

21st Century Assistive Technology for Young Children: Cutting Edge Technologies that Support Children's Access to Learning

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Assistive Technology: Where have we been and where are we heading?

The Past: Assistive technology has been around since ancient times and throughout the ages has had the same goal: To help individualizes with disabilities do what they otherwise couldn't do without it. The introduction of the personal computer and later the widespread adoption of mobile devices (smartphones, tablets) have had profound impacts on assistive technology. To see the history of assistive technology throughout the ages check out Bluebird Care's timeline of "[Assistive and Adaptive Technology from Ancient to Modern Times](#)".

The Present: There is an astonishing diversity of assistive technologies available today, many of which are available to be used on consumer technologies such as computers, tablets and smartphones. Thanks to movements such as Universal Design for Learning (UDL), assistive technologies are increasingly no longer stand-alone products or software, but rather features available to be used in the technology used by everyone. Furthermore, assistive technology is more readily available than ever before, with technologies such as smartphones showing heavy usage amongst Americans of many different socioeconomic backgrounds.

The Future: In the late 1800 and early 1900 a series of [futuristic pictures](#) were made in the form of postcards depicting what the artists imagined the year 2000 would be like. So, what does the future look like for us? In the coming years, the diversity of assistive technologies will keep expanding, providing more new and unique ways to interact with and benefit from assistive technologies. Just as assistive technology software relied on the consumer demand for personal computers, these new assistive technologies rely on the demands of the consumer. Whether these new technologies will become popular and stick around is still to be seen, however many of these technology trends are creating unique assistive technologies that give clues into some of the potentials of the assistive technologies of the future.

Technology trends and what they mean to assistive technology and individuals with disabilities:

3D Printing

Maker Movement

Contextual Computing

Telepresence and Robotics

Crowdfunding

The Internet of Things (IoT)

Digital Citizenship & Cyber safety

Wearables

3D Printing

Definition: 3D printing or additive manufacturing is a process of making three-dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the entire object is formed. 3D printing offers a way for both industries and everyday people to create extremely unique and specialized products and share these products as digital files to be recreated on other 3D printers. Mashable Explains 3D printing in this YouTube Video [“What Is 3D Printing and How Does It Work? | Mashable Explains.](#)

General Examples: Commonly used to create prototypes of products, specialized parts for machinery, etc. Also, growing in popularity is 3D printed jewelry, housewares and other cool stuff. For more examples check out [3D Printer: 50 Things You Can Make.](#)

Implications to Disability: 3D printing helps everyday people create complex products cheaply, greatly expanding the potential of the Do-It-Yourself (DIY) assistive technology world. Enabled by Design Founder Denise Stephens believes "3D printing has a huge potential to disrupt—it means people with disabilities will have the power to revolutionize the products they use and to make them highly personalized."

We have already seen news stories of the difference 3D printed prosthetics make for individuals with disabilities. 3D printing should also offer a new wave of adaptations for daily living, adaptations for positioning and mobility and much more. Furthermore, the integration of 3D printing into education offers a new way to engage students.

Examples of 3D Printing in Action:

- 3D Printed Adaptive Technology Allows Amputee to Play Trumpet
 - <http://disabilityand.me/2013/09/14/3d-printed-adaptive-technology-amputee-trumpet/>

- 3D Printed “magic shoes” make life easier for kids with disabilities
 - <https://www.newsroom.unsw.edu.au/news/students/3d-printed-magic-shoes-make-life-easier-kids-disabilities>
- 5-Year-Old Boy Gets Robotic Hand Made With 3D Printer
 - https://youtu.be/HkJ_nGdHf7U
- 8 Achievements in 3D Printed Assistive Design
 - <http://www.tctmagazine.com/prsnlz/science-and-tech/assistive-3d-printed-design/>
- CBS Evening News: Boy gets prosthetic hand made by 3-D printer
 - https://www.youtube.com/watch?v=FGSo_I86_IQ
- Five-Year-Old Girl Gets 3D Printed Prosthetic Hand From Public Library
 - <https://www.3printr.com/five-year-old-girl-gets-3d-printed-prosthetic-hand-public-library-0141862/>
- Student makes low-cost prosthetic with 3D printer
 - <http://www.cbsnews.com/videos/student-makes-low-cost-prosthetic-with-3d-printer/>

3D Printed Items:

- 3D Printed Books for Young Children
 - Tactile Goodnight Moon: <http://www.thingiverse.com/thing:390159>
 - 2nd Tactile Goodnight Moon: <http://www.thingiverse.com/thing:427233>
 - Tactile Harold and the Purple Crayon: <http://www.thingiverse.com/thing:397762>
 - Dear Zoo: <http://www.thingiverse.com/thing:455727>
- 3D Printed Braille and Picture Books Help Blind Children to Read
 - <https://www.dezeen.com/2016/02/04/3d-printed-braille-and-picture-books-help-blind-children-to-read/>
- 3D Printed Hinge Glasses
 - <https://formlabs.com/blog/3d-printed-hinged-glasses/>
- Braille Rubik’s Cube – Instructables
 - <http://www.instructables.com/id/Braille-rubiks-cube/>
- Fittle - Making 3D printed objects to help blind children “see” the world
 - <http://awards.ixda.org/entry/2014/fittle/>

3D Printers:

- MakerBot Replicator 2X (\$2,499.00): Full featured 3D desktop printer
 - <https://store.makerbot.com/printers/replicator2x/>
- The 3Doodler (\$99.00/3D Pen): Creates objects for learners who are blind or need visual spatial supports.
 - <https://www.youtube.com/watch?v=cXM3L7tv37k>

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Resources, Articles, and Videos:

- 3D Printing Will Change the World
 - <https://hbr.org/2013/03/3-d-printing-will-change-the-world>
- Diagram Center – A Benetech Initiative
 - <http://diagramcenter.org/3d-printing.html>
- Enabling the Future - A Global Network Of Passionate Volunteers Using 3D Printing To Give The World A "Helping Hand."
 - <http://enablingthefuture.org>
 - <https://www.facebook.com/enableorganization>
- Helping Hand Project
 - <http://www.empowered.org/Helping-Hand-Project-1>
- Instructables
 - <http://www.instructables.com/howto/3d+printed/>
- Miguel Valenzuela Spills the Batter on PancakeBot's Food Printing Technology
 - <http://3dprintingindustry.com/2015/03/23/miguel-valenzuela-spills-the-batter-on-pancakebots-food-printing-technology/>
- Students Creating 3D printed AT
 - https://www.youtube.com/watch?v=N_-sVw_hQ5k
- Thingiverse
 - <http://www.thingiverse.com>

Contextual Computing

Definition: Contextual computing, also called context-aware computing, is the use of software and hardware to automatically collect and analyze data about a device's surroundings in order to present relevant, actionable information to the end user.

General Examples: Location based reminders are reminders that pop up on your phone based on your location.

Implications to Disability: Here's how our interactions with technology go: We think of something we need to do, pull out our phone, unlock it, find what we need, press some buttons, and then put the phone away. Contextual computing is proactive, guessing when you will want certain information or to do certain tasks, and sending you what you need. For example, [Google Now](#) (an app for Android devices) will understand your commute, and if traffic is bad it proactively sends an alert before you leave so you can account for traffic. Contextual computing will allow technologies to proactively provide individuals with

disabilities with the support they need when they need them in clever and convenient ways.

Examples of Contextual Computing in Action:

- Estimote Smart Beacons – welcome to the contextual computing era!
 - <https://www.youtube.com/watch?v=SrsHBjzt2E8>
- Great Examples of Context Awareness – UX Design for Mobile Developers
 - https://www.youtube.com/watch?v=KXNNbWg_peM
- St. Paul police officer develops app to better handle people with autism in the field
 - <http://www.fox9.com/news/222638558-story>

Contextual Computing:

- Location based reminders: “Remind me when I get to work to talk with my supervisor about that forum.”
 - Google Now (Free; App available for various platforms)
 - <https://www.google.com/landing/now/>
 - Siri for Apple mobile device (Free; Built in Feature)
 - <https://www.apple.com/ios/siri/>
- Super Speak - Context aware communication
 - How to use SuperSpeak a NEW generation AAC for nonverbal children
 - https://youtu.be/nZ_RC115-QI
 - SuperSpeak App - <https://itunes.apple.com/us/app/superspeak/id950087951?mt=8>
 - SuperSpeak Facebook Page - <https://www.facebook.com/thesuperplus>
 - iBeacon - https://www.amazon.com/Radius-Networks-RadBeacon-Dot-Technology/dp/B00JJ4P864/ref=sr_1_3?ie=UTF8&qid=1493828941&sr=8-3&keywords=ibeacon

Future Assistive Technologies Using Contextual Computing:

- Letting your smartphone’s location services know which locations trigger anxiety, with corresponding supports presenting themselves when you are near or at a location. (i.e. a social story you wrote for yourself about the dentist office shows up as you near the dentist office).
- Using a smartphone’s microphone to sense when someone is in a conversation, or in a conversational environment, and sending social cues to a smartwatch that give tips on how to start or maintain a conversation.
- A computer observing a student’s web searches and website contents as they are researching for a project, and providing smarter word prediction and spell checking results as they write.

