



## **PECS<sup>®</sup> to SGD: Guidelines and Recommendations for a Successful Transition**

### ***Position Statement:***

***Pyramid Educational Consultants' position regarding providing speech generating devices (SGD) including touch screen tablets with apps is that best and evidence-based practice for teaching functional communication and social interaction for individuals with ASD who are not speaking is to begin intervention with PECS, and to transfer to an SGD only after spontaneous, functional, picture-based communication skills have been established and the learner has mastered Phase IV of the PECS protocol. This sequence assures that the learner has acquired independent social approach, picture discrimination, communicative persistence, and the building of multi-picture sentences.***

### **Introduction**

The Picture Exchange Communication System<sup>®</sup> (PECS<sup>®</sup>) is an evidence-based augmentative/alternative communication system that is often chosen as a communication intervention for learners with autism or other complex communication needs who are not developing spoken communication. Speech language pathologists and other clinical/educational service providers often plan to transition from PECS to a speech-generating device (SGD) for long-term use after learners successfully progress through the PECS protocol, particularly for those learners who do not develop speech following extended use of PECS and complementary intervention efforts. In the current document, we present and describe recommendations for best practices associated with this transition, from assessment of the learner and the device prior to the transition from PECS through to intervention planning and assessment of the learner's successful independent use of the SGD.

When considering adopting or transitioning a communication system, it is important to consider the definition of communication. Communication involves behavior directed to another person who then mediates access to a reinforcer, which may be tangible (e.g., an object or activity) or social (e.g., shared attention). Of particular relevance to individuals with autism or other complex communication needs, communications need to be initiated spontaneously and completed independently in order to be effective in real world contexts. While teaching these skills using high-tech devices may be possible, extensive experimental research has already produced solid evidence that PECS training results in swift increases in spontaneous and functional picture-based communication in most children with autism and related developmental disabilities. Experimental research also further suggests that PECS training produces notable positive effects on speech and social development in some children with autism. In particular, recent research suggests that PECS is equally as effective for facilitating speech compared to more directly speech-based approaches in young children with autism who display very few spoken words. Therefore, our position is that best and evidence-based practice for children with autism who are not speaking is to initiate PECS training, and to transfer to an SGD only after spontaneous functional picture-based communication skills have been established via the PECS protocol. The guidelines below



are designed to support effective transition from PECS to SGD in learners with autism or other complex communication needs.

Pyramid Educational Consultants does not endorse or recommend any specific speech generating device or app for tablets. Rather, our recommendation is to assess the individual's current PECS skills and to choose an SGD or tablet app that will best accommodate the individual's current communication skills and allow for continued language growth.

## **Best Practice Recommendations and Guidelines**

### **Assessing the Learner Before the Transition**

As a general guideline, we recommend that individuals not be transitioned from PECS to an SGD until they have mastered Phases I through IV of the standard PECS training protocol. Completion of PECS Phase IV ensures mastery of the following PECS-based skills, which we consider pre-requisites to transitioning to an SGD. Specifically, we recommend that the learner has an established history of spontaneous and independent use of the following skills with his or her PECS book prior to the team considering a transition to an SGD.

- Persistence in identifying and approaching communication partners across environments
- Discrimination between 20 pictures in a picture array
- Navigating from page to page while building a Sentence Strip™
- Pointing with index finger to individual pictures during Sentence Strip exchange

**Recommendation 1:** PECS Communication/Language Sample. Collect a communication/language sample via observations conducted across several days that includes (a) total number of pictures currently used, (b) average number of pictures used per sentence, (c) longest picture sentence used, (d) frequency of PECS or other no-tech communications produced across the day, (e) rate of spontaneous versus prompted uses of PECS communications, and (f) average time or number of steps needed to complete a PECS-based communication exchange. Consider all of the pictures in the learner's PECS book, even those that are used only occasionally.

