STACS

standardized tactile augmentative communication symbols

Ellen Trief, Ed.D.

Second Edition

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AMERICAN PRINTING HOUSE

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Adaptive Design Association: Jennifer Hercman
Hunter College, CUNY: L. Beth Brady, Ph.D.
APH: Tristan Pierce, Hope Paulos, Laura Greenwell,
Stephanie Lancaster, Anthony Jones
Photographer: Adam El-Sawaf

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APH: Tristan Pierce, Rosanne Hoffmann, Terri Gilmore
Graphic Design: InGrid Design
Photographers: Julia Hanlund, Ron Terner
Videographer: Julia Hanlund
Video Production: InGrid Design

Dedication

This product is dedicated to all of the learners who have limited to no verbal communication, but have something to say.

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Acknowledgements

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About the Author

Ellen Trief, Ed.D., Professor in the Blind and Visually Impaired and Severe/ Multiple Disabilities Programs in the Department of Special Education at Hunter College School of Education, City University of New York.

Prior to teaching and advising at Hunter College, Dr. Trief educated children and adults with visual and multiple impairments and was Director of Education and Preschool and Early Intervention at an agency for the blind in New York City.

Dr. Trief was an Associate Editor of the *Journal of Visual Impairment & Blindness (JVIB)*; she has co-authored numerous articles in JVIB and other journals and has presented at conferences and in-service workshops. She has authored four books, three on curriculum for early intervention and preschool and one on pre-college skills for the student with visual impairments. She is the editor of both volumes of *Working with Visually Impaired Young Students: A Curriculum Guide for Birth-3 Year Olds* and *A Curriculum Guide for 3 to 5 Year Olds.*

Prior to retiring, Dr. Trief consulted for many schools and agencies that provide services to children who are blind and visually impaired. (2013, 2024)

Foreword

It is often said that vision and hearing are the senses through which we organize the world around us. Most fully sighted people can walk into a room and take in its totality with a glance. They know where everything is placed and can instantly recognize familiar people. Likewise, when people can hear and understand spoken language, they have immediate access to messages sent verbally from others.

Children with multiple disabilities live in a world that is often confusing to them, especially if they cannot see or hear clearly. These learners receive fragmented bits of information and are tugged and prodded throughout life. When a learner gets into a car, the learner may not know if they are going to the doctor, to school, or to Grandma's house. As educators, it is our role to help these learners understand day-to-day routines and find order in the world that surrounds them, and most importantly, to give them the means, the tools, and the desire to communicate. Clearly, communication is the foundation for the building of social relationships—the most important aspect of all of our lives.

The concept of using objects of reference to develop communication skills in children with multiple disabilities dates back to the 1960s. At that time, Jan van Dijk and his

colleagues developed calendar systems as a part of the total communication system for children who are deafblind. Tactile symbol systems are now more commonly used, and objects and tactile symbols are recognized as valuable tools that aid conversations about people, places, events, and ideas.

In reality, however, few teachers possess the background to effectively implement symbols as a part of the communication system for their students. Often, classrooms will have something that resembles a calendar system, but it is not used because the teaching staff does not understand how to use it and the important role that it plays in a student's learning. Finally, teachers and their support staff do not have the time or tools to make the appropriate symbols.

Members of the special education field who work with students who have visual impairment and multiple disabilities are very grateful to Ellen Trief and her team, who have researched a methodology for the selection and use of tactile symbols with this population of learners. The research team called upon many education professionals—who are experienced working with learners who have deafblindness and multiple disabilities—to assist them in the selection of symbols to be used in this study, to design the protocols for their use, and to develop training modules for participating teachers and related professionals. We are

grateful to the American Printing House for the Blind (APH) for its support in keeping this research alive by making these products available to parents, teachers, and related professionals.

I am confident that this manual and the accompanying materials will improve teacher understanding of the use of tactile symbols and provide a jumping off point from which to develop personal communication systems. STACS: Standardized Tactile Augmentative Communication Symbols will open the doors of communication and enrich the lives of countless children and adults.

Marianne Riggio, retired
Regional Coordinator
Africa and Caribbean Regions and
Training Coordinator
Perkins International 2014

Your STACS Kit will look like this…

Message to the Reader

STACS: Standardized Tactile Augmentative Communication Symbols is a set of 27 communication cards, and this instructional manual with assessments. The assessment forms may be photocopied from this manual or be downloaded from the APH STACS shopping page.

Your STACS Kit includes the following communication cards:

Alphabet Song
Art
Bathroom
Blank
Blank
Circle Time
Classroom
Cooking
Drink
Finished
Food
Gym
Literacy
Lunchroom
More
Music
No
Occupational Therapy
Physical Therapy
Rest Time
Sensory
Snack
Speech
Toothbrush
Twinkle Twinkle Song
Wheels on the Bus Song
Yes

A learner explores a STACS card and its referent.

Introduction

STACS: Standardized Tactile Augmentative Communication Symbols, based on a 3-year research study (see Appendix B), helps learning partners (i.e., teachers, parents, peers, etc.) establish a basic beginning vocabulary to use with learners who have no means of formal communication. It is critical to emphasize that this is just a beginning, and continued use and introduction of additional individualized symbols is highly recommended.

Light (1997) states that communication is the essence of life and every individual should have access to some form of communication to express wants and needs, develop a social closeness, share information, and participate in social etiquette. Professionals and families who work and live with learners who have visual and multiple impairments know this to be true and regard this as a creed that inspires them each day when given the privilege of working with these learners.