Resources, Articles, and Videos:

- How to Create Location-Based Reminders with Siri
 - <http://www.imore.com/how-create-location-based-reminders-siri>
- The Best Clever Uses for Location Based Reminders
 - <http://lifehacker.com/the-best-clever-uses-for-location-based-reminders-1578747141>

Crowdfunding

Definitions: Crowdfunding is the practice of funding a project or venture by raising many small amounts of money from a large number of people, typically via the Internet.

General Examples: Kickstarter (crowdfunding website), GoFundMe (crowdfunding website), Pinterest (social media platform commonly used for DIY ideas).

Implications to Disability: Thanks to crowdfunding, people no longer need to have the capital to take a great idea to market. Instead you can take your great idea to the public and ask them to back your great idea and help bring it to life. Self-created assistive technologies are being made, shared, and funded into production, all via the general public (as opposed to private industry). Everyday people are able to work together to collaborate, create, and fund new assistive technologies, all without ever meeting face-to-face, or working for an assistive technology company.

Examples of Crowdfunding in Action:

- Findster (\$99) Funded via Indiegogo. Includes 1 guardian module, 1 kid module, and 1 charging station. A GPS locator for child or pet that does not require a monthly subscription and does not rely on Bluetooth.
 - <https://www.indiegogo.com/projects/findster-kids-gps-tracker-free-of-monthly-fees-technology--2#/>
 - <https://www.facebook.com/findster>
- Leeka (\$790): Funded via Indiegogo. A smart toy set on changing the way children with developmental disorders learn, play and progress.
 - <https://www.indiegogo.com/projects/leka-an-exceptional-toy-for-exceptional-children-autism--2#/>
 - <https://www.facebook.com/WeAreLeka/>
- Vidget (Intro price - \$89.95 - \$139.95; List price - \$112.95 - \$174.95): Funded via Kickstarter. The Vidget is a specially designed flexible chair that allows for movement and fidgeting, which can help learners with attending and focus. Now available in five different

sizes ranging from toddler to adult.

- Viggikids “Fidget in your Vidget” - <http://www.viggikids.com>

Crowdfunding Sources for personal needs:

- FundRazr (5% for completed or incomplete campaign plus 2.2% +\$.030 transaction fees)
This website is dedicated to raising money for anything from personal causes to nonprofits to entrepreneurial projects.
 - <https://fundrazr.com>
- GoGetFunding (3.5% with a keep-what-you-raised model, plus 2.9% transaction fee) This London based fund-raising site can be used to raise money for anything from paying for pet’s medical bills to creating a short film.
 - <https://gogetfunding.com>
- GoFundMe (GoFundMe's fee is 5% from each donation you receive. WePay's fee is 2.9% + \$0.30 per donation.) GoFundMe personal online fundraising websites are for individuals, groups & organizations.
 - <https://www.gofundme.com>

Digital Citizenship and Cybersafety

Definition:

- Digital citizenship is the norms of appropriate, ethical, and responsible technology use and Internet communications. With the ever-increasing use of digital and Internet technology for learning the concept of teaching digital citizenship has become ever important. All users of technology need to know how to use technology appropriately in order to be prepared for a society full of technology.
- Cybersafety aka Internet Safety is the safe and responsible use of Information and Communication Technologies (ICT).

Implications to Disability: The Internet is part of modern life, allowing us to find information, to connect socially, play games, and more. However, the modern Internet also brings new challenges to parents and educators of individuals with disabilities. Learners with disabilities are more likely to be cyberbullied than others, and a disability can make someone more vulnerable to online scams or manipulation. Providing ways for individuals with disabilities to equally participate as a digital citizen while still being safe and responsible is a new challenge parent and educators must face when raising and educating a child in today’s connected world.

Tools for Cyber Safety:

- Circle with Disney (\$99.00): The Circle with Disney security device, controlled by a simple mobile app, provides parental content filtering and time limits for every device in your home network.
 - <https://meetcircle.com>
 - Circle Home by Circle Media Incorporated ([Android](#) and [iOS](#)) Free
 - Meet Circle - <https://www.youtube.com/watch?v=95TBbnrluyM>
- iPhone Restrictions aka parental controls (built in feature): Restrictions is a feature you can turn on to prevent access to specific apps and features. Tap Setting > General > Restrictions. To enable, tap Enable Restrictions and enter a 4-digit passcode. You'll need the passcode to change your settings or turn off Restrictions. If you lose or forget your Restrictions passcode, you'll need to perform a factory restore to remove it.
 - <http://support.apple.com/en-us/HT4213>
- Limitly (Free): [Android](#) app for limiting when apps are used.
- Parent Kit (Free 1 month trial; \$24.00/6 months; \$39.00/12 months): [Apple App](#) and service that allows the user to set scheduled times during the day that someone can use apps on their device and turn off access to all apps during prohibited times. Does not have the ability to turn off select apps.
 - <https://parentkit.co/>
- Screen Time Parental Control (Free): Android app that allows users to manage the time kids spend on their devices. Offers a variety of flexible features for both adults and kids such as using to independently using to help work toward a personal goal (i.e., restricting use of social media during study times.) The app is controlled via its accompanying remote app which is also free. NOTE: Most Android devices lack built in parental controls, however there are many different parental control apps available that offer even greater flexibility than many of Apple's parental controls.
 - <https://play.google.com/store/apps/details?id=com.screentime>
- SecureTeen Parental Control (\$39.99/1 year/3 Devices Subscription): An Android app that allows parents to monitor kids' online activities and filter mature content, block unwanted applications to keep children safe, tracks kids' outdoor location and more.
 - <http://www.secureteen.com/android-parental-control>
 - <https://play.google.com/store/apps/details?id=com.infowise.parentalcontrol.secureteen>

Resources, Articles and Videos:

- A Magazine is an iPad That Does Not Work
 - <https://www.youtube.com/watch?v=aXV-yaFmQNk&spfreload=5>
- American Academy of Pediatrics: Media and Children Communication Toolkit
 - <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Pages/Media-and-Children.aspx>
- Apps to Help Keep Track of What Your Kids are Doing Online
 - <https://www.common sense media.org/blog/apps-to-help-keep-track-of-what-your-kids-are-doing-online>
- Common Sense Media
 - <https://www.common sense media.org>
- ConnectSafely.org
 - This web site offers a list of resources categorized as Safety Tips and Safety Advice that explain different technology trends and accompanying concerns.
 - <http://www.connectsafely.org/safety-tips-advice/>
- Cyberbullying: What Parents Can Do to Protect Their Children
 - <http://www.pacer.org/publications/bullypdf/bp-23.pdf>
- Digital Citizenship: Using Technology Appropriately
 - http://www.digitalcitizenship.net/Home_Page.php
- Edutopia Digital Citizenship Pinterest Board
 - <https://www.pinterest.com/edutopia/digital-citizenship/>
- K12 Digital Citizenship Wikispaces – Special Needs
 - <http://k12digitalcitizenship.wikispaces.com/Special+Needs>
- Living and Learning with Mobile Devices: What Parents Think About Mobile Devices for Early Childhood and K-12 Learning
 - A report from Grunwald Associates LLC Learning First Alliance on the perceptions of parents of a mobile generation.
 - http://www.corp.att.com/edu/docs/mobile_kids.pdf

Maker Movement

Definitions: The maker culture is a contemporary culture or subculture representing a technology-based extension of DIY culture. Typical interests enjoyed by the maker culture include engineering-oriented pursuits such as electronics, robotics, 3D printing, as well as more traditional activities such as metalworking, woodworking, and traditional arts and crafts.

General Examples: The Maker Movement has its roots in the Do-It-Yourself (DIY) movement

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where inventive creative people are taking readily available low cost materials and making them into useful tools. The [Maker Faire](http://makerfaire.com) in the San Francisco Bay area holds an event annually where folks come together and showcase their ideas. <http://makerfaire.com>

Implications to Disability: The Maker Movement leverages the creativity and availability of local resources to make the things that are needed to help people. Using 21st technology like 3D printers, makers are making and sharing their ideas for others to benefit from. Often the price is much lower compared to traditional renditions of an item and can be made much quicker.

Examples of Maker Movement in Action:

- ATinNH YouTube Channel: Therese Willkomm
 - <https://www.youtube.com/user/ATinNH/videos>
- FabricATe
 - <https://sites.google.com/a/udel.edu/fabricate/fabricate/illustrations>
- GoBabyGo: A project started out of the University of Delaware in which off the shelf motorized child vehicles are purchased and customized for children with disabilities.
 - <http://www.udel.edu/gobabygo/>
 - <https://www.youtube.com/watch?v=U-NE7B0RTdA>
- How does a \$50 3D-printed
 - <http://www.foxnews.com/health/2014/04/23/how-does-50-3d-printed-hand-match-up-to-42g-prosthetic/>
- Toddler with paralysis zips around in homemade wheelchair (Bumbo)
 - <https://www.youtube.com/watch?v=pnIyIHRqpgY>

Resources, Articles, and Videos for DIY:

- Build Better Accommodation Solutions For Less (interview with the “MacGyver” of AT Therese Willkomm)
 - <http://assistivetechology.about.com/od/ATCAT4/a/Build-Better-Accommodation-Solutions-For-Less.htm>
- PowerUp WHAT WORKS: Tech Tip – Do-It-Yourself! Take advantage of new technologies, DIY assistive tech, and Make Culture to create customized solutions for and WITH your students
 - <http://powerupwhatworks.org/page-puww/do-it-yourself>
- Simon Technology Center Pinterest Page
 - <https://www.pinterest.com/simontechcenter/diy-assistive-technology/>

Telepresence and Robotics

Definitions:

- Telepresence refers to a set of technologies which allow a person to feel as if they were present, to give the appearance of being present, or to have an effect, via telerobotics, at a place other than their true location.
- Robotics is technology that is designed, built, and used to operate robots.

General Examples:

- Telepresence: Skype, Face-Time, Google Hangouts, and other video conferencing tools.
- Robotics: Used in factories to perform high precision welding and riveting jobs; Commercially available in products like the Roomba Vacuum to perform everyday cleaning functions.

Implications to Disability: Technology already provides many ways of “being” somewhere without physically being there such as Skype, Google Hangouts, Face-Time, etc. Currently, technologies such as telepresence robots offer individuals previously unthought of opportunities to be in school, participate in class, and chat with friends, all while being in a care or home environment. Telepresence also impacts how professionals work with individuals with disabilities. Telepresence allows for tutoring, counseling, and medical advising to happen from many miles away, allowing families to connect to the specialists they need regardless of their geography.

Robotics has many different possibilities to support individuals with disabilities with daily living aids, as well as a unique way to practice social skills.

Examples of Telepresence and Robotics in Action:

- A Day in the Life of Kyle
 - <http://www.vgocom.com/day-life-kyle>
- Collaborating to Support Aiden
 - <http://www2.cde.state.co.us/media/resultsmatter/RMSeries/CollaboratingToSupportAiden.asp>
 - Desired Results Access Project - Video Library (Getty)
 - 3 videos chronically Getty’s journey with inclusion using a VGo Robot
 - <http://www.draccess.org/videolibrary>
- Robots Teach Communication to Kids with Autism
 - <https://www.youtube.com/watch?v=lm3vE7YFsGM>

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Telepresence and Robotics:

- Doctor on Demand: Live MD & Therapy Visits w/ Board-Certified Physicians and Psychologists (App – Free): It is free to sign up for the service and does not require a subscription. Doctor visits are only \$40 per visit.
 - <http://www.doctorondemand.com>
- Double Robotics (\$3,499 Double 2 Standard Set + Double Care (3-year warranty), Double Case - \$699, Requires iPad (not included), no subscription required.
 - <http://ksn.com/2014/02/10/robot-helping-a-kansas-boy-connect-with-his-class/>
- MiP (\$99.99): Robot toy controlled with hand gestures.
 - <http://www.wowwee.com/mip/>
- My Keepon (\$159.00): Small interactive toy robot that responds to touch and sound.
 - <http://www.mykeepon.com/index.php>
- NAO V5 Evolution Robot (\$7,900.00): Humanoid robot being used in research and education worldwide.
 - <http://shop.robotslab.com/collections/all/products/nao-h25>
 - <https://asknao.aldebaran.com>
- RoboKind Robots4Autism (Approximately \$7,000.00): An advanced social robot with multiple capabilities.
 - <http://www.robokindrobots.com/robots4autism-home/>
- VGo Robots (Approximately \$3,995.00; A telepresence robot controlled via computer with webcam or iPad. The VGo allows the user to physically move within an environment and interact with others from a distance. subscription no longer required. Additional accessories available.
 - <http://www.vgocom.com>
- Vidyo (subscription service): Telemedicine and telehealth solution powered by technology.
 - <http://www.vidyo.com/solutions/healthcare/>

Resource Articles and Videos:

- Aldebaran Robotics Connects with Autistic Children
 - <http://www.bostonglobe.com/business/2014/06/14/nao-from-aldebaran-robotics-connects-with-autistic-children/10FpLVqBk4wPsK0q21kxDI/story.html>
- Robots May Help Kids with Special Needs
 - http://www.roboticsbusinessreview.com/article/robots_may_help_kids_with_special_needs
- ROBOTS4AUTISM with ZENO-25-HD-Spring City Films
 - <https://vimeo.com/123113412>

- There's a New App that Will Let You Have a Real Doctor's Appointment Using Video Chat on Your Smartphone
 - <http://www.businessinsider.com/doctors-on-demand-medical-app-2013-12>
- This Cute Robot Helps Children with Autism Socialize
 - <http://mashable.com/2012/05/14/keepon/>
- VGo Telepresence Robot gets Verizon LTE, We go Eyes-on (video)
 - <http://www.engadget.com/2012/01/11/vgo-telepresence-robot-lte-ces/>

The Internet of Things (IoT)

Definition: A proposed development of the Internet in which everyday objects have network connectivity, allowing them to send and receive data.

