

Fall 12-10-2018

# Mainstream Tablets as Speech Generating Devices: Considerations in Decision Making

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## Recommended Citation

Sienza, Kaylee; Beck, Ann R.; and Yacucci, Amy L., "Mainstream Tablets as Speech Generating Devices: Considerations in Decision Making" (2018). *Graduate Independent Studies - Communication Sciences and Disorders*. 12.  
<https://ir.library.illinoisstate.edu/giscsd/12>

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Mainstream Tablets as Speech Generating Devices:

Considerations in Decision Making

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## MAINSTREAM TABLETS AS SPEECH GENERATING DEVICES

### **Introduction**

In a world full of a wide array of different technological conveniences, the realm of augmentative and alternative communication (AAC) and speech generating devices (SGDs) continues to transform at lightning speed. When AAC became a field of its own, cell phones and computers were just beginning to appear in the mainstream market. Smartphones? No one knew what they were yet. Technology at the time was innovative; however, it was clunky and expensive. For AAC users, the possibilities unlocked through technology was unimaginable. Those who require the use of an alternative form of communication with voice output, the options were limited to expensive, dedicated devices with advanced technology. Dedicated SGDs are defined as a high-tech computer device purchase for the sole purpose of communication. Today, modern technology has expanded the field of SGDs to include the convenient technology we all know and love. From the moment Steve Jobs announced the very first iPhone, the world had changed forever: including the world of SGDs. In the world of AAC today, mainstream tablets like iPads are being explored and purchased for the use of communication devices due to cost, advanced technology, and convenience. It may seem innovative and exciting. There are, however, several considerations to explore prior to determining if an individual will benefit from a mainstream tablet used as a SGD.

### **AAC Basics**

Prior to deciding between a mainstream tablet SGD or a dedicated SGD, it is important to understand the various options and configurations of the various available programs and devices for AAC. All SGDs, whether on tablets or dedicated devices, have various language representation methods (LRMs), vocabulary configurations, and homepage designs that make them unique. It is imperative to understand that SGDs are not a one-size-fits-all product. A formal speech-language evaluation along with collaboration with a team of providers are the

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most effective and desirable methods for determining the best hardware and software appropriate for an individual. According to Roth (2005), choosing an appropriate AAC device for those in need of aided-language is an intensive, time-consuming process that involves several members on the care team to determine a system that is most appropriate for a individual or individuals.

### **AAC Language Representation Methods**

Before choosing between a mainstream tablet device or a dedicated device, it is important to explore the various methods of aided language within both applications and devices. There are many different choices for applications or programs when it comes to SGDs, each with small differences that make them unique and attractive. All SGDs, whether tablet based or dedicated, follow three basic language representation methods (LRMs). These consist of single-meaning pictures, semantic compaction, and alphabet-based representation methods (see appendix A; Moffat & Tan, 2015; American Speech-Language-Hearing Association (ASHA), 2018). Applications and devices may use one or more LRM (Hill, 2010). Single-meaning pictures similar to those seen in Boardmaker® and Symbolstix® or real photos of objects are used to represent one single word or message (ASHA, 2018). Thus, each word is represented by a single meaning picture. It is a 1:1 relationship between the symbol and the meaning of the word. The greater the vocabulary needed by the individual using AAC, the more pictures and pages there are to navigate through to complete a thought.

Semantic compaction, also known as Minspeak® (stands for ‘minimal effort speech’), uses the same icons or symbols for multiple different word meanings reducing the number of symbols necessary, even as vocabulary grows (ASHA, 2018). In addition, fewer hits or selections are required to create a full phrase or sentence. For example, an icon of an orange can represent both the fruit and the color. The symbols are organized into semantic categories or word families by associations that are frequently made with the objects (Minspeak, 2018).

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Consider the orange example again. An orange may also be associated with “eat”, “bite”, or “hungry”. Typically developing individuals learn language and vocabulary through associations made to fit into already created semantic categories or word families, and semantic compaction is designed in a similar way for those using AAC (Minspeak, 2018).

The final LRM is alphabet-based. Many applications and devices that contain either single-meaning picture or semantic compaction LRMs also utilize the alphabet-based method. Alphabet-based uses a typical keyboard and orthography to spell out desired words and may also use a predictability feature to aid in quicker typing (ASHA, 2018). Alphabet-based applications or devices may also contain pre-programmed words and phrases (Moffat & Tan, 2015). All of the LRMs are available for both mainstream tablet devices (applications) or dedicated devices.