The need for a commercially produced standardized set of tangible symbols came from requests from teachers and therapists throughout the United States who expressed a concern about producing their own tangible symbols for the learners they serve. Many observed that the learners moved frequently from classroom to classroom or from school to school and thus had no continuity of symbols

between various teachers or therapists. Proposals of what the icon or referent should be for any given word varied greatly from teacher to teacher or therapist to therapist. Learners who have visual and multiple impairments require consistency for optimal learning opportunities.

Another reason that both teachers and therapists value the need for standardization of tangible symbols is the time and resources it takes to create each individual symbol. Many feel they do not have adequate time or the technical skills to make sturdy and safe symbols.

The target population with which to use a standardized tangible symbol system consists of learners who have a variety of disabilities and who may benefit from a multisensory approach to language learning. Disabilities include cognitive delays, speech and language impairments, fine and gross motor impairment, and/or hearing delays.

Learners who are blind or visually impaired with emerging language skills; learners who are not able to use print, picture symbols, or braille; and learners who need support in their expressive communication are potential candidates for a tangible symbol system.

In addition, learners who are deafblind often benefit from a tangible symbol system.

A learner identifies an activity.

The learner performs the activity.

Symbols can be used throughout a learner's life span from as early as age 3 to adulthood. Tangible symbol systems are effective for learners who have a limited expressive vocabulary of less than five words and have difficulty accessing picture symbols and/or sign language. These individuals have presymbolic or emerging symbolism skills and are likely to have pre intentional communication skills. Many learners who could benefit from the use of tangible symbols have tried other communication systems, but found them difficult to access.

This kit consists of 25 standard tangible symbols and two blank cards to make individualized symbols. The manual guides you through the instructional process on how to introduce symbols and then how to use them consistently across appropriate activities during the day. Learners need multiple opportunities for exposure to a symbol, and it is highly **recommended to use the symbol at least three times during an activity:** at the beginning, middle, and end. Use the included task analysis to guide you through the process on how to introduce new symbols to a learner. Use the included data sheet to track how a learner progresses or successfully understands the meaning of the symbols. It is important to read the detailed instructions on how to investigate what a learner knows—referred to as *probing*—at the completion of an activity.

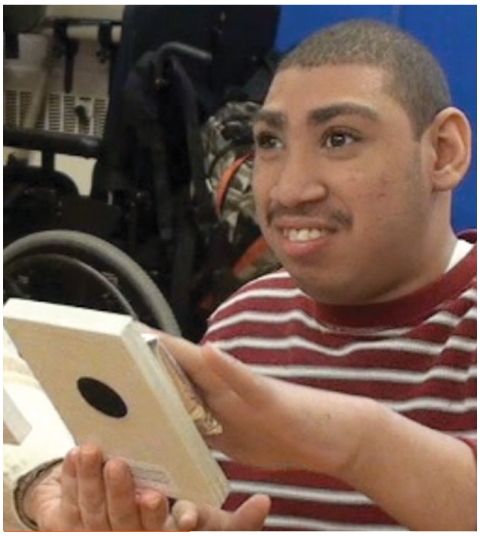
This manual is a comprehensive guide on how to probe, collect data, and create additional individualized symbols for a learner.

A teacher signs “more” while a learner touches the “more” STACS card.

Probe Phase

CHAPTER 1

What are **tangible symbols?**



Defining Tangible Symbols

Tangible symbols are whole or partial objects that share a strong perceptual relationship with the referent (what is represented). A referent is a person, place, thing, or activity (Rowland & Schweigert, 2000; Golinkoff & Hirsh-Pasek, 2000). The use of tangible symbols evolved from the methodology developed by Dr. Jan van Dijk in the 1960s: He worked to support the development of communication skills in learners with deafblindness. Van Dijk found that movement, objects, and gestures produced within the context of well-established routines are effective in building relationships and conversations. Rowland and Schweigert (1989) introduced the term "tangible symbol" to refer to three-dimensional symbols that possess distinguishing tactile qualities (i.e., shape, texture, and consistency) and can be easily manipulated. Tangible symbols are often used as an expressive and/or receptive form of communication with learners who have visual and multiple impairments because they are tactile and make fewer demands on memory and representational abilities than more abstract symbols (Rowland & Schweigert, 2000). Miniature objects are not appropriate for learners who have severe vision loss because the detail of such representations is often expressed through color and also because the relationship between the miniature and the referent may not be as apparent when access is tactual rather than visual.

Importance of Tangible Symbols

Communication is integrally tied to quality of life. Communication allows us to share our ideas and feelings, learn from one another, and to have control in our lives (Downing, 2005). Learners with visual and other impairments may not develop symbolic and intentional language, and they require specialized instruction to reach their full potential as communicators. These pre-linguistic learners may be either pre-intentional or intentional communicators. Intentional communicators understand that the purpose of communication is to send a message to another person to accomplish a function, such as directing another person's behavior, making a request, or protesting an undesired activity. Symbolic communicators understand that an item, idea, person, or activity can be identified by its referent, such as its name. When learners with multiple disabilities are presymbolic communicators, they are either pre-intentional or intentional and they require alternative forms of communication. For example, tangible symbols may reduce challenging behaviors such as biting, hitting, and tantrums while increasing functional communication behaviors (Hetzroni, 2003). This happens when the learner's intent is expressed (i.e., frustration, anger, protest) via the use of a tangible symbol as an alternative to physical behavior.

Levels of Representation

According to Beukelman and Mirenda (2005), tangible symbols are identical, similar to, or associated with their referents. A toothbrush embedded in a card represents toothbrushing (identical); tiles embedded in a card represents bathroom (associated); and in the case of a conceptual word such as "no," the representation is more abstract (Trief, Bruce, & Cascella, 2010). Rowland and Schweigert (2000) suggest that tangible symbols (especially those that do not bear a strong perceptual relationship with the referent) serve as a bridge from intentional, presymbolic communication to symbolic communication for learners with multiple disabilities.

