Preface

Background

In a 2012 review of Andrew Solomon’s *Far From the Tree*, Emma Brockes noted in *The Guardian*, “The Internet has changed the fortunes of many millennial children who might otherwise have grown up feeling isolated and, along with their parents, [it has] given them communities.” Early in 2014 our first volume of well researched studies—*Innovative Technologies to Benefit Children on the Autism Spectrum*—appeared. It described dramatic breakthroughs in assistive technology that promised to radically improve the training, progress and communication of children and adults on the autism spectrum. Various forms of hand-held technology were featured in this previous collection. These devices comprised perhaps the most wonderful invention ever for children on the autism spectrum. Their affordability, portability, ease of use and acceptability in a society saturated with such devices meant that individuals on the spectrum could privately, repeatedly and comfortably practice anything that could be “inputted” to suit their individual needs and their social-emotional and cognitive development.

This present volume, *Recent Advances in Assistive Technology to Support Individuals with Developmental Disabilities*, features numerous authors, who, driven with a passion fired by personal and familial encounters with affected children or by the charisma of mentors in their institutions and fields, are refining their evaluations of previous findings and assessing the true efficacy of apps on iPads and iPods, avatars, gaming, microswitch-based (MSB) programs, music technology, robots, text to speech services, speech therapy devices, tele-rehabilitation, video modeling, virtual reality, and websites.

They insist that we must carefully customize programs and technology to ensure a perfect fit. But there is more. Here we branch out to consider advances in help for developmental disorders of all types: accessing texts, pediatric feeding disorders, help for children who live far from urban, well equipped health centers, how to use music to mitigate the effect of severe developmental disabilities and even comic books and films to convey to young, typical peers, exactly how significant and beneficial some of these assistive devices are for the characters depicted.

Thankfully, the astounding proliferation of technological advances also allows for the fruitful collaboration of the researchers, themselves. They can work in settings thousands of miles from each other and merge or challenge their respective ideas and studies of how the most recent advances in assistive technology can serve individuals with developmental disabilities of very diverse kinds. They have toiled to collaborate on a text that will be useful to parents, physicians, pre- and primary school teachers, special educators, research scientists and technologists, who are working to enhance the impact of assistive technology on the social, cognitive and physical functioning of individuals with developmental disorders.
Chapters

In Chapter 1 (iPods and iPads as AAC Devices for Children with Developmental Disorders), Larah van der Meer of Victoria University of Wellington, New Zealand, considers the seemingly magical but altogether popular capability of iPods/iPads, loaded with software, that virtually create speech generating devices. She questions whether they are truly as effective as older AAC devices and customizable for each individual application. The children definitely prefer the use of the iPod/iPad technology; if the software and devices are carefully calibrated for their use and if the children are well trained, these devices hold great promise for them.

In Chapter 2 (Implementing iPad and Mobile Technology for Children with Developmental Disabilities: Facilitating Language and Literacy Development), Cathi Draper Rodriguez, Iva Strndova and Terry Cummings join forces to detail ways mobile technology can be harnessed to make school, home and social environments more accessible to students with intellectual disabilities (ID). Underpinning the chapter is the UDL (Universal Design for Learning) which comprises a solid base from which to examine apps that are available, how students can access curriculum using these apps and how teachers can select the best apps for each student. Cathi Draper Rodriguez, based in the United States, researches technologies to teach English to individuals with and without disabilities and offers early intervention to young Latina mothers. Iva Strndova of New South Wales specializes in understanding the life experience of women with intellectual disabilities, and Terry Cummings researches students with emotional and behavioral disorders.

In Chapter 3 (Using iPads and Mobile Technology for Children with Developmental Disabilities: Facilitating Language and Literacy Development), Lisa Proctor and Ye Wang posit that though mobile technology provides ample opportunity for language and literacy development, parents, educators and speech-language pathologists need to be vigilant about their use. Improper use, they caution, could actually serve as an impediment or as a distraction in this population’s communication development. Proctor and Wang’s chapter focuses on home and school settings, and no wonder. Already in graduate school, Lisa Proctor observed a young girl with a severe communication disorder who was empowered and given a voice through technology. Proctor has continued to work in this area for the last thirty years. Ye Wang’s awareness of the struggles of deaf individuals in her family - Chinese deaf individuals - was realized early on. Her parents, both deaf, had different trajectories: her father never attended school, while at age 40 her mother was the first deaf individual to receive a college degree in her hometown. Wang’s great passion to study the field of deaf education and Special Education with a special emphasis on technology clearly derives from these salient experiences back home.