### **Vocabulary**

Vocabulary layout, configuration, and selection is important to consider when choosing a specific program for either a mainstream tablet or a dedicated SGD. Each SGD varies in their homepage design and vocabulary layout, so it is important to consider the SGD’s specific features when choosing the best option for a particular individual. Teaching language to individuals using aided communication should follow what typically-developing individuals do in everyday communication. Marden (2015) states that about 40 to 50 core words comprise the vocabulary that we use in typical conversation with others, and 200 to 400 words make up 80% of the words used on a daily basis. Core vocabulary consists of various parts of speech such as verbs, adjectives, pronouns, and prepositions. Nouns and proper nouns are commonly referred to as fringe vocabulary (see appendix B; Moffat & Tan, 2015; Language Lab, 2018). Fringe vocabulary is highly specific to a topic or individual (Marden, 2015). Although fringe vocabulary words can add color and specificity to a conversation, they are not essential to communicate a message clearly. The desire for AAC users is that they develop language and

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communicate messages just like a typical speaker. Applications or devices that are chosen for AAC users, therefore, should be approximately 80% core vocabulary based with 20% fringe vocabulary.

### **Vocabulary Organization and Color Coding**

Many dedicated devices and SGD applications have specific ways that vocabulary is organized on the display. Color-coding has been considered an evidence-based practice in AAC to assist those using AAC in organizing words into grammatical categories (Zangari, 2013). Some of the most common forms of color-coding in AAC are Fitzgerald Key, Modified Fitzgerald Key (Appendix C), and Goossens, Gran, and Elder Key (Appendix D). Each of these color-coding systems organizes vocabulary into grammatical categories using different colors. Modified Fitzgerald Key organizes the vocabulary on the display into 10 categories, whereas Goossens, Crain, and Elder Key organizes the vocabulary into five categories (Zangari, 2013). Zangari (2013) advocates that one color-coding approach is not necessarily better than the other, however, consistency is the key. Not all color-coding systems are available on every device or application, and some devices and applications have their own color-coding systems. It is less about the type of coding system selected and more about the consistency of using the coding across pages for the individual.

### **Features in Mainstream Tablet Software (Apps vs Device Software)**

One of the differences between applications on mainstream tablet devices and the software used on dedicated devices is the customization options available. One of the main customization options available on SGDs are grid size options. Grid size refers to the number of buttons or icons on the screen at any given time. Some applications on mainstream tablets may or may not allow for customization of the grid size or button size (Frank, 2018).

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In addition, mainstream tablet device applications may not allow for controlling of outside features on the device from within the application (Frank, 2018). For example, when comparing the Prentke Romich Unity dedicated device with the LAMP Words for Life application, features like a note taking application or email are not able to be controlled by the LAMP Words for Life application but can be controlled by the Unity device (Frank, 2018). The ability to reply to an email or type notes from the SGD can be useful for individuals and individuals who need to communicate in multiple different ways and to remain connected socially to others. Using the SGD to control those functions permits simplicity, efficiency, and an all-in-one functionality. This may be especially important for those who use alternative access methods such as switches, eye-gaze, or head-pointing as it provides accessibility to other methods of communication that otherwise are not possible. In addition, many dedicated devices come with a way to connect to a computer so that the device can control the functions of a computer (Frank, 2018).

### **Hardware**

Once foundational elements of LRM, vocabulary, and organization have been determined for the individual or individual, hardware considerations can then be made. It is important to consider both mainstream tablets and dedicated devices as both offer various pros and cons that make them unique. Durability, size, and accessories are some of the main hardware components to contemplate. Along with the hardware components comes variability in cost, accessory availability, and insurance coverage; all of which are vastly different for both mainstream tablet SGDs and dedicated SGDs.

### **Dilemmas**

One of the main benefits of using mainstream tablets as SGDs, such as iPads, is that they can do more than just serve as communication devices. Individuals using mainstream tablets as

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SGDs can benefit from other functionalities on the devices (Landon, 2018). Individuals who use the tablet SGDs can have the benefits of an all-in-one style device in that the tablet can be used for time management apps, schedules, timers, and learning apps (Landon, 2018, AAC-RERC, n.d., Dolic, Pibernik, & Bota, 2012). In addition, many sensory needs can be met with apps on the device. However, the all-in-one functionality comes with cautions. If individuals are using their tablets for all of the various functions, are the individuals getting the most out of the primary purpose of the tablet: communication? (Landon, 2018). When the individual is engaged in a learning game or opportunity on the tablet, they are then unable to use the same tablet for communication purposes. They would not be able to talk and interact with others about how fun the game is or to ask for help when needed.

In addition, many individuals benefiting from an SGD also struggle with transitions between activities, especially non-preferred activities (Landon, 2018). Landon (2018) warns that the same behaviors the SGD is trying to suppress may actually be increased by the multi-functionality of the tablet. With that being said, not all individuals using SGDs or being evaluated for SGDs struggle with transitions or impulse control and could become increasingly independent with multi-functionality (Landon, 2018). One main concern with tablet SGDs is the actual rate of communication (Landon, 2018). If the individual is in the middle of working within another application, response time in conversation may be reduced making it unnatural in social exchanges (Landon, 2018). Conversations typically are instantaneous and waiting for an individual to close the current task and open the speech-generating app may add significant gaps to the conversation, which is already a less efficient mode of communicating. Tobii-Dynavox, the Prentke Romich Company, and the Saltillo Company have recently released an iPad dedicated device to suit the needs of those who prefer the iOS platform but also could benefit from the durability and training that comes along with a dedicated speech generating device



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(Frank, 2018; Grzych, 2018; Thole, 2018). In addition, both companies report that for a nominal fee, the dedicated iPad device can be “unlocked” in order to allow some multifunctionality and access to internet functions (Frank, 2018; Thole, 2018).