Standardized and Individualized Tangible Symbols

Tangible symbols may be standardized or individualized. A highly idiosyncratic experience of a referent is best represented by individualized tangible symbols whereas standardized symbols may be used when a referent is experienced in a similar way for most individuals and when a dominant feature of the referent is represented (Downing, 2005). For example, there may be a specific tangible symbol for a learner (i.e., Michael) and another tangible symbol for Michael's teacher with whom he shares a function. When using a standardized set of tangible symbols, it is important to include individualized symbols

for each learner. Select individualized symbols for referents that have positive salient features for the learner. Daily routines practiced with consistent naming and coupling of the referent and the tangible symbol reinforce their relationship for the learner.

Turn to the next page for examples.

Standardized Symbol

Individualized Symbol

Standardized Symbol

Individualized Symbol

Good Tangible Symbols

CHAPTER 2

Selection of **tangible symbols**

Characteristics of Good Tangible Symbols

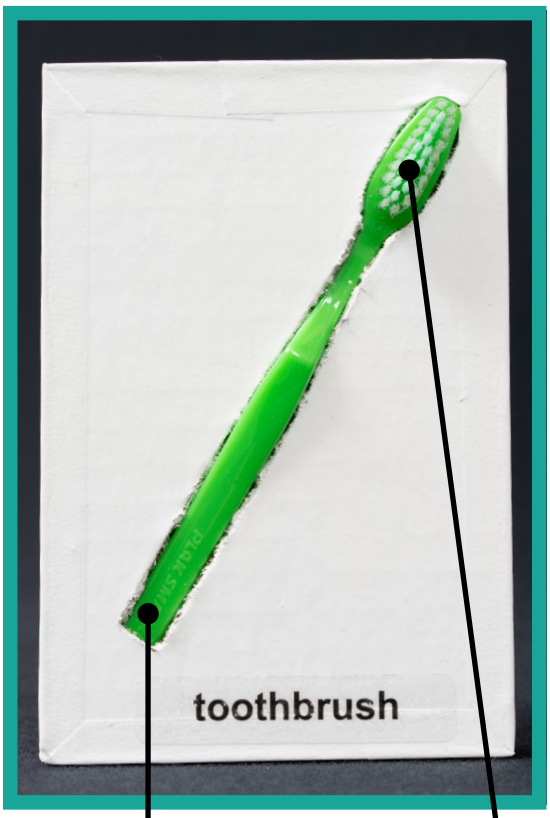
Communication partners should base early representations, including individualized and standardized tangible symbols, on each learner's needs, interests, and preferences (Westling & Fox, 2009). Learners are more motivated to learn representations for referents that are of **high interest** to them (Bruce & Conlon, 2005; Miles & McLetchie, 2008; Rodbroe & Souriau, 1999; Vicker, 1996). Representations for preferred activities trigger memories of pleasant events, thus they evoke greater potential for conversation (Rodbroe & Souriau, 1999).

It is best to select early tangible symbols for objects on which the learner can **perform actions** (MacFarland, 1995; Van Dijk 1967). Good representations share a history with a referent that is grounded in motor experiences. Repetition of motor experiences helps the learner recognize the perceptual characteristics shared by the referent and the representation and to ultimately recognize the power of the tangible symbol as a form of expressive communication (Rowland & Schweigert, 2000).

To select tangible symbols for a learner with very low vision, it is important to base the selections on **tactual** (rather than visual) **characteristics** (Downing, 2005; Goldware & Silver, 1998). Rodbroe and Souriau (1999) suggest that we also consider the tangible symbol's

perceptual qualities in relation to the learner's perceptual preferences; we should exercise care to avoid textures that the learner dislikes. Other considerations for tangible symbol selection include the size of the learner's hand, the learner's physical strength, positioning needs, and tangible symbol placement requirements.

Tactual Characteristics



Handle

Bristles

Turnable Pages

It is also critical to invite family input about preferred family activities, family routines, and priorities that can be represented by tangible symbols. Collaboration ensures consistency in how tangible symbols are used in the school and home contexts (Stremel, Bixler, Morgan, & Layton, 2002).

Embedding Tangible Symbols

STACS cards have embedded objects. Embedding a tangible symbol allows the learner to tactually or visually see the partial or whole object placed or mounted in a card. Embedding a tangible symbol may help some learners to distinguish when the object is just an object (to be manipulated) and when the object is a symbol to be used in communication. Thus, embedding the tangible symbol may limit the perseverative or repetitive actions otherwise performed on the object. Embedding can also support communication partners to use the same name for the referent and the tangible symbol. Consistent naming of the referent in tandem with repeated pairings with the tangible symbol is critical to the development of receptive vocabulary (Bloom, 1993; Bruce & Conlon, 2005; Downing, 2005). In addition, embedding may make it easier to attach the tangible symbol to various surfaces. For example, place hook and loop material on the back of the embedding material to attach the symbol to slant boards for choice-making or as part of a daily schedule display.

Use high contrast colors between the tangible symbol and its background mount to enhance the use of functional vision. Care must be taken to ensure that the perceptual features most salient to the learner are tactually accessible and apparent.

Indicating Responses

An indicating response is the way the learner displays their selection of the tangible symbol. The educational team, including the parents, must recognize and identify the particular indicating response for each learner. Indicating responses for use with tangible symbols include picking up, touching, pointing, reaching toward, leaning toward, or consistent eye gaze toward the symbol (Rowland & Schweigert, 2000). In addition, some learners might push the tangible symbol in the direction of the communication partner.