**Rationale:** In any communication transition, the responsible team has an ethical responsibility to plan the transition in a manner that ensures that the individual does not lose any current communication capabilities. This goal is particularly true for individuals who have only a limited repertoire of functional and spontaneous communication skills. The collection and consideration of this language sample ensures that the team has a full and representative sample of the learner's current real-world functional communication skills. Specific collection and consideration of data on the relative rates of spontaneous versus prompted PECS-based communications is particularly important, because spontaneous initiation



of communications is a key area of weakness for learners with autism and related communication disorders. The team can also refer back to the results of this assessment, or re-conduct it, once the learner has transitioned to the SGD.

**Recommendation 2:** Picture Discrimination Skills. Assessment of picture discrimination skills, showing clear mastery of at least 20 symbols on each of at least three pages within the PECS book.

**Rationale:** Picture discrimination is required for the use of an SGD as a functional communication system. Research has found that insufficient picture discrimination skills can lead to abandonment and/or misuse of the SGD by the learner (e.g., using SGD as a toy; Calculator & Johnson, 2008).

**Recommendation 3:** Persistence in Social-Communicative Approach. Assessment and planning related to the learner's capacity to transfer the skill of independently finding a Communicative Partner and bringing the SGD to that individual, across a variety of environments, contexts, and individuals. Alternatively, it may be appropriate for some learners or devices for the learner to find Communicative Partners and bring the Communicative Partners to the SGD.

**Rationale:** Communication is functional when it is spontaneously and independently implemented by the communicator to effectively provide a message to mediate the behavior of a Communicative Partner. Identifying and exchanging with a Communicative Partner is a critical first-step initiation to all communication skills that is typically severely limited in individuals with autism. Therefore, careful planning and consideration is required for this aspect of communication in the transition to an SGD. This includes ensuring that the learner is initiating social-communications independently across a variety of environments, contexts, and individuals, reflecting solid persistence in initiating and successfully completing communication. Additionally, the team should develop lessons to address learner 'repair strategies' for when the SGD's voice is not heard (e.g., in noisy environments).

**Recommendation 4:** Mastery of Navigation for Sentence Strip. Assessment and planning related to the learner's capacity to transfer the multiple-step procedural skill of independently navigating a PECS book to create a picture-based sentence on a Sentence Strip, and to use an index finger to point to/touch the individual pictures on that Sentence Strip without prompting.

**Rationale:** Successful use of an SGD requires mastery of a multiple-step navigational process in order to create a picture-based sentence. In order to complete this task, the learner must be proficient in touching individual pictures, alongside other navigational skills. Therefore, it is important for the learner to have mastered the creation of picture-based sentences via PECS, as well as pointing to individual pictures on the Sentence Strip, both of which are PECS Phase IV skills.

### **Match PECS<sup>®</sup> Features to SGD Features to Choose Appropriate Device**

In any communication transition, the responsible team has an ethical responsibility to plan the transition in a manner that ensures that the individual does not lose any current communication capabilities. This



is particularly true for individuals who have only a limited repertoire of functional spontaneous communication skills. Given that individuals with autism experience significant difficulties with pragmatic aspects of communication, and particularly social-communicative approach, it is critically important that portability issues do not interfere with continued communication or reduce communication opportunities for the learner.

Directly compare the features of the SGD with the current PECS skills of the individual, specifically determining whether and how the SGD has the capacity for both providing the learner with a means to both rapidly transfer existing communication skills for use with the SGD and continue to expand his or her functional communication and language skills.

**Recommendation 5: Number and Type of Symbols.** Select a software program or application that allows for replication of all vocabulary currently in the learner’s PECS book, allows for construction of sentences, and will accommodate continued language growth. The device must also allow for the learner to access all vocabulary associated with the device independently, rather than relying on a Communicative Partner to change overlays or screens. PECS books can accommodate any type of symbol. If the learner is using a combination of line drawings and photos, the device must accommodate this. Many tablet apps and SGDs have the capability of importing a picture or photo from the internet or from a personal picture library stored on the device. Consider the type of specific symbol set currently in use in the PECS book to determine if that symbol set will be available with the SGD. If not, then assess the learner’s use of the different symbol set by replacing frequently used pictures in the PECS book with symbols from the set used in the potential SGD. Assess use of the new vocabulary with Correspondence Checks (see Frost & Bondy, 2002).