Landon (2018) states that there are four criteria to consider when determining if a tablet is an appropriate choice for use as the SGD. First, the individual should have the appropriate motor control to be able to independently switch between apps on the device. Secondly, the individual should be able to follow directions appropriately given by teachers or others. Third, the individual must be able to handle impulse control and maintain attention to tasks at an age appropriate rate. Lastly, the individual must be able to differentiate between appropriate times to use the device for speech-generating purposes and when to use the device for other tasks (Landon, 2018). All of these skills should be probed during the AAC assessment process in order to determine if a tablet device will be an appropriate choice for the individual. Abbott and McBride (2014) advocate that an evaluation and feature matching should be completed before determining if a mobile or tablet device is the better choice.

One pro of choosing a tablet-based SGD is the looks or aesthetics. Many individuals would prefer not to “stand out from the crowd” as much as possible. Selecting an iPad as the speech generating device may reduce the abnormality factor associated with AAC in that many individuals who do not rely on an SGD still use iPads to communicate and complete other daily routine tasks. The AAC-RERC advocates that mobile devices have increased the normalcy in AAC and helped the world better understand what AAC is (n.d.). Tablet SGDs increase the acceptance of those using AAC (AAC-RERC, n.d.) Those using the tablet for an SGD can also have the same access to the technology that many people in the world enjoy every day (AAC-RERC, n.d.). Dolic, Pibernik, and Bota (2012) advocate that tablet devices may help with inclusion of those with disabilities into society. Hershberger (2011) states that specialized or

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dedicated SGDs can draw attention to a disability, whereas tablet devices allow individuals using AAC to fit right into society. Dolic et al., (2012) further advocate that it is the right of individuals with disabilities to have the same accessibility to online interactions that are part of today's society and believe that tablet devices help with this inclusion.

### **Cost Considerations**

Often times, selection of the AAC device is not made based solely on the needs of the individual using AAC. Many school districts and other facilities, due to the current economic climate, search for low-cost options because reimbursement rates through insurance and Medicaid/Medicare may not cover the majority of the expense of speech generating devices. According to Hershberger (2011), the traditional model of AAC implementation begins with a clinical evaluation, obtaining physician prescription for the durable medical equipment (AAC device), and extensive paperwork for insurance funding all with the assistance of a representative from the device manufacturer. Hershberger (2011) further states that the model is shifting from traditional to a consumer model in which an evaluation may not be necessary and a representative from the manufacturer is not necessarily involved. The AAC-RERC adds that tablet SGDs are becoming increasingly more popular when compared to dedicated devices because they are reasonably priced and readily available in addition to having lower cost apps that have very similar functions to dedicated devices (n.d.). In many school districts, the choice for and SGD is a tablet using language applications that can be bought in bulk at fairly low costs. The problem? Decisions about the type of application or device is pre-determined due to cost and availability while the individual needs of the individuals are not necessarily being considered (Abbott & McBride, 2014). Choosing mainstream tablets due to low cost does not mean that the individuality piece of the AAC evaluation has to be compromised. There are many SGD

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applications available for mainstream tablets with various unique features that can be trialed to include individuality in the decision-making process (Frank, 2018; Grzych, 2018; Thole, 2018).

The great thing about providing a reasonable cost for a SGD is that this aspect increases the availability of the SGD to those who may benefit. For many individuals with complex communication needs, something to communicate with is better than no SGD at all. Hershberger (2011) states that parents feel more in-control because they can easily access the application store on the tablet device and download the app for a reasonable price without paying for an expensive evaluation. However, as the array of speech-generating applications continues to expand, choosing the most appropriate application for an individual becomes overwhelming and confusing. Without an appropriate AAC evaluation, it is difficult to select the most appropriate speech-generating app for the individual with complex communication needs. It is important to keep in mind that the needs of all AAC users are vastly different and one application will be not appropriate for all individuals.

In addition to lower costs, another convenience is that many apps are easily updated through the app store on tablet devices. Often times, dedicated devices many need to be updated by the manufacturer (Dolic et al., 2012). Hershberger (2011) states that the price of tablet devices, the speech-generating apps, and the convenience of a one-click download make tablets an attractive choice for an SGD but advocates that choosing a tablet device over a dedicated SGD can sacrifice durability.