A learner using a symbol with a teacher establishes joint attention.

CHAPTER 3

Communication

Four Main Goals of Communication

Communication is difficult for learners who have multiple and visual impairments; they often do not have purposeful expressive language. These learners require multiple approaches to learn a communication system, and one of these approaches includes a set of standardized tangible symbols.

According to Light (1997), communication is the essence of life and there are four main goals or purposes of communication:

1. Expressing Needs and Wants

How does a learner with limited to no expressive language inform a communication partner of their basic needs and wants? Can this learner ask to go to the bathroom or ask for food or a drink when hungry or thirsty? The use of tangible symbols can help the learner to express some very basic needs and desires.

2. Developing Social Closeness

When a learner is actively engaged with another person in an activity using symbols for receptive and expressive communication, a natural relationship evolves and a social closeness is nurtured and developed.

3. Exchanging Information

An exchange of information takes place when a learner requests something through the use of the tangible symbols, and the communication partner can provide what is being requested. In addition, the learner can say "yes," "no," "more," or "finished" to indicate personal feelings about the interaction.

4. Fulfilling Social Etiquette and Routines

Acknowledging other people through greeting and salutation are the beginning steps of social etiquette. Routines are learned and reinforced through the use of daily schedules or calendars. Tangible symbols guide learners through their daily schedules and assist their transitions from one activity to the next. Tangible symbols are helpful as an alternative to challenging behaviors and fulfilling appropriate social expectations.

Communication Functions With Tangible Symbols

Numerous examples of how tangible symbols aid the development of communication functions exist. Tangible symbols increase independent receptive and expressive communication skills, create a focal point for conversations, increase the number of communication partners, develop time concepts, teach sequencing, and develop early literacy and pre-braille skills. In addition, they

facilitate access to the curriculum and activity schedules, ease transitions from one activity to another, as well as provide a bridge to access more abstract symbols such as pictures or eventually speech. Tangible symbols provide a transition from presymbolic to symbolic communication for learners with emerging or pre-intentional communication skills.

Tangible symbols are ideal tools for a nonverbal learner to use to greet, direct, request, make choices, reject, protest, label, comment, indicate needs, and state feelings and/or physical well-being.

Benefits of Tangible Symbol Communication

There are many measurable benefits to learners who use tangible symbols. Some learners establish *joint attention* (a type of social interaction in which a learner coordinates their attention between a partner and an object or event). Another benefit is the learner's acquired ability to identify key landmarks such as the Music Room. The benefit of learned behavior regulation and anticipation of an activity may lead to a successful and measurable outcome for the learner.

Snack Time

CHAPTER 4

Using **STACS**

Best Practice

It is best to introduce and use STACS (and all tangible symbols) during natural and consistent routines. Remember, tangible symbols are part of the whole communication system and must be paired with the referent, whether it is a person, place, or an activity.

Always place print and braille labels on each symbol.

Choosing Symbols for Individual Learners

A thorough assessment must take place to determine the learner's interests, level of abstraction, experience with the activity, sensory needs and limitations, expressive and receptive language levels, tactile preferences, visual considerations, fine and gross motor skills, and the tactile saliency of the symbol. This assessment must also include an analysis of the environmental factors that support or inhibit the use of tangible symbols throughout daily routines.

Accessing the Symbols

Show the learner the symbol for an activity and say it is time for that activity. For example, you may show the learner the "tennis ball" tangible symbol and say, "It is time for gym." Introduce the learner to the tennis ball and give him time to tactually explore it. Every time the learner has gym, he is shown this tangible symbol and takes it with him to the gym class. Always introduce the symbol during the natural time when the learner would be asked to do the activity. Try to sit behind the learner when working with him, especially if the learner is totally blind.

Eventually give the learner more than one symbol to prompt activity choice-making. If two symbols are presented, the learner can choose between two activities. Before any actual training begins, 2 weeks of *errorless*

learning is required for each symbol used with each learner. Errorless learning involves introducing the learner to the symbol with the object during the natural time for the activity to take place. After the 2-week period, follow the task analysis and instructions for the *probe phase* located in chapter 6.

Deciding Which Symbols to Introduce

Select at least five of the 25 symbols to introduce to the learner through errorless learning. Each time a new symbol is introduced, provide the learner with 2 weeks of errorless learning.

Follow these two guidelines:

- Choose symbols representative of activities that occur frequently on a daily basis and can be accessed during the natural routine.
- Select symbols that are highly motivating to the learner and have value from the learner's perspective.

Continue to expand the use of symbols by adding to the repertoire. It is often difficult for teachers and therapists to know exactly which symbol will provide that important connection for the learner. Keep trying…

A teacher uses sign to instruct a learner.

CHAPTER 5

Considerations for Working **With Children who are Deafblind**

Which Learners who are Deafblind Should Use Symbols?

Tangible symbols are appropriate for use as a receptive form of communication with any learner who is deafblind and as an expressive form of communication for learners who have a predictable motor, behavioral, or communicative response that the communication partner can interpret. They are often used with preverbal communicators who do not yet express themselves in a more abstract form such as signs or line drawings. Tangible symbols are often paired with other forms of communication (such as signs) as anticipation or organizational cues within a daily schedule or in daily journals or experience books.

Over 80% of learners who are deafblind have additional disabilities. Learners who are deafblind should possess the motor skills to grasp and feel the symbol. Other communicative behaviors are typically taught through the use of symbols. Symbols are used with learners who are deafblind to build a repertoire of communicative behaviors such as anticipation, joint attention, reciprocal experiences, and varying degrees of representation.