**Rationale:** Introduction of an SGD must guarantee that the learner does not lose the ability to independently access his or her entire PECS vocabulary to communicate about particular items, events, or activities. The PECS learner first learns to use individual pictures, but then combines multiple pictures on a Sentence Strip in order to communicate increasingly complex messages (e.g., phrases, sentences). Transitioning to an SGD with phrases that are preprogrammed to be accessed with a single button press takes away the capacity for the learner to combine pictures in sentences that communicate novel ideas.

**Recommendation 6: Voice Output.** The SGD voice can be either digitized (recorded) or synthesized (computer generated) speech. The age-appropriateness and sex of the voice should also be considered, and an age-appropriate and same-sex voice should be used if that is an option. Because the learner will be using the SGD in multiple environments, consider whether or not the device has adjustable and adequate volume for various environments. If the transition team anticipates that the learner will be spelling words, then a device with text to speech capabilities should be chosen.

**Rationale:** There is very limited research on the effects of different types of SGD voice output options on communication and speech development (Schlosser & Blischak, 2001). However, adjustable and



adequate volume is important for communicating across different environments that involve different levels of background noise. An age-appropriate and same-sex voice is also helpful in that it provides a more similar proxy voice to the learner's own voice, and may be viewed as more acceptable by peers. As yet, no voice output condition has been demonstrated to improve either communication skills or to promote more vocalization.

**Recommendation 7: Message Window.** Many SGDs have message windows that provide the user with a stationary display of the symbols selected during the generation of a message. When the learner presses a vocabulary button, either that picture, the printed word, or both appear in the message window. It is very important to choose an SGD that will accommodate the picture, or both the picture and word, in the message window.

**Rationale:** Learners who have mastered Phase IV of PECS and are using expanded vocabulary have learned to build a picture sentence by moving pictures from PECS book pages to the Sentence Strip. The message window option on the SGD is an equivalent feature, and its use supports the learner by providing visual cues during sentence generation and repair. Learners who have relied on this visual picture cue during sentence construction may fail to construct sentences on an SGD that does not provide this same picture-based visual support during sentence construction.

**Recommendation 8: Display Configuration.** Choose a device that allows for changing the size of a specific picture, and thus array size, on each single display page. Many SGDs also offer the capability of choosing specific pictures to display on all pages, which can be helpful for some learners.

**Rationale:** Upon completion of Phase IV, a PECS user has mastered a field size of 20-60 pictures per page and can navigate between multiple pages of this array size. Most dynamic display SGDs can be set up to have this same organizational structure. This visual and functional similarity between the learner's PECS book and the SGD facilitates effective use of the SGD and generalization of the PECS skill set to SGD based communications.

**Recommendation 9: Auditory and Visual Feedback.** SGDs usually have a variety of settings that provide auditory feedback (e.g., a "click," or the voice speaking the word) and/or visual feedback (e.g., the picture highlights in some fashion or appears in the message window portion of the screen) for button presses. The team should determine what activation feedback options the device offers and compare this to what happens when a PECS picture is selected and exchanged (e.g., VELCRO® sounds). Specifically, the learner using PECS hears only VELCRO® when constructing messages. The Communicative Partner reads the strip after the learner has exchanged the message, so the learner hears the spoken feedback only after he/she has built a sentence and established contact with the Communicative Partner.

**Rationale:** PECS users receive specific forms of feedback during sentence construction and the exchange of the Sentence Strip. This immediate feedback is important for the transitional user, who similarly



needs to confirm a successfully activated button on the SGD. The auditory feedback, or its absence, also provides information for both the learner and the teacher regarding errors, such as inadequate pressure to activate the button or multiple button pushes.