Furthermore, when selecting a dedicated SGD, often times a local representative or consultant from the manufacturer becomes part of the care-team for the patient and caregivers throughout the lifetime of the device (Hershberger, 2011). These representatives may provide patient and caregiver education and training with the device, assistance with troubleshooting, and manufacturer warranty fulfillment. Hershberger (2011) advocates that the representatives not

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only replace devices that are under warranty, but they willingly provide a loaner device during the time of service so that the patient is not without a method of communication for any period of time. If a individual who relies on an AAC device to communicate has to be without their device, this would result in significant communication limitations for the individual. Although the cost of dedicated SGDs is significantly higher, the services provided and the worry-free guarantee that are included with the cost of the device may be worth the money for some individuals.

### **Insurance**

Insurance companies, Medicare, and Medicaid currently do not typically cover mainstream or “over-the-counter” tablets used as an SGD because it is not sold as the sole purpose of communication (Frank, 2018). Many individuals prefer mainstream tablet devices over a dedicated device because of many of the aforementioned reasons, most importantly cost and consumer preference for iOS-based devices. In order to address the issue of low-cost options and operating system preferences, companies like Tobii-Dynavox, the Prentke Romich Company, and Saltillo have created a dedicated iPad device that allows insurance to cover costs associated with the device because it is considered durable medical equipment. This tablet is also offered at a more reasonable cost than typical dedicated SGDs without compromising a warranty and adequate training (Frank, 2018; Thole, 2018; Grzych, 2018). In addition, support from a local representative or consultant to assist with troubleshooting and adjusting to a new SGD would not have to be compromised in choosing an iPad dedicated device (Frank, 2018; Thole, 2018). Although not all methods of selection are available for the dedicated iPad devices at this time, the creation of dedicated mainstream iPads addresses many dilemmas that have emerged as a result of mainstream tablets entering the AAC world (Frank, 2018; Thole, 2018).

### **Red Flags**

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For many AAC users, communicating with an SGD requires innovative ways to control the device. Many individuals with complex communication needs also exhibit difficulties with motor control and may have limited use of their arms or hands. In order for these users to have access to an SGD, specialized controls including eye-gaze devices, switches, or wheelchair mounts may be necessary for the individual to be successful with the device. As mainstream tablet devices are newer to the market and lack compatible hardware, many of these accessories are not yet available to purchase to make the device accessible to those who need them (Abbott & McBride, 2014). Abbott and McBride (2014) state that access methods other than direct selection using the finger, (e.g., switches, joysticks, scanning devices) typically require purchase of separate equipment from the manufacturer of the SGDs and are typically only available for dedicated SGDs. In addition, many AAC users may have motor control that is reduced or weakened. These users may benefit from using keyguards for touch-screens to help them choose the icon desired without pushing others at the same time. Keyguards are another accessory that are not yet easily obtained for tablet-based SGDs.

Furthermore, many speakers in mainstream tablet devices do not have the output sound quality that dedicated devices have which may make mainstream tablet devices difficult to hear in noisy or busy environments (Frank, 2018). Classrooms, lunch rooms, birthday parties, and sporting events are just a few noisy environments that those using AAC may be in on a regular basis. If the speaker is not loud enough to be understood over immense background noise, it is as if the AAC user is not even talking. This may lead to frustration and lack of follow-through with the mainstream tablet SGD. Dolic et al., (2012) state that mainstream devices have the technology to include accessories, especially with Bluetooth functionality; however, the app developers still need to work on supporting Bluetooth features of mainstream devices (Dolic, et al., 2012).

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Another issue to consider is the accessibility to the tablet device. Mainstream tablet devices were not specifically designed for individuals with complex communication needs causing complications for accessibility of the device. When a tablet is not being touched for a set amount of time, the standard feature allows the tablet to enter sleep mode. If an individual does not have the motor control to swipe the screen to the right or tap to unlock the device, the individual may be without a means of communication. Additionally, Abbott and McBride (2014) advocate that swiping and clicking on mainstream tablet devices opens a wide array of possibilities to enter and exit applications and navigate through pages; however, this can create distractions for those who struggle to maintain attention to the task. Although work arounds like guided access and the ability to turn sleep mode off are available for mainstream tablet devices to assist with task maintenance and device power, these features are somewhat hidden and may be difficult to access without previous knowledge or use of the features. Accessing these technologies without normal language function may cause the individual to become frustrated.

### **Conclusions**

The technology in the field of AAC continues to advance rapidly, which continues to leave questions in the field unanswered. More research is needed in the area of AAC regarding the benefits of tablet devices and SGD apps. Areas that need to be explored pertaining to tablet based SGDs are social issues, technology compatibility, and sensory issues (AAC-RERC, n.d.). Although there appears to be many possible benefits of tablet devices, the AAC assessment process should continue to be individualized, as there are many considerations that should be made prior to choosing a mainstream tablet as an SGD. Foundational elements of AAC including language representation method, vocabulary, and vocabulary organization should be considered prior to determining appropriate hardware for a individual. Individuals with complex communication needs deserve to have a gold-standard evaluation to ensure their individual needs

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are considered and the most appropriate device or hardware is selected. The professional knowledge, skills, and judgement of a highly qualified speech-language pathologist will ultimately lead to appropriate decision-making when considering using either a dedicated SGD or a mainstream tablet.