Presentation of Symbols to Learners who are Deafblind

The first step to initiate an interaction with a learner who is deafblind is a touch on the shoulder or elbow to alert the learner someone is there. Immediately follow the touch with a name sign or symbol to tell them who that person is.

While 90% of learners who are deafblind have some functional vision or hearing, access is a primary consideration when planning a tangible symbols intervention. Our ability to see and hear helps us to understand contexts and to make associations between representations (such as tangible symbols) and referents. Thus, it is especially critical to plan compensatory strategies for learners who are deafblind. Learners who are deafblind may not have the benefit of hearing context cues or naming of the tangible symbol. Like other learners with visual impairment, they may not have sufficient functional vision to easily grasp the visual perceptual similarities between the symbol and the referent. Thus, it is especially critical to support their tactual exploration of the symbol and to pair the touching of the symbol with touching and naming the referent. Naming of the referent must be provided in a communication form that is accessible to the learner (which may be a sign, gesture, or speech).

While consistency is important for all learners, it is especially critical for learners who are deafblind. Vision and hearing help us to organize our experiences, so learners who are deafblind need adults to communicate a clear beginning, middle, and ending for each interaction and activity. The physical layout of the activity, the words used, and forms of communication must be carefully planned and systematically implemented because the learner who is deafblind does not have access to natural cues available to other learners. In short, structure activities to incorporate the use of tangible symbols in a predictable manner for learners who are deafblind. These routines should have a clear beginning, middle, and end to set the learner up for success in learning how to associate new symbols with what they represent.

When using a commercial set of standardized symbols, there is still a need to individualize. Teachers and therapists should select symbols for preferred activities and objects as often as possible. Select only symbols that really capture what the learner finds most important about an experience or activity. If such a representation is not part of the commercial/standardized set, the teacher or therapist should create one that is individually suitable.

Some symbols (including those within standardized sets) are more perceptually similar to the referent than others, and that similarity will differ across contexts. Thus, the

educational team (including the family) must consider if the representation in the standardized set is a good match to the learner's context and to that learner's level of comprehension. It is generally accepted that cues/symbols that are more iconic (more perceptually similar to the referent) are learned more easily. The team will want to start with more iconic tangible symbols and gradually introduce more abstract symbols.

Representation of a teenager's learning team.

CHAPTER 6

STACS Assessment Forms, Intervention Strategies, and Procedures

STACS Assessment Forms are available for download from the APH STACS shopping page under the Manuals & Downloads tab.

Communication Assessment Suggestions

Prior to introducing a learner to STACS, the family and members of the educational team should identify the learner's current communication status. This assessment should describe any medical or psycho-educational issues that influence the learner's communication abilities, how and why the learner expressively communicates, and the learner's receptive communication skills. Below are three steps or tasks that may help describe the learner's current communication status:

Step 1: File Review and Case History Protocol

Step 2: Teacher and Parent/Caregiver Rating Scale

Step 3: Structured Sampling Tasks to Elicit Communication and Intentionality

STEP 1
File Review and Case History Protocol

Obtain a copy of the learner's educational records and review the three most recent individual education plans (IEPs). Among these records, review the most recent evaluations from special education, school psychology, speech-language pathology, physical therapy, occupational therapy, social work, and nursing. Any related reports should also be reviewed. In addition, all instructors, as well as the learner's family or caregivers, should meet to discuss the learner's background status. Discuss the topics in the File Review and Case History Protocol Chart and use these categories to summarize the learner's background information. This chart should help identify the medical, sensory, and psycho-educational skills related to the learner's communication status.

STEP 1
File Review and Case History Protocol

Motor/ Physical Status	Cognitive Status (IQ)	Medical Status/ Conditions
Hearing Status	**Vision Status**	**Sensory Status**

Play Skills (check)	Intentionality Status (check)	Symbolism (check)
○ Isolated ○ Parallel ○ Associative ○ Cooperative	○ Pre-intentional ○ Somewhat intentional ○ Intentional	○ Non-symbolic communication ○ Presymbolic communication (Emerging symbolism) ○ Symbolic communication Identify the # of symbols: _____
Attention Status	**Speech/ Vocalizations**	**Exploration Skills/Status**

STEP 2
Teacher and Parent/Caregiver Rating Scale

All instructors and the learner's parents or caregivers are encouraged to identify the learner's current communication status, specifically:

- receptive communication skills,
- forms or ways of communication, and
- functions or reasons for communication.

This information will help identify the learner's current communication status at school and at home.

STEP 2
Teacher and Parent/Caregiver Rating Scale

Receptive Communication Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
1. Turns head/body to environmental sounds					
2. Attends or orients to objects or people					
3. Responds when own name is called					
4. Responds to the meaning in a speaker's tone of voice (angry, happy)					
5. Knows the first names of peers at school					
6. Knows the names of teachers					
7. Understands one-step verbal directions or commands within everyday routines					
8. Understands two-step verbal directions or commands within everyday routines					

Receptive Communication Cont'd Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
9. Understands yes/no questions related to daily routines					
10. Anticipates steps within a daily routine					
11. Understands when told "You have to wait."					
12. Understands when told "no"					
13. Understands when told to give an object to someone, i.e., "Give (object) to (person)."					
14. Associates objects with specific routines (vacuum = chore; utensils = mealtime)					
15. Understands social phrases and gestures ("Hi, how are you?" "Bye," "Later")					
16. Understands touch cues					
17. Understands tangible object cues					
18. Understands tactile or visual sign language cues					