In Chapter 4 (Early Literacy and AAC for Learners with Complex Communication Needs), Janis Doneski-Nicol and Jody Marie Bartz offer the most up-to-date information and practical resources for early (pre-school and elementary) students with complex learning needs and assess benefits, challenges and ideas for future research. Janis Doneski-Nicol, a speech-language pathologist and special education teacher has provided Assistive Technology (AT) for over 20 years, and Jody Marie Bartz, who has been in the field of developmental disabilities since her nephews were diagnosed with autism, combine forces to take readers up to the front lines. Bartz’s own research includes studying the impact of educational, communal, familial and medical collaboration on outcomes for children with disabilities.

In Chapter 5, The Use of Mobile Technologies for Students At-Risk or Identified with Behavioral Disorders within School-Based Contexts, is the particular passion of Frank J. Sansosti and Peña L. Bedesem, both of Kent State University. Fully cognizant of how powerful these devices can be in regulating
behavior, stimulating motivation and learning new skills, they worry that educational service providers do not collect enough data to demonstrate their impact on student outcomes. The team checks for technological know-how among school personnel, and the ideal training for educators that would afford the finest outcomes in embracing the latest technologies. As such, this chapter offers recommendations (and the research to support them) for parents teachers and aides in terms of becoming familiar with the generally available technologies for these at-risk students or for those diagnosed with behavioral disorders.

In Chapter 6 (Recent Advances in Augmentative and Alternative Communication: The Advantages and Challenges of Technology Applications for Communicative Purposes), Toby Mehl, a speech-language pathologist from the City University of New York, cautions that despite the benefits of the latest, novel and easily accessible techniques of technology applications for communication, detailed assessments and collaborative evaluations concerning individual needs and abilities have been lacking. She insists that therapists, parents and developers of AAC applications must work together to ensure success and a “good fit” for children who utilize these devices.

In Chapter 7 (Selecting Computer-Mediated Interventions to Support the Social and Emotional Development of Individuals with Autism Spectrum Disorder), a super research troop from the College of Staten Island, City University aims to delve deeply into the importance of developing target skills and matching the individual’s needs and interests to the technology available. The reader is invited to sample various experiments using iPad type apps, virtual environments, even robots, and consult websites that offer additional resources. The ultimate goal: to be able to select interventions which are good fits for individuals with ASDs. This impressive research team is led by Kristen Gillespie-Lynch who was originally inspired to work with technology and children with ASDs by reading a dissertation about how computers might be to autism what sign language is for the Deaf; she then designed a survey to assess computer mediated communication for people with ASD. All of the team members, Gillespie, Brooks, Gaggi, Sturm and Ploog, have interests ranging from the design and development of apps and gaming, social networking for entertainment and educational purposes – to college age kids with autism and the study of abnormal attention patterns.

In Chapter 8 (Avatars, Humanoids, and the Changing Landscape of Assessment and Intervention for Individuals with Disabilities across the Lifespan), Emily Hotez offers parents, professionals and individuals with disabilities a glimpse into the literature about virtual reality and robot-based interventions with children, adolescents and adults. She then delves into directions for future research. Hotez, a student at Hunter College/City University, believes her interest in autism was inspired by her sister, Rachel, whose strengths and challenges have motivated her study of family engagement in interventions. Hotez currently investigates factors that predict the efficacy of parent-mediated interaction for children with ASD and works to improve developmental screening practices in NYC pediatric offices.

In Chapter 9 (Microswitch-Based Programs (MBP) to Promote Communication, Occupation and Leisure Skills for Children with Multiple Disabilities: A Literature Overview), Fabrizio Stasolla and Viviana Perilli offer an overview of microswitch-based (MSB) programs to improve communication, occupation and leisure skills for children with multiple disabilities. They begin with studies published from 2004 -2014; next they consider the strengths and weaknesses of these studies and conclude with a number of issues to be addressed in the future. From Italy we are gifted with the research of Fabrizio Stasolla – whose interest in children with severe to profound developmental disabilities was inspired by Professor Giulio Lancioni’s work at the University of Bari. She studies how to provide cognitive/behavior interventional assistive technology for children with multiple disabilities, developmental disabilities, Autism and Rett and Down syndromes. Viviana Perilli is the first researcher to study the cognitive rehabilitation of dementia with a special interest in supporting the residual abilities of individuals with Alzheimer’s disease using assistive technology.
In Chapter 10 (Improving Student’s Academic Learning by Helping them Access Text), Michael Ben Avie, Regine Randall, Diane Weaver Dunne and Chris Kelly, focus this chapter on CRISKids recordings – text to speech services that can express human emotions. Since children who can read and understand text are more on task and engaged in classroom routines, teachers can spend far less time redirecting them. So everyone wins: students with print disabilities and the rest of the class. CRISKids for Schools is the brainchild of Diane Weaver Dunne whose father unknowingly suffered from dyslexia and dropped out of school at age 14, still unable to read. Now an avid reader at age 70, he discovered that two of his nephews and one great nephew were diagnosed with dyslexia, the disability that he and his own brothers had shared.