## Appendix A

## AAC Language Representation Methods

<p><b>Single Meaning Pictures</b></p>	<p><u>One</u> picture/symbol represents <u>one</u> word or phrase.</p> <ul style="list-style-type: none"> <li>• Literacy is not required</li> <li>• Explicit teaching is required for non-concrete words and their pictures (in, out, want, like)</li> <li>• Amount of symbols grows with each new vocabulary word</li> </ul>
<p><b>Semantic Compaction</b></p>	<p>Pictures have multiple meanings and when put together can create words, phrases, or sentences.</p> <ul style="list-style-type: none"> <li>• Literacy is not required</li> <li>• Training is required to learn system</li> <li>• Vocabulary is rule driven to support language development</li> <li>• Supports development of motor programs</li> <li>• Small amount of pictures required even when vocabulary grows</li> </ul>
<p><b>Alphabet Based</b></p>	<p>Words are spelled using letters</p> <ul style="list-style-type: none"> <li>• Literacy is required</li> <li>• Software does not limit vocabulary</li> <li>• Large amount of input is required (multiple hits for one word)</li> <li>• Small symbol set (26 letters)</li> <li>• Rate can be enhanced with predetermined phrases</li> </ul>

(Moffat & Tan, 2015)



**Appendix B**

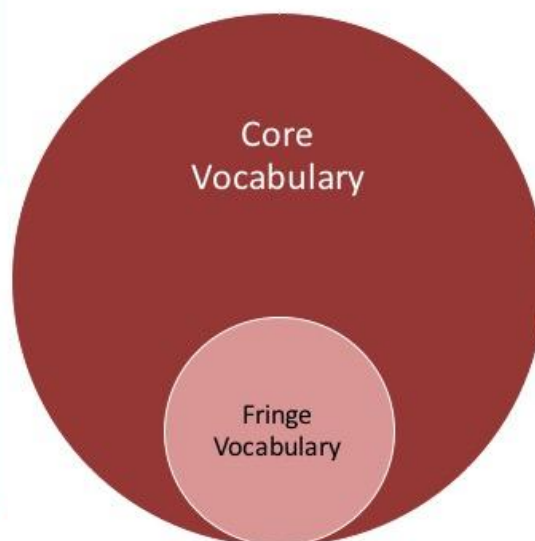
# Vocabulary

## Core Vocabulary

- Small number of words
- High frequency
- Applicable to all topics and environments
- Variety of parts of speech
- 80% of spoken communication

## Fringe Vocabulary

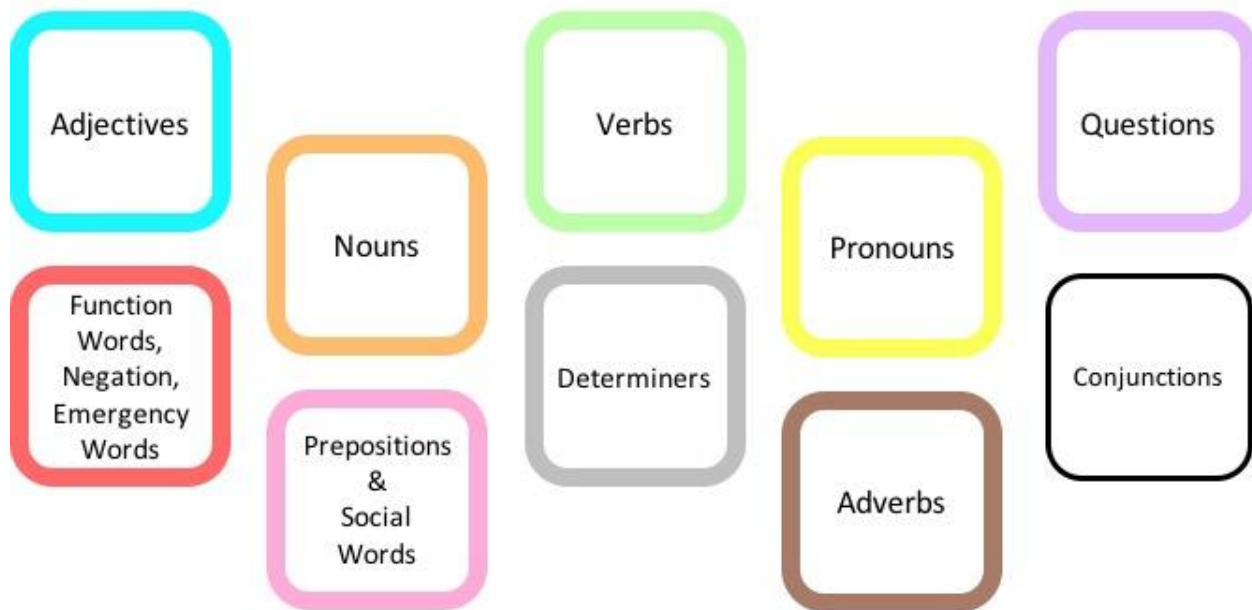
- Very large number of words
- Low frequency
- Applicable to limited topics and environments
- Mostly nouns and proper nouns
- 20% of spoken communication



