to demonstrate how children's interest, enthusiasm, and attention for new technologies may be a win-win proposition. In this chapter we discuss technology and a framework for personal epistemology

Chapter 2. Beliefs - *The Epistemology of Young Children* builds on chapter one, but focuses on the epistemology of young children. Denise includes background information regarding cognition and cognitive development in terms of information processing theory and Bloom's Taxonomy; (1) children's personal epistemologies; (2) children and technology; and (3) teachers and the use of technology to support epistemological development in the classroom. This chapter provides a new perspective based on the research of children's personal epistemology. This area of research is new, considered controversial, and may be the key to opening the closed doors of understanding learning. Denise builds a case for the potential of young children's early epistemological development and how it influences use and acceptance of technology.

Chapter 3. Historical Development. - In the *Historical Perspectives of the Concept of Child and Technology Innovation*, the authors give the reader an overview of how the evolution of technology has intersected with and influenced the changing concept of child. This chapter is organized around technology innovations in eight identified historic periods. It discusses both how technology has influenced culture and how social cultural norms have changed technology. It also provides the historic context for the changing power structures in early childhood environments. We contend that the rapid changes in technology have dramatically changed the concept of child in the socio-culture environment globally and moved the young child into an active power role. We do not claim that technology innovations alone have caused the power shift between teacher and child in educational environments, but it seems evident that there is a relationship between the changing role of the child and the development of technology.

Chapter 4. Perceptions - *iPods, Internet and Apps, Oh My: Age Appropriate Technology in Early Childhood Educational Environments* discusses what exactly is age appropriate technology. The authors propose that integration of technology into early childhood programs has two major obstacles: (a) teachers' attitudes towards and beliefs about technology and (b) perceptions of what is developmentally appropriate practice (DAP) in their classrooms. This chapter explores the perceptions of age appropriate technology from two groups of professionals: Instructional Design and Technology (IDT) and Early Childhood Education (ECE) practicing professionals. Much of the resistance to technology use in ECE programs comes from the beliefs about what is and is not age appropriate for young children and myths about the effect of technology on young children's development. This chapter is based on results from a survey answered from two groups of professionals who, surprisingly, have many levels of agreement about what technology young children should use. This chapter gives information about age appropriate myths, practice, and possible reasons for technology acceptance or resistance in classrooms and helps reflect on the use of technology.

Chapter 5. Social Cultural Systems – In *Ariel and Buzz Lightyear are Coming to School: Incorporating Children's Popular Culture Ideas in the Classroom,* Allison Henward discusses the influence of pop culture in relation to social cultural systems. This chapter examines how preschool teachers can facilitate the use of popular culture oriented technology in the classroom. Acknowledging that ideology and social class play a major role in the inclusion/ rejection of popular culture technology children interact with in the United States, this chapter outlines the approaches teachers can take in understanding (and in some cases, incorporating) popular culture technology into the classroom to more effectively bridge home and school environments. We called a truce in this thankless no-win war with our kids over popular culture. Pop culture is influencing many cultures globally and this chapter should help readers reflect on how their socio-cultural environments support this trend. For children whose home lives embrace popular culture and media this may be yet another affirmation of how different school may be from local communities.

Chapter 6. Perceptions - *Technology and Social-Emotional Development in the Early Childhood Environment* discusses the research and issues relating to social-emotional domains in early childhood environments. Technology has changed the socio-cultural environment globally and we, as educators of young children, need to change how we approach social and emotional support for our children. The authors focus on three main components of social-emotional development: (a) Development of social and emotional domains in young children; (b) How social and emotional development can be nurtured in the classroom through the use of technology; and (c) How teachers can utilize intentionality of practice to encourage social and emotional development. The authors include some information from parents and how they rank the importance of social skills between child/child and child/adult. The aim of this chapter is to generate a framework between childhood social and emotional development for teachers as

we find ourselves in the midst of technologies that, at first glance, may seemingly elude the importance of social and emotional development in children.

Section 2. Technology in our Classrooms

Section 2 provides information that is domain specific for applications of technology and includes subjects related to early childhood classroom environments. These include play, mathematics, science, reading, and teacher self and peer assessment. Play has become a major issue in early childhood educational environments as teachers who claim to support play for learning eliminate play to meet their interpretations of academic standards. Play and technology can be integrated to help children develop across developmental domains. The new support for mathematics and science potential for understanding in young children has led us to include chapters about these two vital content areas. Reading remains a topic of interest for all educators and parents. We have included information and examples of a tiered intervention approach to reading instruction for young children. The last chapter in this section discusses the importance of teacher reflection for self and peer assessment and gives suggestions for technology to support this practice. Reflection is a key to better instruction yet teachers report they "don't have time" to reflect on their practice.

Chapter 7. *Using Technology in the World of Play* is the first chapter in this section due to the growing international controversy about the role of play and academic standards in early childhood classrooms. The authors start this section with a chapter about play, a highly supported approach to learning in early childhood environments. Recent accountability pressures have influenced the time allotted for play in the United States and other countries. This chapter discusses the accepted types of play in which young children engage and how technology supports this approach to learning.

Chapter 8. *Supporting Mathematics for Young Children through Technology* addresses how technology, like teacher quality, has profound and systemic problems with equity. This is evident across cultures and countries. The authors, Angie Powell and Beverly Ray, discuss the integration of two professional organizations in the United States, National Association for Education of Young Children (NAEYC) and the National Council for Teachers of Mathematics (NCTM), to support mathematics learning for children ages 3-8. The authors discuss nine principles of teaching mathematics and how technology supports each of these important approaches to learning. There is a review of the research relating to technology and mathematics, advice on intentional teaching and connections to the Classroom Assessment Scoring System (CLASS). CLASS is an observations adopted by the U.S. Department of Health and Human Services federal review (PRISM) teams for Systems Monitoring to evaluate classroom environments in Head Start programs and is widely accepted in early childhood in the United States. The chapter includes web resource sites for teachers of young children.