**Recommendation 10: Communication Device Portability.** The team should expect that the learner will carry his SGD to various activities and locations throughout his day, and also find and approach a variety of Communicative Partners. Choose an SGD that is rugged enough to be used in all environments, that can withstand being dropped, and that is able to be configured with a carry handle or strap. Input from an occupational or physical therapist is valuable in determining the best way for the learner to carry the SGD once it has arrived. While preparing for the transition, the team should ensure that the learner independently moves throughout his day and does not require reminders or prompts to get or carry his PECS book. If this skill has not been expected or taught, the team should recognize this limitation to spontaneous and independent communication and teach the skill before transitioning to the device.

**Rationale:** In Phase II of PECS, the learner learns to carry his PECS book to various activities and locations throughout his day and to find and approach a variety of Communicative Partners. This component is critical to independent functional communication, particularly for individuals with autism and other complex communication needs. Planning is required in order to transfer these critical pragmatic aspects of the learner's PECS-based communication skills to an SGD.

### **SGD Configuration and Customization**

Most SGDs allow for customization of a variety of options including language software, vocabulary organization, selection of a synthesized voice, picture size, and whether pictures are arranged on scrolling pages or successive pages. Selecting configuration and customization options that match with, or otherwise support, the learner's existing PECS-based communication skills is critical for successful transition from PECS-based communications to communications with an SGD.

**Recommendation 11: Voice Options.** If the device offers multiple voices, choose a voice that best matches the age and gender of the user. Most SGDs offer options as to when the speech is activated so that the user and listener hear each word as its button is pressed or when the entire sentence or icon sequence has been constructed and the learner presses the message window "speak all" button. In order to simulate PECS use, we recommend that the learner builds a message in the message window and then activates the message window to speak the entire sentence. If the user requires specific auditory feedback the moment a button is pushed, then consider using both options (i.e., during sentence construction and activation of the full sentence in the message window). If sentence construction requires navigating into or out of categories/folders, then pressing these category/folder buttons should not produce a vocalization.

**Rationale:** The PECS user hears only VELCRO® when constructing messages. However, the Communicative Partner reads the strip after the learner has exchanged the message, so the learner





hears the spoken feedback only after he/she has built a sentence and made contact with the Communicative Partner. Configuring the SGD to speak the sentence after the learner activates the full message in the message window provides consistency in the transition from PECS use to SGD use. Although it may be preferred or helpful for some learners to also hear the vocalization of each selected word during sentence construction, vocalization of category/folder labels should be avoided because these items are not part of the sentence.

**Recommendation 12: Vocabulary Organization.** Once the SGD has arrived, the team should determine whether to use the vocabulary organization system available on the device or to customize the vocabulary organization. Many devices offer a choice of vocabulary organization options of varying levels of complexity. If the transition team uses the SGD “as is,” then we suggest mapping where the learner’s vocabulary from his PECS book is found on the device. If choices for vocabulary organization are included with the device, then choose one that matches the learner’s current PECS skills. Consider taking advantage of options to hide/unhide certain pictures that are not likely to be used immediately by the learner. For customizing the organization, begin programming the SGD with those items/pages/navigation buttons that will allow the learner to use the most frequently used vocabulary and sentence constructions from his or her PECS repertoire. Vocabulary can be organized on digital pages according to environmental functions and contexts, such as foods, toys, playground activities, etc., or according to parts of speech. Vocabulary items that pertain to multiple contexts should be placed on the main digital page.

**Rationale:** The SGD must include all of the learner’s current PECS vocabulary. This vocabulary must be quickly and functionally accessible to the learner. Vocabulary organization within the SGD should also minimize the required number of button presses and other aspects of navigational complexity. The learner’s previous PECS experience will typically involve organization of pictures according to activity types (e.g., “snack time,” “playground time,” “lunch time,” “circle time,” etc.) on individual pages. This organizational structure for vocabulary should be maintained. In addition to matching the learner’s previous picture-based vocabulary organization, this structure also limits the navigational complexity for each communication, since the learner will not need to make or plan extra steps according to traditional categories of language (e.g., nouns, verbs) and, instead, will have functionally and contextually relevant symbols available to them.