(Language Lab, 2018)

Appendix C

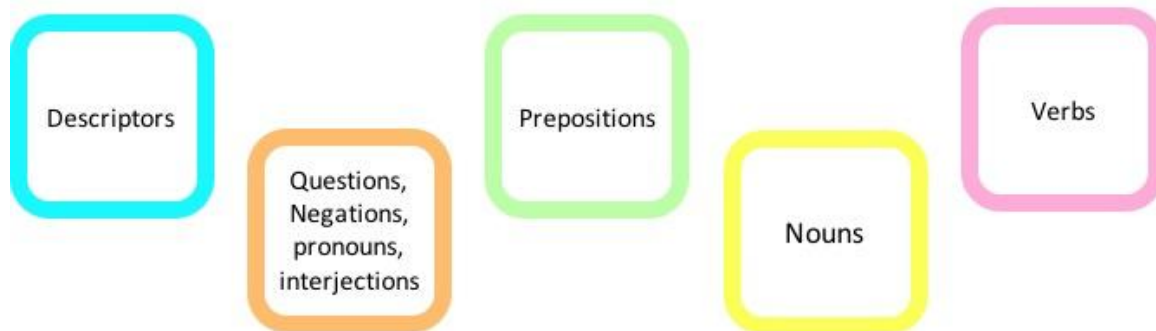
# Modified Fitzgerald Key



(Zangari, 2013)

Appendix D

# Goossens', Crain, and Elder Key



(Zangari, 2013)

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### **Justification for In-Service**

In the field of speech-language pathology, individuals are inundated with new information and evidenced-based practices at a rapid rate. The field is continuously evolving and improving to make the lives of our clients and their outcomes better. Augmentative and alternative communication (AAC) is not exempt from the rapid changes. AAC is continuing to be researched within the field, however, the growth of technology changes the field even faster. Research to create evidence-based practices can be time-consuming, and technology in devices seems to grow and change quicker than the protocol for implementation of the technology. One way to inform speech-language pathologists in the field of current best practices, dilemmas, and technology advances is to provide a voluntary informational session. As a graduate individual seeking more information about the topic of mainstream tablets as SGDs, I realized quickly that answers to many dilemmas are yet to be answered. However, I desired to share what the field currently knows so that we can improve the outcomes of individuals in need of communication devices. Many speech-language pathologists were not required to take a course in AAC during their graduate studies, so informing them about foundational elements of AAC can help build understanding of how AAC devices should be chosen for individuals in need of an alternative form of communication.

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## Presentation Notes

- Slide 1
- Slide 2
  - First I would like to take a moment to introduce myself. My name is Kaylee Sienza, and I am a second year SLP graduate individual at Illinois State University graduating in May 2019. I am from Oglesby, Illinois or right by Starved Rock State Park. I am very interested in AAC and children with complex communication needs as well as bilingual children. I hope to become an elementary or preschool SLP when I graduate. I chose this topic to research because I learned about it in Mrs. Yacucci's AAC course over the summer and wanted to learn even more. Mrs. Yacucci encouraged me to look further into the topic upon completion of my paper.
- Slide 3
  - These are the topics I will be covering throughout the presentation.
    - I am going to touch on some differences between mainstream tablets as SGDs and dedicated SGDs.
    - I will talk about the software and hardware differences for each
    - I will cover the cost considerations, dilemmas, and insurance coverage.
- Slide 4
  - My three purposes or goals of this presentation are to provide you with an understanding of the basics of high-tech AAC devices. I hope when we are finished you will have a clearer understanding of the differences between mainstream tablets and dedicated devices. Finally, I hope to provide you with the most important considerations in the decision-making process.

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- Slide 5
  - I just wanted to start off by giving you some terminology that will be part of this presentation. When I write SGD, I am referring to a speech generating device. Mainstream tablets are tablet devices able to be purchased on the mainstream market like iPads. Dedicated devices are those that are dispensed by an AAC company for the main purpose of communication. Language representation method is the way in which buttons on the SGD are organized. I will go into more detail about these later. Core vocabulary refers to the vocabulary that comprises the majority of our speech. Finally, fringe vocabulary are topic specific words that are typically nouns.
- Slide 6
- Slide 7
  - Things to know to get started are that AAC devices are not a one-size-fits all product. So, what does that mean? Individuals have very different needs based on many different factors including where the device is used most, medical diagnosis, prognosis, and age of the individual. There are many other specifics, but those are some of the most common ones. Formal speech-language evaluation can help consider all of the aspects of the individual being considered for AAC, and it will help in determining the best fit for a individual.
- Slide 8
  - I mentioned earlier something called language representation method, and this again is the ways in which the vocabulary is organized on the AAC application or dedicated device. Applications or dedicated devices may use only one or a mixture of them. The first language representation method is single-meaning