Chapter 9. *Inquiry and Technology* discusses international research about inquiry and young children in play-based programs and ways teachers of young children can use technology to support this recommended approach to teaching. We have included how inquiry and technology relate to higher order thinking, Webb's work on Depth of Knowledge and Porter's research on Cognitive Demand. The chapter includes detailed examples of how real teachers use technology to support their teaching and student learning through inquiry investigations. We have tried to build a case for science in early childhood environments and explain why this important domain needs more attention in the early years of children. Resources for teachers and children classroom use are included.

Chapter 10. *Technology for Multi-Tiered Interventions for Reading and Behavior in Early Childhood Education* describes how multiple tiers of increasingly intensive interventions function as early intervening services and how technology can aid in the implementation of multi-tiered interventions. The focus of this narrative is reading, but this approach has been successful across disciplines. The authors cite a paper presented at the Responsiveness-to-Intervention Symposium by Barbara Floorman which gives real examples of successful implementation of the multi-tiered approach.

Chapter 11. *Using Technology in Self and Peer Reflective Assessment* discusses the need and implementation of self and peer assessment for teachers. Peer and self reflective assessment approaches have become recommended for building better teachers. This chapter discusses the changes teachers need to implement to adopt this approach to assessment. A teacher who chooses a self-assessment process to lead to self-improvement can use technology to enhance her practice in several ways. We include real examples from a project where teachers used technology as the starting point for self and peer assessment and their experiences and recommendations.

Section 3. Supporting Parents with Technology

The two chapters included in this section were developed based on requests from teachers who believed that they needed better information on children in their programs with special needs in order to support and work with their parents. It is specifically designed for as guiding information that teachers may use with parents of special needs children. The first chapter comes from the experiences of an educational coordinator working with children with serious medical illnesses and chronic disabilities. We have become aware of the lack of information for teachers in this area and have learned of many of the problems these children and parents face when they miss school for medical treatment. The continuing connection to school is considered one of the motivating factors that influences these children and is important. The second chapter comes from faculty, one of whom is a parent of children with disabilities. It gives teachers insight into the world of these parents and how to support these families through technology.

Chapter 12. *Learning, Growing, and Connecting in Sickness and in Health: Exploring Technology, Parenting, and Young Children with Serious Medical Illnesses and Chronic Disabilities* explores the various ways in which typically developing children, children with disabilities, and children with chronic illnesses and their parents utilize technology to access information, acquire social support, and achieve parental and developmental goals. Children with serious medical illnesses and chronic disabilities endure many obstacles as they persist through cognitive, social, and emotional developmental milestones. Jessika and Denise explore the various ways in which technology impacts dyads between parents and typically developing children, as well as those between parents and children with chronic disabilities or serious medical illnesses. Jesikka's work with young children and parents at the internationally renowned St. Jude's Medical Research Hospital has influenced her approach to learning and teaching. Teachers are often unprepared to support children or parents of these children who valiantly try to continue their academic experiences in the face of such major obstacles. This chapter will help professionals work with parents of these children and hopefully gain a clearer understanding of the role teachers and technology play in their lives. The authors realize that technology needs, preferences, and uses of parents differ across time, across cultures, and across familial circumstances.

Chapter 13.*A Parent's Guide to Support Technologies for Preschool Students with Disabilities* provides overview information while simultaneously providing actual specifics related to technology that can be useful to parents throughout the journey of raising a child with special needs. While the perspective

of this chapter is for parents, it is written as a guiding document for teachers working with parents of special needs children. Teachers now face many challenges in their classroom and are often not prepared to work with parents of special needs children. This chapter will help professionals better understand the technology support for these children and parents and their legal obligations in the United States. Parents of individuals with disabilities must stay abreast of advances in technologies and understand how to use such in their daily activities with their child as life enhancing modifications and adaptations in technology will lead to habilitation by enhancing the independence of the child. It is also important that teachers have this information and give parents the support they need.

Section 4. Working the Web

In this section we provide chapters relating to the current concerns about the issue of cyberbullying and internet safety and a resource chapter to help the readers better understand social networking potential.

Chapter 14. *Internet Safety: Proactively Protecting Young Children from Internet Threats* is a chapter that explores the increasing issue of cyberbullying and aggressive interactions in early environments. This social cultural issue is becoming a global problem as more young children joining the social networking systems. This chapter will explore the roots of cyberbullying, including relational aggression and bullying in early childhood, will examine issues in internet safety that pertain to young children, and will differentiate the issues with young children from those that plague older children. Resources for working with children, parents, and educators will be reviewed, and future safety issues of internet and other mobile technology will be discussed.

Chapter 15. *Connecting, Collaborating, and Learning Online* is designed as a practical guide for teachers, parents, and children. The authors define and give examples of sites appropriate for these groups. It is a resource chapter that will help the reader better understand the many opportunities for social networking.

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.

CONCLUSION

We hope that this book with help educators better utilize technology in their professional environments. Bringing together multi-level teams to write and work on these chapters has been an enriching experience for us and hopefully also for the reader. We can no longer be complacent about the importance of technology in our early childhood classrooms but must become advocates and users if we are to support our children and parents. For many years, we have claimed we support the development of *life-long learners* in the United States. Technology has given us the opportunity to make that a reality for teachers, parents, and children.

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