**Recommendation 13: SGD Page Navigation Requirements.** Dynamic display SGDs offer various options to allow the user to transition between pages. Tablet apps typically provide the option of limiting vocabulary items to what will fit on a single display page or the option to include virtually unlimited vocabulary items on a page that is scrollable. If the learner will be moving between pages, buttons such as “next” or “back” will be necessary to include on each page. If the device’s vocabulary storage is category based, learners will need to select a category symbol to *open* a page containing that vocabulary and then push a *close* or *home* button to exit that page. Customize the device so that these navigation or category buttons do not appear in the message window or speak when activated.



**Rationale:** It is critically important not only that the SGD includes all of the learner’s vocabulary, but that his or her vocabulary is quickly and functionally accessible. Vocabulary organization within the SGD should also minimize the required number of button presses and other aspects of navigational complexity.

**Recommendation 14: Clear Display.** Many PECS users, once they have exchanged the Sentence Strip, retrieve the Sentence Strip from the Communicative Partner and put the pictures back into their assigned locations in the PECS book. Once the learner has constructed and spoken a message, devices offer options for the user to clear the display. Some devices can be customized to clear the display automatically after the message has been spoken. Others require that the user push a “delete” or “clear” button for voice to read the entire message displayed in the window. The message window should be cleared after each message activation rather than allowing the learner to activate the speak feature multiple times to repeat the same message.

**Rationale:** The goal of SGD use should continue to be independent communicative interaction with a variety of Communicative Partners, including “lay” listeners. In order for the learner to independently construct several messages within a multiple-exchange activity or conversation, he must assume responsibility for clearing the message window after the device has spoken. We recommend teaching the learner to clear the message window after each activation even if his or next message is likely to be identical. This is comparable to what a speaking individual must do to repeat the same message.

### **Teaching Device Use**

Transitioning the learner’s PECS skills to the SGD will require time and carefully planned lessons. Merely presenting the learner with the device and demonstrating its use is not sufficient. Once the device has been customized, begin teaching the learner to use the device with a Communicative Partner.

**Recommendation 15: Create Structured Lessons for Beginning SGD Use.** Initial lessons should be conducted with activities that are familiar and motivating to the PECS user and during which he or she interacts with the CP for a variety of communicative exchanges. Refer to the PECS Language Sample and choose several of the learner’s most frequently used sentences to begin teaching. The team should write a step-by-step sequence (talk analysis) of all actions the learner must complete to construct and deliver the message in an interactive manner. This sequence should include accessing and turning on the device, navigating to and selecting the correct vocabulary to construct the message, activating the voice, and preparing the device for the next communicative exchange.

**Rationale:** Transfer of skills from a PECS book to an SGD will best be accomplished by beginning lessons in a motivating and familiar activity during which the learner is accustomed to using PECS. Because SGD use will not exactly mirror the steps used to communicate within PECS, the transition team should know precisely which steps are necessary for a variety of messages. This transfer is most thoroughly and





reliably done by mapping out a variety of frequently used phrases so that team members involved in the first training lessons are aware of and fluent in completing each step in the sequence.

**Recommendation 16:** Maintain Learner Spontaneity/Initiation. To begin the first lesson, the PECS book and the SGD must be available to the learner as he or she is most likely to initiate a communicative interaction by reaching for the pictures on/in his PECS book. To transfer this behavior to the SGD, use the 2-Person Prompting Procedure (Frost & Bondy, 2002). This strategy involves the Communicative Partner making the learner aware of the communicative context (enticing with a desired item), and then the Physical Prompter waiting for the learner to reach to his PECS book (initiating the interaction) and before physically prompting the learner to the SGD. Following the principles within the PECS protocol, the Physical Prompter would use backward chaining to first physically prompt the learner to complete each step of the task analysis and then eliminate these prompts over successive communicative opportunities.

**Rationale:** Communication is only functional when it is spontaneously and independently produced by the communicator to effectively mediate the behavior of a Communicative Partner. The PECS user has a rich history of initiating communicative interactions by getting his book, constructing a message, finding a Communicative Partner and delivering the message, so this history should be utilized in teaching SGD use.

