

Tablet Computers and Apps as Informal Assessment Tools

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*The contents herein are mostly based upon a previous article and conference presentations developed with Cristi M. Saylor, Deaf and Hard of Hearing Teacher with the San Diego County Office of Education.

Introduction

Tablet computers such as the iPad can be used as an informal assessment tool for children, including those with health issues and multiple disabilities. This can be accomplished by taking advantage of features unique to these devices, as they provide a flexible and easy access medium to a wide range of possibilities for the child to demonstrate their skills, concept development, and interests. In my work as a technical assistance provider I observe a child in his/her natural routine at home or at school in order to provide the educational team with recommendations to enhance the child's educational program. With some students, the use of the iPad has allowed me to supplement other ways to gather information about the child like direct observation, interview of caregivers and service providers, and reading of reports. By using the tablet I may: 1) confirm some of the child's skills observed during the routine, 2) gather new insight about the child's abilities and knowledge, 3) learn about sensory and physical accommodations the child needs for accessibility, 4) have a deeper understanding of what is motivating for the child so it can be applied to this technology and to other learning experiences, and 5) be able to engage a child who might otherwise be difficult to assess due to lack of interest and/or no previous experience interacting with me.

Reasoning

Following are some factors unique to tablets that can make them useful assessment tools:

1. **High contrasting visuals:** Tablets keep children's interest due to high contrast images and their movement on the screen as they are easier to follow visually and more motivating. Also, for children with visual loss or other conditions that prevent or interfere with their ability to focus, the tablet's black frame provides a boundary, making pictures easier to perceive than those on larger computer screens.



2. **Interactivity:** The straight forward cause and effect quality of the tablet computer is one of its biggest assets. When children touch the screen, the app responds rapidly with visual and auditory changes. With this immediate response children are more likely to become interested and stay attuned longer, allowing more time to gather information about the child.
3. **Portability and accessibility:** Children are more likely to feel comfortable with new tools if they can access them easily and comfortably. For instance, children can place the iPad in their visual field and as close or as far as they need to in order to see it and touch it, and they can play with it in their natural settings (e.g., on the floor, on an adult's lap, on a mat lying on their sides, etc.) as compared to desktops or laptops.
4. **Ease of use:** It is fairly easy for the child to activate and manipulate the visuals presented on the screen, even if the child has little strength or relatively poor coordination. For example, the screen will respond to a simple tap or, if the child needs to match two pictures together, with little physical effort the child can pinch and drag the picture to where it needs to go. In this way children with physical and medical problems may demonstrate higher cognitive abilities in ways that they could not with other tools.
5. **Engagement:** Children often respond to a tablet (even if it is new to them and they are meeting the service provider for the first time) because of its small size, vivid colors, high contrast, and sound. The professional can then sit down and play with the child to discover what the child can do, what motivates the child, and what the next steps to further their learning experience might be using the device. This experience can also provide the adult with information that can be used to engage the child in other learning experiences outside the tablet.
6. **Content:** The information presented in the apps can be used as is, but in many cases content can be created with the help of the camera and the tablet computer's accessibility to the internet. Creating customized content connects to the child's familiar experiences so as to facilitate engagement. For example, one question frequently asked in schools is if a child can recognize pictures. Many times they do not see any response from the child because the pictures they show the student are not motivating to the child. With the tablet the classroom staff can take pictures of the child's highly preferred objects, activities, and/or people and work with these pictures and very likely the child will respond to them.
7. **Degrees of complexity:** The tablet apps are able to create an immense conceptual world, from visuals that move at random, to simple shapes with bright colors, to complicated scenes where the child needs to discriminate between images, to layers of information that grow in complexity. This richness allows the service provider to determine the child's comprehension threshold. Cristi M. Saylor and I have developed a way to systematically introduce apps to young children, which can be found [on page 8 here](#), for the purpose of providing a guide to the service provider or caregiver on where to begin and continue as they introduce different apps to the child. The sequence starts where it only requires the child to look at the visuals in the screen, and progresses to where the child can interact by tapping at random with the visuals, and from there to where he/she needs to do specific actions in order to get the right response.

Responses to Look For When Children Use the Tablet Computer

When assessing children of all ages with multiple disabilities using a tablet computer, service providers need to be prepared to spend time and actively engage the child. They also need to be attentive and observant. The child's responses may be subtle (e.g., changes in facial expressions, gaze, vocalizations and other physical movements), or more obvious (e.g., the child responds accordingly to the app's requests).



Following is a list of commonly observed behaviors and ways that the quality of the interaction between the child and the tablet computer, and the child and the adult may be assessed.