General Examples: The [Nest Thermostat](#) (controls your home heat through an online service), and [Wemo Switch](#) (turns appliances on or off remotely from your phone or tablet).

Implications to Disability: The [Internet of Things](#) is a design movement seeking to embed Internet functionality into everyday devices, giving users new and creative ways to interact with everyday objects by connecting them to Internet services. The Internet of Things holds promise to automate many daily living activities, reducing strain for those with disabilities.

The Internet of Things:

- Amazon Echo (\$179.00) ([Android](#) and [iOS](#)): A device that acts as your home's command center, playing music, providing weather updates, creating grocery lists and more, all via voice activation. Also works away from home with free companion app. (For more information on this type of technology, see "ambient listening devices" in the "The Future Assistive Technologies of the Internet of Things" listed below.)
 - http://www.amazon.com/oc/echo/ref_=ods_dp_ae
- Amazon Echo Dot (\$49.99) ([Android](#) and [iOS](#)): A smaller button version of Amazon Echo. The Echo and the Dot work together. You do not need an Echo for a Dot to work. Same function as the Amazon Echo in a smaller more portable package.
 - <https://www.amazon.com/All-New-Echo-Dot-2nd-Generation/dp/B01DFKC2SO>
- Sen.se Smart connected devices for health, safety, and well being.
 - Smart Peanuts
 - Thermo Peanut (\$29) Measures and sends temperature information to your smart phone
 - <https://sen.se/store/thermopeanut/>

- SensePeanut by Sen.se ([Android](#) and [iOS](#)) Free
 - Sleep Peanut and Med Peanut (coming soon)
- Mother and Motion Cookies (\$149) Comes with the Mother monitor and four motion sensor cookies. Can be used in many ways to monitor a variety of activities including walking, tooth brushing, door activity, and much more.
 - <https://sen.se/store/cookie/>
 - Pocket Mother by Sen.se ([Android](#) and [iOS](#)) Free
- Silver Mother (\$299) Silver Mother is a curated set of monitoring programs adapted for elderly care. It works using the Mother® system and its multi-purpose tracking sensors that can intelligently analyze hundreds of movements, habits and activities. There are Mother programs for every age, lifestyle and situation.
 - <https://sen.se/store/silvermother/>
- Tile (\$25.00): Once attached to an item, Tile can send out an audio signal to help you find it, or it can use GPS via your phone to be found. The more things connected to the Internet the more easily they can be found.
 - <https://www.thetileapp.com/>

The Future Assistive Technologies of the Internet of Things:

- The Internet of Things will help make the transition to independence easier for individuals with disabilities by creating more seamless interactions with our environment. For instance, there are smart home systems that will automatically lock and unlock your door, or turn on lights in a room as soon as your smartphone is close enough to them. Creating custom automation commands for the needs of individuals with disabilities has the potential of eliminating strenuous routines around the home.
- Ambient listening devices, such as Amazon Echo, plan on being your homes central command center, allowing you to do many different things with one device by using voice activation. Creating assistive applications for these type of devices will allow people to have a second “brain” in the room at all times. It will allow them to ask and receive answers to basic questions, remind themselves to do tasks, receive important information, and operate appliances: all by using their voice.
- Connecting Internet services (such as calendars, weather reminders, grocery lists, etc.) to the home environment will help facilitate independence by creating more levels of support for individuals with disabilities. Imagine your house turning lights on and off when it knows it’s time for you to leave to catch the bus to work or to remind you of an appointment.

Resource Articles and Videos:

- Six Things You Should Know About the Internet of Things
 - <http://www.techradar.com/us/news/world-of-tech/future-tech/six-things-you-should-know-about-the-internet-of-things-1289157>
- The Internet of Things Could Empower People with Disabilities
 - <http://www.cmswire.com/cms/internet-of-things/the-internet-of-things-could-empower-people-with-disabilities-026211.php#null>

Wearable Technology

Definition: Wearables are clothing and accessories (watches, bracelets, etc.) incorporating computer and advanced electronic technologies giving a user feedback of their actions or unique ways of controlling or interacting with other technologies.