Expressive Communication Forms Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
19. Uses vocalizations/sounds					
20. Says real words or phrases					
21. Uses immediate speech imitation (echolalia)					
22. Uses delayed speech imitation (echolalia)					
23. Uses sign language or modified signs					
24. Uses leading gestures by pulling or directing someone's hand					
25. Withdraws hands away from an object or person					
26. Uses gestures to push items toward someone					
27. Uses gestures to push an item away from self					
28. Uses pointing gestures					
29. Uses reaching gestures toward an object					
30. Uses reaching gestures toward a person					
31. Uses facial expressions to communicate					

Expressive Communication Forms Cont'd Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
32. Gets up and leaves and/or turns head or body away to communicate					
33. Uses head nods and/or head shakes					
34. Uses body orientation by standing near something or someone to communicate					
35. Uses objects to communicate					
36. Uses photographs to communicate					
37. Uses picture symbols to communicate					
38. Uses an electronic communication device					
39. Uses challenging behavior to communicate					

Expressive Communication Functions Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
40. Communicates the names (labels) of common people, objects, and activities					
41. Communicates greetings and farewells (“Hi,” “Bye”)					
42. Communicates to draw attention to self					
43. Communicates protest or “no”					
44. Communicates physical state (sick, well, or hurt)					
45. Communicates emotional state (happy, sad, angry, enthusiastic)					
46. Requests desired items (objects, routines)					
47. Requests desired people (staff or peers)					
48. Requests an event continue or more of something					
49. Requests help					
50. Requests permission					
51. Comments about self					
52. Comments on the actions of others					

Expressive Communication Functions Cont'd Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
53. Communicates to signal the beginning of interaction (i.e., initiates)					
54. Communicates to signal the end of an interaction (i.e., terminates)					
55. When a choice is given, chooses one over another					
56. Communicates to tell someone else what to do (i.e., directs people)					
57. Persists in communication, (i.e., if learner communicates something that a listener does not understand, this learner repeats the message or conveys the message another way)					
58. Communicates to let someone know that they did not understand what the other person was saying					

STEP 3
Structured Sampling Tasks to Elicit Communication and Intentionality

If the educational team and the learner's family are unsure about the learner's level of communication, utilize two structured sampling activities. These tasks give the learner an opportunity to demonstrate communication and intentionality.

The purpose of the following tasks is to give the learner the opportunity to demonstrate expressive communication skills and intentionality. Intentionality occurs when the learner deliberately or purposefully acts to engage others in a communicative interaction. Intentionality can be conveyed via many communication forms (e.g., vocalizations, gestures, body orientation, body language), and some of the earliest signs of intentionality occur when the learner deliberately seeks attention, makes a request, directs the actions of others, and/or seeks a response from someone else. The core element of intentionality is that the learner uses actions to deliberately involve another person in an interaction. Two structured sampling activities that may help identify the learner's expressive communication skills and level of intentionality follow. They are designed to be flexible and adaptable to each unique situation; opportunities are created that allow the learner to engage another person in the interaction.

1. Choice Activity

The teacher obtains two small toys or non-food objects from the student's classroom. One is a favorite toy/object, and the other is a toy/object that does not interest the learner. The teacher sits within reach and tells the learner that they are going to play together and in turn gives the learner the favorite toy/object. After about 30 seconds, the teacher will ask the learner to return the toy/object **(i.e., "Give me the _____.")** and/or physically assists the learner in returning the toy/object. The teacher presents two items (a favorite toy/object and an undesired one) in a choice-making format by allowing the learner to touch both and then places them just outside immediate reach. While presenting the toys/objects, the teacher uses verbal speech **(i.e., "Would you like the _____ or the _____?")** and ensures that the teacher's body is within the learner's immediate reach. The teacher gives the learner enough time to make a choice. If the learner makes a choice, the teacher encourages play with the toy/object. If the learner does not select one, the teacher offers assistance **(i.e., "Let me help you pick a toy.")**, hands the learner the favorite item, and then repeats the task one more time. Throughout the activity, the teacher verbally praises the learner for participating in the play event and determines how and whether the learner attempted to engage the adult in any actions to deliberately communicate a message.

2. Identical Toy Activity (communication temptation)

The teacher obtains two identical battery-operated or electronic toys in the learner's classroom that require a single step action to make the toy operate. For example, toys with a simple button or switch that causes them to do something (i.e., move, speak, light up, etc.), which shuts off after a few seconds, and thus requires reactivation. One of these toys should work correctly, and the identical toy should have its batteries removed so that it does not work, even when the button is pushed.

The teacher introduces the properly functioning toy to the learner by naming it, making it work, and engaging the learner with it. The learner should be able to feel the toy and practice making the toy work with adult assistance. After about 30 seconds of play with the toy, the teacher keeps the toy that works and hands the one without batteries to the learner. The teacher activates a toy and plays with it while encouraging the learner to play with their toy. The teacher observes how and why the learner attempts to engage the teacher in the interaction.

Weekly Data Collection Form

Student Name: _____

Week Beginning: _____

Criteria for Determining "Yes"

- ✔ Picking up the symbol and handing it to a communication partner
- ✔ Touching, reaching toward, or pointing to the symbol
- ✔ Any body part making contact with the symbol deliberately
- ✔ Clear eye gaze in the direction of the symbol

Activity fill in below...		Enter a **'Y' for YES** or an **'N' for NO** for each trial																								
		Mon.					Tues.					Wed.					Thurs.					Fri.				
1																										
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Continued...