Basic behaviors:

1. **Willingness to engage:** The child begins to observe the tablet with curiosity. At first, the child may only look at the screen but not touch it. The adult can introduce the child to several apps to find which ones will be the most interesting. The child may visually follow the actions on the screen and join with the adult's actions such as tapping or sliding the finger on the screen to create changes on the screen.

JR was four and had spent most of his early life in and out of hospitals. When I introduced him to the iPad his health had stabilized. When I first sat on the floor with JR and showed him the iPad, he was not interested and walked away, but as I continued playing without him he eventually returned. Once he sat down with me, he began to touch the screen like I was doing—moving the index finger on the screen so that the app would change in shape and color—and observed the results.

2. **Visual attentiveness:** The child not only observes the screen, but also begins to look with intent at the different images and actions. The child may look at a specific target (fixation), and/or may follow it (tracking). Visual distance from the iPad and visual field may be considered. If the child has cortical visual impairments (CVI) he or she may not look directly at the screen just as if they had a visual field loss. (Of course, it is important to know what the child's specific visual impairment is, and the visual functioning.) You will learn what kinds of movement patterns, images, colors and shapes the child pays attention to and can then choose apps that will strengthen their visual attentiveness.

Christopher was nine years old and had CVI. It was my understanding that he had had some previous exposure to the iPad but had not responded to it. In this case he looked at things that interested him for short periods of time. Knowing he had CVI, I showed him an app with moving black and white patterns and some colored shapes as children with CVI will more likely respond to these high contrast visual patterns in movement. Christopher observed the app for a long time and was able to track the red and blue shapes on the screen, which implied that when presented with the right visuals he would attend.



3. **Reaching and touching:** The child reaches and touches the screen looking for a reaction. The action may be random or more refined, with the child touching specific areas on the screen to obtain a specific response.

John, aged two, loved an app where he could create and burst colorful bubbles on screen by touching it with his finger. He observed his new creations—the bubbles—but then he liked to see how easily he could burst them and make them disappear. He could look at visuals, touch them and transform them. On the other hand, Christopher, the nine-year-old with CVI seemed to only like to track the visuals on the screen. Perhaps, in his case, looking at them in order to process all the information on the screen was enough for him.

Quality of the interaction with the tablet computer:

1. **How the child uses the app:** This would include all of the basic behaviors previously described plus physical and cognitive abilities to activate the app and to respond to what it asks for:

Back to John: he loved bursting bubbles, but he was also able to sort and categorize the pictures by similarity and difference, size and use. He could go to the home page of the app and choose which activity he wanted, change pages, close the app, tap a picture and slide it to where it needed to go. (He had been exposed to the iPad very early at home which would need to be factored in here.) At times he missed some of the answers. It was not clear if it was because he did not know it or he was tired. John had CHARGE Syndrome, had health problems and fatigued easily. At times he lay on his side in order to continue to play with the tablet. Still it was obvious he was making connections between different concepts, and the next steps were to gradually present him with more challenging apps to expand his cognitive abilities, always taking into account his physical and sensory needs.

2. **Length of engagement:** The length of time the child is engaged using the tablet computer. This would include the sensory and physical breaks the child needs to take in order to continue playing with the tablet computer.

Here you might want to ask yourself, is the child lying on his side, for example, because he is physically tired and needing to rest? Are her eyes fatigued? Is the child used to paying attention for such a long time? And, even though the tablet computer is fun to use, does the child need to take a break or physically move for a short period of time in order to continue?

Peter (four years old): He liked to look at and touch the scenes and watch the responses of the characters and objects from his favorite app. He would play for a bit, take a break by walking around the living room, and then resume play (at that time he was attending school but he was still receiving some educational services at home).

The teacher remained in place with the app opened to where Peter left it. The last time I spoke with the teacher she said that Peter was able to sit for longer periods of time with the tablet without needing to walk around the room. This is a good reminder on how consistency and repetition and modeling the right behavior may help the child lengthen the periods of engagement. With other children you may need to observe carefully the child and may have to make the decision to give the child a break because the child may not be able to do it on his own. If you observe that the child withdraws, or get overexcited, this would cue you to give the child a break or change the activity completely.

3. **Accommodations:** Does the child need special accommodations in order to access the tablet and the apps? Some of these accommodations could be related to: distance of the iPad, placement of the iPad in the visual field, iPad flat on surface or on a easel, support under the elbow, wrist or hand-under-hand approach to touch the screen, volume down to be able to pay attention to the visuals, or up in order to listen to the auditory information.