In Chapter 11 (Video Modeling for Learners with Developmental Disabilities), Peggy Whitby, Christine Ogilvie and Krista Garland introduce research literature on video modeling and offer practical suggestions on how to implement video modeling with individuals on the spectrum and with other developmental disorders. Already early in her teaching career, Christine Ogilvie found that she could reach more of her students while employing assistive technologies focused both on communication and academics. Once she tried the devices out with children on the spectrum, she found her calling. Peggy Whitby of the University of Arkansas and Krista Vince Garland from Buffalo State University, join her in demonstrating how video modeling can successfully be used by learners with varying developmental disabilities.

In Chapter 12 (Assistive Technologies at the Edge of Language and Speech Science for Children with Communication Disorders: VocalID™, Free Speech™, and SmartPalate™), Josephine Ancelle of Teacher’s College, Columbia University, offers a fascinating glimpse into the development and use of Free Speech™ – an app developed to transform disorganized single concept images into meaningful sentences. Smart Palate™, which makes EPG (Electropalatography – which enables visualization of tongue to palate contact during speech production) more accessible in therapy and at home, and VocalID™ are additional topics that are introduced and expertly evaluated in this chapter.

In Chapter 13 (Telehealth Technology and Pediatric Feeding Disorders), Taylor Luke and Rebecca Ruchlin describe the benefits of utilizing Telehealth Technology for Pediatric Feeding Disorders. Telehealth Technology is alive and well in a large variety of health services throughout the country. It utilizes video conferencing technology to deliver various health therapy services, offering face-to-face interactions among specialists, parents and children. For some time, teletherapy has offered help for speech-language intervention and social behavior management. Luke, whose passion to find solutions is driven by the overwhelming number of children who need services but cannot, for reasons of geographic, language, and socioeconomic barriers, access adequate care, looks to technology for powerful answers. Ruchlin, who has witnessed therapists work tirelessly with Matthew, her brother with autism, wants very much to help, especially in the area of feeding and swallowing disorders. With the authors’ special interest in the pediatric population and familial sources of inspiration, Luke and Ruchlin combine talents and the notion of teletherapy to remedy feeding disorders in infants, toddlers and children with developmental disorders world-wide.

In Chapter 14 (Music and Developmental Disorders), Michelle Blumstein, who has loved music from a very early age, presents a survey of research about the types of technology that music therapists use to aid children with developmental delays. Music is a powerful motivator, since it provides an enjoyable experience and allows children to feel a sense of control that too often eludes them.

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In Chapter 15 (Dissemination of Assistive Technology Devices for Children with Disabilities through Realabilities), Senada Arucevic, of Long Island University in Brooklyn, NY creatively contextualizes her discussion of various forms of assistive technology on the characters with disabilities who are portrayed in the TV Show and Comic Book Series, Realabilities.

Realabilities, a series of animated episodes and comic books created and tested by Silton, Arucevic, Ruchlin and Norkus, found that typical children who watched and read about these spirited and capable children with disabilities, demonstrated enhanced cognitive attitudes and behavioral intentions towards individuals with disabilities. After all, these exciting episodes feature young people with disabilities who utilize assistive devices in clever ways, reducing the stigma that wheelchairs, hearing aids, etc. often elicit. In this way, the team is working from the outside in: the robust world can learn and appreciate a thing or two about the benefits and significance of the devices and much more about the stuff these heroes with differences are made of. Read this chapter and cheer. Then go out and find the comic books!

In Chapter 16 (Using Technology to Support Social Competence), our collection closes with a wonderful team composed of researchers, occupational therapists and special educators who deal directly with how to impart social competence which comprises a complex set of skills that affects quality of life across all environments: home, school, employment and the community. Theory of Mind, relationship building and self-regulation must be learned by individuals with ASD and all kinds of disabilities. The team, led by Brenda Myles, who has been acknowledged by the University of Texas as the second most productive researcher of ASD in the world, and Jan Rogers, Director of The Ohio Center for Autism and Low Incidence Assistive Technology, Amy Bixler Coffin, a special educator for 24 years, Wendy Szakacs and Theresa Vollrath, review this area of study and suggest a variety of practices to support its development.

Adaptive and Assistive devices have existed from time immemorial. Canes and crutches, for example, are used as often today as they ever were for basic mobility, but they don’t go so far as to bolster self-esteem, self-actualization and social acceptability. All the studies we’ve included, indeed all work with developing ever more refined models of technological modalities to empower and socialize individuals with disabilities. These chapters largely focus on inclusion or, at least, a path to social inclusion, away from the margins of society from which so many individuals with disabilities watch the robust world go by. The stunning gains achieved with the devices described in the following pages are breathtaking and humbling. May the work of these authors be blessed and then undertaken by many of you who can see the critical need and new opportunities all around.

Nava R. Silton
Marymount Manhattan College, USA