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pictures in which there is a 1 to 1 ratio of vocabulary to pictures. Every new word in the child's vocabulary is represented with a new picture. There are pages and pages and folders of different categories of words to sift through. Literacy skills are not required for this language representation method. The second method is semantic compaction also known as Minspeak. The main difference is that one picture can be used to represent multiple different meanings of a word. This reduces the number of pages and hits necessary to convey a message. The vocabulary is organized most similarly to how typically developing individuals develop language. Semantic compaction also does not require literacy. The final method is alphabet-based or just a keyboard to type messages. This is often included with other methods, but requires literacy to be able to compose messages.

- Slide 9
  - TouchChat Demo
- Slide 10
  - LAMP WFL Demo
- Slide 11
  - Vocabulary and language should be taught to those using AAC in a similar way to how language is taught to typically developing individuals. It is important to understand the two main types of Vocabulary that is used in conversation with one another. 40-50 words make up most of the conversational speech we use, and 200-400 words total make up 80% of the vocabulary we use on a daily basis. Therefore, SGDs whether tablet based or dedicated, should reflect this. We call the words we use on a daily basis core vocabulary. Core vocabulary is comprised

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of verbs, adjectives, and prepositions. The nouns in our speech are the words that add color to a conversation but are not necessary to get the message across in the conversation. The chosen SG app or dedicated device should therefore focus on easy access to core vocabulary.

- Slide 12
  - Here is a little visual representation of vocabulary that we use on a daily basis. And we will watch a short video that explains it a little bit more.
- Slide 13
  - Another foundational element of AAC is the way in which the vocabulary in the device is color coded and organized. It has been proven effective in research because it organizes the vocabulary into grammatical categories. The two I will specifically show you today, which are the most popular, are Modified Fitzgerald Key and Goosens, Crain, and Elder Key. There are many other different methods of color coding out there, and several companies have adopted their own. One method of color coding is not necessarily better than the other, but the most important thing is consistency.
- Slide 14
- Slide 15
- Slide 16
  - I have now covered the basics of what comprises the basics of AAC. Now I am going to go into some software or application differences in AAC devices.
- Slide 17
  - Some of the main customization options within applications include grid size and outside feature controls. Grid size is the number of icons displayed on the screen

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at one moment, and some of the applications for mainstream tablets may not offer all of the grid size options that the dedicated devices do. As far as outside feature controls, dedicated devices may be able to control other forms of communication for users. Dedicated devices may be able to allow the individual using AAC to type using their icons from their device to communicate via email or text or even complete a google search. This feature may be especially important to those individuals who require alternative access methods like switches or eye gaze because these forms of communication may not otherwise be accessible to the individual using AAC. I am going to talk a little bit more about these accessories in the hardware section.

- Slide 18
  - Now that I covered the main software components of AAC, I am going to move into hardware information. This will cover things like durability and aesthetics.
- Slide 19
  - In an article published by ASHA, they outlined four skills necessary for an individual to have to benefit from a tablet device over a dedicated device. The first skill is that the individual should be able to have the appropriate motor control to switch between applications with ease. This means hitting the tiny home button or swiping the screen accurately to switch when necessary. In addition, the individual should be able to easily follow instructions given to them to do the tasks asked of them while also controlling the impulsivity to go do other tasks on the iPad when the intention is for speech generation. Finally, the individual should be able to determine when it is appropriate to use the device for tasks other than speech generation. Many of these skills are high level cognitive

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tasks and may be difficult for many individuals. These skills should be probed during the assessment process to determine if a tablet device is appropriate.

- Slide 20
  - So, one of the considerations for thinking about a mainstream tablet AAC device is the possibility of a multi-purpose use. There are many applications available out there to assist individuals and individuals with their day such as time management applications, schedules, timers, learning applications, and sensory applications. An article published by ASHA indicated that individuals who benefit from an SGD can often also benefit from all of these functions as well. But with the multi-functionality comes dilemmas. What about those individuals who struggle with transitions? Are those struggles going to become apparent when switching between the SG application and the other application? In addition, if the individual is spending time in other applications, are they really using it for its intended purpose? Communication? When the individual using the device is in another application, often times the SG application cannot be open at the same time. If it can be, it is a limited screen. In addition, does it make conversation more unnatural because there is an extended time period necessary to switch between applications to respond? These are all questions that can be probed during the assessment process to determine if an individual can handle these dilemmas that come with mainstream tablet multi-functionality.
- Slide 21
  - For individuals who need to use other methods besides direct selection with the finger, mainstream tablets may not provide all the accessories they need to communicate with ease. Some alternative forms of controlling the device include

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eye-gaze, switches as well as wheelchair mounts and keyguards. Although many mainstream tablet devices do not yet have these accessories readily available, FORBES AAC is a company that has begun making mainstream tablets into dedicated devices and they do offer some accessories like wheelchair mounts, but not all accessories are currently readily available. I will talk more about FORBES AAC a little later on in the presentation, but for now I am going to show you a short video of some of the alternative access methods.