General Examples: Bracelets like FitBit and Withings (track movement, assist with navigation, monitor fitness goals, etc.), smart watches like Samsung Gear 2 and Apple's iWatch (sync with smartphones to make calls, display information, etc.), and Google Glass.

Implications to Disability: This technology offers flexibility to those with disabilities in the different way a user can interact with technology. Wearables also offer a more personable way than ever before to interact with technologies. Wearable technologies will give people new ways to control technologies and new ways for technologies to send signals and messages (such as medication reminders, etc.) to users who need them.

Wearables will:

- Create a new level of support for individuals with executive function challenges. Wearables will have the ability to sense and understand when you drift away from a task, or become inactive, and help you keep on track or re-charge your focus
- Bring numerous benefits to mental health management. Biofeedback sensors can help individuals be proactively aware of stress levels and also help manage and measure important habits such as sleep and exercise.

Wearable Communication:

- iWatch (prices vary) can be paired with a variety of communication apps to provide a

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different way of accessing a tool for communication.

- [Proloquo2Go – Symbol Based AAC by AssistiveWare](#) (\$249.99): Proloquo2Go (P2G) is a comprehensive communication app for the iPad, iPod Touch and iPhone. You need to purchase the app for the iPad in order for it to work on the iWatch. It has limited functionality due to its size but is designed for quick text/symbol communication.
 - [Proloquo2Go for Apple Watch! Use the app as a single switch on iPhone](#)
- [:prose by Smartstones, Inc.](#) (\$59.99) is a unique communication system that pair with iWatch, [Smartstones Touch](#) (\$159.00) and [Emotiv EEG](#) (\$299.00 – 799.00) and uses gestures and brain waves (think to speak) to communicate.
 - [Speak :prose – Think to Speak with the first sensory communication platform - video](#)
- [Talk Track Wearable Communicator](#) by Ablenet (\$145.00) is a simple 4-message wearable communication device. Useful for communication on the go and quick phrases.

Wearable Clothing:

- [Super Suits FUNctional Clothing](#) – GoBabyGo: Clothing designed by UD students in the Super Suits Project.
- [Independence Day Clothing](#) (prices vary): This clothing line offers an optional GPS sensors embedded in the clothing to help track and keep safe individuals that are prone to wandering or getting lost.
 - [News Anchor Ditches CNN to Create Life-Changing Clothes for Autistic Kids](#)
- [Snug Vest](#) (\$365-\$394 depending on size): An inflatable vest that provides Deep Pressure Therapy. The user inflates the vest with air and controls how much pressure the vest provides.
 - [Snug Vest in 60 Seconds - video](#)
- [TJacket Basic and TJacket](#) (\$399/\$599): A Deep Pressure Therapy vest that simulates the pressure of a hug. Custom pressure provides via an app. The TJacket Basic provides one point of pressure input and a size upgrade fee after one year; The TJacket provides two points of pressure input and free size upgrade after one year.
 - TJacket App (Free – You Need a TJacket to use this app) [Apple](#), [Android](#)
 - [How to Wear the TJacket - video](#)

Resource Articles and Videos:

- Tommy Hilfiger Debuts Adaptive Clothing Line
 - <https://www.disabilitycoop.com/2016/02/23/tommy-hilfiger-adaptive/21949/>
- GoBabyGo creates FUNctional Fashion for special needs children

- <https://www.youtube.com/watch?v=csIbDTzCLsI>
- Wheelchair Clothing for Men & Women
 - <https://us.izcollection.com>

Wearables for GPS Tracking and Safety:

- [GizmoPal 2 by Verizon](#) (\$79.99) [Apple](#) and [Android](#): Wearable device that requires cell activation. Allows GPS location monitoring and 2-way calling with parent phones. Requires activation and cell service.
- [Kid GPS Wrist Watch Phone](#) (\$109.95): Wearable that is worn by kids and tracked by parents. Allows for one way calling between the watch and the parents phone. Parents can monitor kid location, send alerts, and more.
- [iSafe Built in Alarm Backpacks & Bags](#) (prices vary): Backpacks and bags with a built in safety alarm that children can pull when they feel unsafe. When pulled an loud alarm scares off potential threats.
 - <https://www.youtube.com/watch?v=SmaQQxIL90E>
- [iSwim Band](#) (\$17.95): Backpacks and bags with a built in safety alarm that children can pull when they feel unsafe. When pulled an loud alarm scares off potential threats.
 - [Potentially Life-Saving App Gives Parents Peace of Mind During Summer Swimming Season](#)

Wearables for Health and Fitness:

- [EPIC-id](#) (\$50): Waterproof USB band that contains your contact and medical information in case of an emergency ICE.
- [Temp Traq Wearable Thermometer](#) (\$34.99/2): Attach thermometer to skin and activate. Provides continuous monitoring of temperature for up to 24 hours. Monitoring and tracking available free companion apps. ([Apple](#) and [Android](#))
- [Vick's Pacifier Thermometer](#) (\$10.99): A pacifier that gives comfort while providing continuous temperature monitoring.