Activity	Enter a **'Y' for YES** or a **'N' for NO** for each trial																									
fill in below...	Mon.					Tues.					Wed.					Thurs.					Fri.					
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Task Analysis

Step	Action
1	Before beginning any activity, use a positive voice to alert the learner to the beginning of an activity by saying, “It is time for music.” (or whatever activity will follow immediately).
2	Use appropriate hand-under-hand technique and place in the learner’s hand the tangible symbol for music.
3	Again, state, “It is time for music.”
4	Take the learner to the activity within 60 seconds of introducing the symbol to the learner.
5	Always pair the tangible symbol with the actual activity.
6	If moving to a new location, show the symbol again upon arrival.
7	Begin to play music, if that is the designated activity; or give the learner a musical instrument such as a tambourine to interact with; or a learner might go to another room with a designated music teacher/therapist.

8	During a natural break such as a transition from one song to another or one instrument to another, use the opportunity to re-introduce the symbol to the learner by placing it in their hands and restating that the learner is at the music activity; begin the next song or introduce a different instrument.
9	At the end of the music session, say to the learner, "Music is finished (reshow the symbol for music to the learner), we now go to…"
10	At the end of the activity, after you have shown the symbol to the learner at least three times during the activity, begin the probe phase in order to collect data.

Data Collection and Probe Phase

Criteria for Determining YES

- ✔ Picking up the symbol and handing it to a communication partner
- ✔ Touching, reaching toward, or pointing to the symbol
- ✔ Any body part making contact with the symbol deliberately
- ✔ Clear eye gaze in the direction of the symbol

The probe phase for data collection needs to occur within 2-3 minutes of the completed activity. See chart on next page…

Step	Action
1	The learner is shown the symbol that was just used during the activity along with a second symbol on a divided board.
2	If the learner is totally blind or has very low vision, then physically prompt the learner to tactilely explore the symbol.
3	Say, “We just finished music.”
4	Present on a board with a divider the symbol for music and another unrelated symbol.
5	Ask, “Show me music?”
6	Wait up to 15-20 seconds for the learner to respond using the response scale below.
7	If the learner responds correctly, then record a “yes” on the data sheet.
8	If the learner responds incorrectly, show and label the correct symbol for the learner, and mark “no” on the data sheet.
9	Change the position of the symbols and repeat a second trial of asking the question, “Show me…?”

SAMPLE
STACS Assessment Forms, Intervention Strategies, and Procedures

John is a 15-year old, non verbal learner with very little light perception. John made significant progress during the study and successfully learned 20 tangible symbols. One day John went up to the symbol board where all of the symbols were posted and tactually searched for a desired symbol. Finding the symbol for nurse, which was an adhesive bandage embedded in the symbol card, John handed the symbol to the teacher. John was taken to the nurse, and it turned out that John had a temperature of 102 degrees. The school called John's Mom, who took John home to recuperate. Since that experience, John has purposefully initiated selecting symbols for choice making and accessing specific wants and needs. John's vocabulary for the tangible symbols has significantly increased. In addition to the standard set, John has many additional symbols, which have been created by using the blank cards, to indicate very specific preferences such as a type of food as well as certain musical instruments to play during music time. As a result, John's frustration level and behavior improved as reported by the classroom teacher and speech-language pathologist.

SAMPLE: John's File Review and Case History Protocol Chart

Motor/ Physical Status	Cognitive Status (IQ)	Medical Status/ Conditions
Ambulates independently	Developmentally delayed 15-month developmental level as measured by the Vineland	Asthma Agenesis of the corpus callosum
Hearing Status	**Vision Status**	**Sensory Status**
Informal hearing screening revealed inconsistent responses	Bilateral light perception	Able to tactually explore common objects and has self stimulatory behavior

Attention Status	Speech/ Vocalizations	Exploration Skills/Status
Able to stay on task for a short period of time	No words Vocalizes pleasure or discomfort through non meaningful vocalizations	Tactually explores various things in the environment
Play Skills (check)	**Intentionality Status (check)**	**Symbolism (check)**
☑ Isolated ○ Parallel ○ Associative ○ Cooperative	○ Pre-intentional ☑ Somewhat intentional ○ Intentional	☑ Non-symbolic communication ○ Presymbolic communication (Emerging symbolism) ○ Symbolic communication Identify the # of symbols: 2

SAMPLE: John's Teacher and Parent/ Caregiver Rating Scale

Receptive Communication Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
1. Turns head/body to environmental sounds	X				
2. Attends or orients to objects or people		X			
3. Responds when own name is called	X				
4. Responds to the meaning in a speaker's tone of voice (angry, happy)	X				
5. Knows the first names of peers at school			X		
6. Knows the names of teachers			X		
7. Understands one-step verbal directions or commands within everyday routines			X		
8. Understands two-step verbal directions or commands within everyday routines				X	

Receptive Communication Cont'd Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
9. Understands yes/no questions related to daily routines			X		
10. Anticipates steps within a daily routine				X	
11. Understands when told "You have to wait."	X				
12. Understands when told "no"	X				
13. Understands when told to give an object to someone, i.e., "Give (object) to (person)."			X		
14. Associates objects with specific routines (vacuum = chore; utensils = mealtime)				X	
15. Understands social phrases and gestures ("Hi, how are you?" "Bye," "Later")	X				
16. Understands touch cues			X		
17. Understands tangible object cues			X		
18. Understands tactile or visual sign language cues				X	

Expressive Communication Forms Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
19. Uses vocalizations/sounds			X		
20. Says real words or phrases				X	
21. Uses immediate speech imitation (echolalia)				X	
22. Uses delayed speech imitation (echolalia)				X	
23. Uses sign language or modified signs				X	
24. Uses leading gestures by pulling or directing someone's hand				X	
25. Withdraws hands away from an object or person			X		
26. Uses gestures to push items toward someone		X			
27. Uses gestures to push an item away from self			X		
28. Uses pointing gestures			X		
29. Uses reaching gestures toward an object			X		
30. Uses reaching gestures toward a person			X		
31. Uses facial expressions to communicate		X			