**Recommendation 17:** Replicate Phase II of the PECS Protocol. Once the learner no longer needs prompting to use the SGD to generate a variety of messages and deliver them to Communicative Partners, incorporate opportunities for being a persistent communicator into training. The learner should be taught to carry the device with him from activity to activity and location to location, independently. He should also be taught how to gain the attention of a Communicative Partner appropriately and effectively, as well as effective and appropriate ways to persist when a Communicative Partner does not respond to the device's voice. Examples might include repeating a message, adjusting the volume of the device, using the Communicative Partner's name to gain attention, and waiting until the Communicative Partner is available to interact.

**Rationale:** In Phase II of PECS, the learner learns to carry his PECS book to various activities and locations throughout his day, to find and approach a variety of Communicative Partners, and to be persistent in his communications. These are critical components to independent functional communication, particularly for individuals with autism and other complex communication needs. The learner's degree of independence in using the SGD is related to his ability to exhibit similar levels of social communicative initiation and persistence, and to problem solve when his initial communicative attempts are not effective. Planning is required in order to transfer these critical pragmatic aspects of the learner's PECS-based communication skills to an SGD.



**Recommendation 18:** Teach New Vocabulary Using the PECS Phase III Protocol. Within the PECS protocol trainers use Correspondence Checks™ and the 4-Step Error Correction procedures to assess and teach picture/symbol discrimination (Frost & Bondy, 2002). When adding new vocabulary to the SGD, use these strategies to ensure appropriate acquisition and use of the new symbols.

**Rationale:** When picture discrimination is not taught systematically or effectively, the learner often defaults to use of the device for limited, generic requests, and/or uses the device as a toy (Calculator & Johnson, 2008). It is also important to note that some learners may press buttons for non-communicative purposes (e.g., to hear the auditory feedback). The use of Correspondence Checks is an established, systematic, and effective means for functionally assessing and teaching new vocabulary in the context of a learner selecting among a number of preferred items and activities.

**Recommendation 19:** Teach Self-Correction Strategies. Anticipate that the learner will make errors such as multiple hits of a single button, placement of pictures in the wrong order in the message window, or opening or transitioning to incorrect pages. Use error correction strategies such as the 4-Step Error or Backstep error correction procedures (Frost & Bondy, 2002) to respond to these errors.

**Rationale:** The teacher or Communicative Partner should not fix mistakes the user makes when using the SGD. This will result in repetition of the errors and/or reliance on the Communicative Partner in the future. The 4-Step and Backstep error correction strategies are evidence-based and have been demonstrated to lead to efficient mastery of the target skills.

**Recommendation 20:** Team Training and Support. Provide training in all SGD and related communication teaching and support methods for this individual learner to all relevant individuals.

**Rationale:** As with any effective communication intervention that aims to teach and support spontaneous functional communication with generalization across contexts, settings, and in nonverbal and minimally verbal individuals with autism, it is critical that the intervention team and all relevant individuals are aware of, and skilled in, any required teaching and support strategies, including prompting and error correction techniques, current ability levels, and future skill targets.

**Recommendation 21:** Maintain the PECS Book as a Back-Up Strategy. Keep the learner's PECS book available as a back-up means for communication, in case the SGD becomes unavailable for a period of time (e.g., hours, days). Have the learner use the PECS book periodically, in order to maintain PECS-based communication in preparation for possible SGD failure.

**Rationale:** High-tech SGDs rely on sophisticated programming and on battery or AC power, so anticipate power outages, battery failure, or device breakdown. SGD technical failure is a common occurrence, and has both direct and indirect impacts on learner communication and well-being (Shepherd, Campbell, Renzoni, & Sloan, 2009). Having the PECS book available, and maintaining the learner's skills in using it, provides a reliable back-up communication strategy.



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**For more information about transitioning from the Picture Exchange Communication System (PECS) to a Speech Generating Device attend Pyramid Educational Consultants' new full day talk, *Transitioning from PECS to Speech Generating Devices (SGDs)*. Go to [www.pecs.com](http://www.pecs.com) or contact Pyramid at [pyramidus@pecs.com](mailto:pyramidus@pecs.com) or 888-732-7462 for more information on this new talk.**