Wearable for Hearing and Vision:

- [ActiVocal Wear Personal Amplifier](#) (\$195): Assistive listening device necklace, filters out background noise and clarifies sound 6 feet in front of the user.
- [Dot Watch](#) (\$290): The first braille and tactile smart-watch.
 - [DOT: First Braille Smartwatch - Video](#)
- [Starkey Halo Hearing Aid for iPhone](#) (\$2,000.00+): Hearing Aid designed to integrate with [Apple](#) or [Android](#) App.

- [Sunu Band and Sunu Tag](#) (\$199): Sonar smart watch that provides haptic feedback for time. The band uses sonar to give the user feedback on their surroundings to help them navigate their environment. Connect band to Sunu Tag to track and locate belongings.
 - [Sunu Band | Smart-Watch](#)
 - SUNU Wearable for the Blind Navigates Post-Accelerator Growth
 - <http://founderswire.com/2015/02/27/sunu-wearable-for-the-blind-navigates-post-accelerator-growth/>

Wearables for Sensory and Self-Regulation:

- [Muse: the brain sensing headband](#) (\$249.00): Muse measures brain activity in real time and walks users through guided focus exercises, alerting the user when their mind is distracted. Helping them to train a wandering mind. With repeated use Muse helps people manage their attention.
 - Muse: the brain sensing headband app (free): [Apple](#) and [Android](#)
- [Spire Activity Tracking for Body and Mind](#) (\$129.95): A wearable that monitors your breathing and tracks stress and mindfulness.
 - Spire – The Mindfulness + Activity Tracker App (free): [Apple](#) and [Android](#)
- [StimTastic Fidget Jewelry](#) (prices vary): A company that designs stim toys, chewable jewelry and fidgets for individuals with sensory needs with designs by individuals with autism.

Resource Articles and Videos:

- Customizable 3D Printed Fidget Spinner Ring (Thingiverse)
 - <http://www.thingiverse.com/thing:188275>
- Let distracted students make DIY fidgets with 3D printers
 - <https://www.iste.org/explore/articleDetail?articleid=573>

Wearables for Time and Focus:

- [Flex by FitBit](#) (\$79.95): The FitBit Flex is one of several fitness trackers from FitBit. The Flex tracks steps, activity, sleep and more. Using the alarms features users can modify their behavior to take breaks while doing homework, check in to make sure they are on track with their homework, and more.
 - FitBit App (Free): [Apple](#), [Android](#), and [Windows](#)
 - [The FitBit as AT](#)
- [iWatch](#) (prices vary) can be paired with a variety of communication apps to provide a different way of accessing a tool for communication.
 - [Children with Autism Visual Schedule](#) (\$12.99): A wearable picture based scheduling

app. A visual schedule once created on your iDevice can be accessed on your iWatch.

- [Octopus Smartwatch](#) (\$109): Smartwatch designed for children ages 3-8 to help them develop good habits. Icon based with different modes operated and support by parent or educator via free app. Currently in crowdfunding pre-order (Indiegogo) with anticipated delivery of March 2017.
- [RE-vibe Anti-Distracton Wristband](#) (\$99.95): This wristband was specifically designed to help people stay on task by sending them vibration alerts.
- [Time Timer Watch Plus](#) (Small & Large Sizes \$84.95): A watch and timer available in colorful small and large sizes. Use to regulate time and maintain focus on tasks.

Other Wearables Resource Articles and Videos:

- Clinical Trial Shows Tongue-Controlled Wheelchair Outperforms Popular Wheelchair Navigation System
 - <http://www.news.gatech.edu/features/tongue-drive-wheelchair>
- FingerReader A Wearable Interface for Reading On-The-Go
 - Wearables have the potential of making accessibility more personable than ever. For instance, MIT's Finger Reader will perform Optical Character Recognition and Read text aloud as you scan over text with your finger.
 - <http://fluid.media.mit.edu/projects/fingerreader>
- Google Glass for Autism
 - Article about using wearables such as Google Glass to provide support to those that struggle to interpret emotions, scanning facial features to display emotional states (happy, confused, surprised, etc.) as text.
 - <http://www.glassappsource.com/google-glass/google-glass-autism.html>

The level of our success is limited only by our imagination – Aesop