- Slide 22
  - The looks of a mainstream tablet device over a dedicated device is not something I had thought about prior to completing this project. I never thought that mainstream tablets could allow individuals using AAC to more easily blend into the crowd. This can create more inclusion of AAC into society. There are lots of individuals who have an iPad with them at all times for other benefits, and it doesn't look any different for those using AAC. It is also the right of individuals who use AAC to have the same access to social interaction like social media that others in the world access on a daily basis, multiple times a day. Mainstream tablets can allow this and so can some dedicated devices.
- Slide 23
  - Another consideration that may be one of the most important is the speech output sound quality. Many tablet devices cannot offer the sound quality that a dedicated device can. Think about many of the environments that individuals spend their day in: classrooms, lunchrooms, PE, sporting events. Many mainstream tablets could not generate sound loud enough so that the individual using AAC could be heard in these environments. This could create frustration with the individual

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using AAC and cause the individual to lose motivation to participate in these activities. Some developers are currently working on developing cases and speakers for mainstream tablets that allow individuals to communicate in these environments with lots of noise.

- Slide 24
  - So now that I have discussed both hardware and software issues that come up when considering between mainstream tablets and dedicated devices, I am going to cover some information on cost and the pros and cons of each device.
- Slide 25
  - Mainstream tablets have made the world's access to communication much greater. Individuals can download communication applications right at home. Of course, there is a small fee, but if a parent wants their child to communicate via an application, they can purchase the application on their own. In addition, if an individual or adult has suddenly lost their ability to communicate, they have a way to communicate if necessary. In addition, for many individuals the idea with mainstream tablets is that "something to communicate with is better than no communication at all." Another pro is that applications are updated through the application store on the device without any involvement of the device company. With these pros comes some cons, however. School districts rely on mainstream tablets due to the current economic climate, especially in Illinois. Reimbursement rates are not great, and mainstream tablets and SGD applications can be purchased in bulk at lower cost. This may cause the individualistic part of an AAC device to be removed and the assessment process may be bypassed. In addition, the amount of SGD applications available continues to expand causing

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frustration and lack of follow through on one application. Parents may also not be choosing the most appropriate application for their child which can lead to frustration as well. There is definitely both good and bad to mainstream tablets.

- Slide 26
  - There are definitely pros and cons that come with dedicated devices as well. Some of the pros is that insurance, most of the time, will cover the cost or some of the cost of the device as durable medical equipment. In addition, with the purchase of a dedicated devices comes representative support as well as a warranty that covers any repairs that may be necessary for the device. In addition, a loaner device may be given to the individual using AAC while their device is receiving repairs at no additional cost. On the other hand, dedicated devices come locked for the sole purpose of use as an SGD, so a fee must be paid to access other features on the device. In addition, these devices typically are more costly than mainstream tablet devices, especially without insurance. Finally, since dedicated SGDs don't always look like mainstream tablets, social acceptance may become an issue.
- Slide 27
  - While there are many benefits to mainstream tablets as SGDs, they are not currently covered by most insurances. One of the main reasons for this is that the devices are not locked for the sole purpose of communication, which is their intention. Insurance companies purchase devices for their intended purpose, not to allow access to other applications within the device. There are new companies like FORBES AAC that I mentioned earlier that are changing the idea of a mainstream tablet and a dedicated device as separate things.
- Slide 28

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- That leads me to a possible solution to the dilemmas presented earlier.
- Slide 29
  - Many AAC companies have just recently (in the past year or two) come out with dedicated devices that are mainstream tablet (iPad) based. I am going to show you short videos or pictures of three companies' iOS dedicated devices and then I will talk a little bit about FORBES AAC.
  - So what does this mean?
- Slide 30
  - Companies creating a dedicated mainstream tablet device means that:
  - Insurance coverage is possible through medicare/Medicaid
  - The cases that are used by each company amplify the sound accordingly to improve sound output
  - Come with consultant and tech support
  - Have warranties - length varies by company
  - Tend to be a little bit cheaper than other devices
  - Can be unlocked to access other features if family pays a nominal fee
  - When I found out about these new products this year, it could not have been more perfect timing. I think I had just started my project and got an email from Tobii Dynavox about their dedicated iOS device. I think that this is a huge step in the AAC world and I think that it is a good solution to many dilemmas involved with mainstream tablet devices.
- Slide 31
- Slide 32



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- So now that I have covered everything, I hope I was able to share some new knowledge with all of you and I hope that you learned something from me today.

I have a few takeaways from this presentation that I want to share with you.

Please do not hesitate to ask me any questions!

- Slide 33
- Slide 34