Susan (7 years old): she had cerebral palsy (CP), visual and hearing impairments and complex health issues. She had some vision in one eye, no vision in the other, and a moderate to severe hearing loss. I presented the iPad within 2" in front of her to observe her visual responses. As a result of her CP, it was difficult for her to maintain fixation, direct and sustain visual attention, but she consistently tried to do so. I slowly moved the iPad from side to side and she followed it. We learned from this observation Susan's ability to follow a visual target despite having limited vision only in one eye and her CP, and that her visual attention increased when the app presented bright visuals that moved at random in combination with music. Also, that when you tried to support her to bring her hand to touch the screen while she was looking at it, it was almost impossible due to her high muscle tone.

Quality of the interaction between the child and the adult:

1. **Pre-intentional and intentional communication behaviors:** The child expresses her or his engagement through behaviors that may not be done on purpose but communicate nonetheless (pre-intentional communication.)

For example, the child may smile and begin to tap the screen with excitement. You may interpret this as, "she is very happy," or "he is getting too excited and needs a break." For example, with JR, we interpreted his tapping harder and harder on the screen that he was getting overwhelmed and we stopped the activity. We were not absolutely sure this is what it meant but we interpreted this way because his behavior was getting out of hand. It was his first time playing with the iPad and he had already been playing with it for half-an-hour. His mother manifested, as he was tapping harder and harder on the tablet, that it was the first time she had seen him playing this long with anything. This revealed to us that although JR had demonstrated that he liked the activity and that he could stay

with it for a longer period of time than anybody would have guessed, he still needed a break. It seemed that he was not able to take it on his own, and he needed someone else to stop it for him. On the other hand, the child may use behaviors that are expressed with intent.

For example, the child pushes your hand away from the screen because they don't want your intervention, or they may grab it to ask for help. We observed John doing this with his mother. When he wanted help from her he brought her hand to the screen as if to say "I want you to do this for me." John knew he could impact the people around him and he was able to communicate with gestures his wants and needs.

Informal Assessment Observation Sheet

The following observation table can help register and track the progress of the child using this technology. It may also help to extrapolate the information gathered to other learning experiences.

Informal Assessment Observation Sheet for Tablet Technology

Child's name: _____

DOB: _____

Date	App	Senses & fine motor skills used	Visual, auditory & physical accommodations	What does the child do with the app	What is the child learning	Time spend in the app	What is motivating to the child	Comments

More apps

Following is a list of apps that can be added to the list that was provided in the "Suggested Apps" column [on page 8 in this article](#):

High contrast patterns:

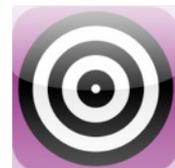
Infant Visual Stimulation (Think Design Studio)

High Contrast Shapes, Letters and Number for Babies (David Dalcu)

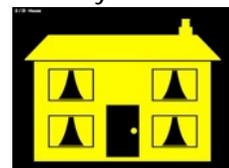
Baby Screen (Planet Sloth)

Infant Zoo (treebetty)

Big Bang Pictures (Inclusive Technology Ltd)



Baby Screen



Big Bang Pictures

Colorful patterns:

Ooze (Collective Cognition)
 KaleidoBalls-Free (Croesus-Mode.com)
 Bubbles Magic (Squishy Things Inc.)



Magic Fingers

Flashlight:

FlashLight LED HD (Santiago Lema)

Painting with music:

Magic Fingers (Sweet Action Games)
 Finger Paint with Sounds (Inclusive Technology Ltd)



Kids Song Machine

Integrated scenes:

Kids Song Machine HD (Genera Kids)
 Talking Larry the Bird for iPad (Out Fit 7 Ltd.)



Math, age 3-5

Early learning:

Math, age 3-5 (Euro Talk Ltd)

Conclusion

Tablet computers and their apps offer a unique opportunity to learn about a child's abilities and preferences. Through this engaging, flexible and accessible technology, youngsters who may not have otherwise been able to demonstrate their skills, can now do so. The information that can be gathered about a child extends from observing very simple/initial behaviors to more sophisticated responses as the technology responds to a wide range of cognitive, sensory and physical abilities. Having a sequence to follow regarding which apps to introduce and when and what they might reveal can help the service provider be more accurate in determining the child's learning threshold and where to go next. Nevertheless, despite the many useful qualities of this technology, the involved participation of the service provider is critical. The adult needs to be focused during the assessment so as to identify the nuances and significance of a particular child's behavior, as well as to know when to intervene when it is necessary. Lastly, having a way to register the information gathered is critical to the process, even when it is called an informal assessment. The information registered allows one to follow the child's progress and to make informed decisions as to improve the teaching-learning experience.

References

Saylor, C. M. & Rodriguez-Gil, G. (2012). Using the iPad and a Sequence of Apps for Young Children with Multiple Disabilities. *ReSources*, 17(2).