Expressive Communication Forms Cont'd Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
32. Gets up and leaves and/or turns head or body away to communicate	X				
33. Uses head nods and/or head shakes				X	
34. Uses body orientation by standing near something or someone to communicate		X			
35. Uses objects to communicate			X		
36. Uses photographs to communicate				X	
37. Uses picture symbols to communicate				X	
38. Uses an electronic communication device				X	
39. Uses challenging behavior to communicate		X			

Expressive Communication Functions Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
40. Communicates the names (labels) of common people, objects, and activities				X	
41. Communicates greetings and farewells ("Hi," "Bye")				X	
42. Communicates to draw attention to self			X		
43. Communicates protest or "no"			X		
44. Communicates physical state (sick, well, or hurt)			X		
45. Communicates emotional state (happy, sad, angry, enthusiastic)			X		
46. Requests desired items (objects, routines)				X	
47. Requests desired people (staff or peers)			X		
48. Requests an event continue or more of something		X			
49. Requests help			X		
50. Requests permissiont				X	
51. Comments about self				X	

Expressive Communication Functions Cont'd Identify how often this learner does each skill independently.	Always > 90%	Often > 50%	At times < 50%	Rarely < 10%	Unknown
52. Comments on the actions of others				X	
53. Communicates to signal the beginning of interaction (i.e., initiates)				X	
54. Communicates to signal the end of an interaction (i.e., terminates)			X		
55. When a choice is given, chooses one over another			X		
56. Communicates to tell someone else what to do (i.e., directs people)				X	
57. Persists in communication, (i.e., if student communicates something that a listener does not understand, this learner repeats the message or conveys the message another way)				X	
58. Communicates to let someone know that they did not understand what the other person was saying				X	

SAMPLE

John's Structured Sampling Tasks to Elicit Communication and Intentionality

Choice Activity

John's teacher Laura reported that John's favorite activity is listening to music on an iPod. Laura chose a braille book as the other object to use during the assessment. Laura gave John the iPod and earbuds with a favorite song programmed in. John needed physical assistance to place the earbuds properly. After 30 seconds, Laura asked for the iPod back. Laura then presented the iPod and the braille book so that John could tactually explore both. John chose the iPod, and Laura gave John time to listen to the favorite song.

Identical Activity (Communication Temptation)

Laura has a BIGmack® switch that activates a blender for making a milkshake. Laura has a second BIGmack switch with the battery removed. Laura shows John the BIGmack switch and they activate it together using a hand-under-hand technique to make the blender start blending. Laura then stops the blender and reconnects the non-operating BIGmack to observe John's reaction. John reaches out and searches the table tactually and realizes that the second switch is not activating the blender. After 30 seconds, Laura gives John the BIGmack switch that does activate the blender.

SAMPLE : Weekly Data Collection Form

Student Name: John

Week Beginning: March 30

Criteria for Determining "Yes":

- ✔ Picking up the symbol and handing it to a communication partner
- ✔ Touching, reaching toward, or pointing to the symbol
- ✔ Any body part making contact with the symbol deliberately
- ✔ Clear eye gaze in the direction of the symbol

Activity		Enter a **'Y' for YES** or a **'N' for NO** for each trial																									
fill in below...		Mon.					Tues.					Wed.					Thurs.					Fri.					
1	Speech	Y	Y	Y								Y	Y	Y													
2	Literacy	Y	N	Y			Y	Y	Y			N	N	Y			Y	Y	Y			Y	Y	Y			
3	Lunch	Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			
4	Toothbrush	N	N	N			Y	N	Y			N	N	Y			Y	Y	Y			N	N	Y			
5	Nurse						Y	Y	Y																		
6	Break	Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			

7	Gym						Y	Y	Y								Y	Y	Y						
8	Cooking	Y	N	Y																		N	Y	Y	
9	Classroom	Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y	
10	O&M											N	N	Y			Y	Y	N						
11	Computer						Y	Y	Y																
12	Bathroom	Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y	
13	Music	Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y	
14	Yes	Y	Y	Y								Y	Y	Y			Y	Y	Y			Y	Y	Y	
15	No	Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y			Y	Y	Y	
16	More	N	N	Y								N	N	Y								Y	Y	Y	
17	Outside						Y	Y	Y								Y	Y	Y						
18	Finished	Y	N	Y								Y	N	Y								Y	Y	Y	
19	Math	N	N	Y			Y	Y	Y			Y	Y	N			N	Y	Y			Y	N	Y	
20	Art						Y	Y	Y								Y	Y	Y						
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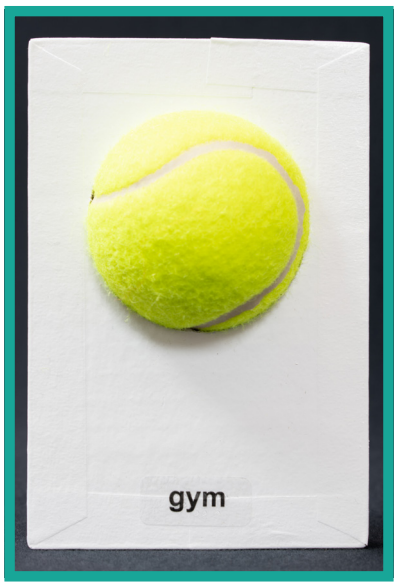
A learner chooses between Yes and No symbols.

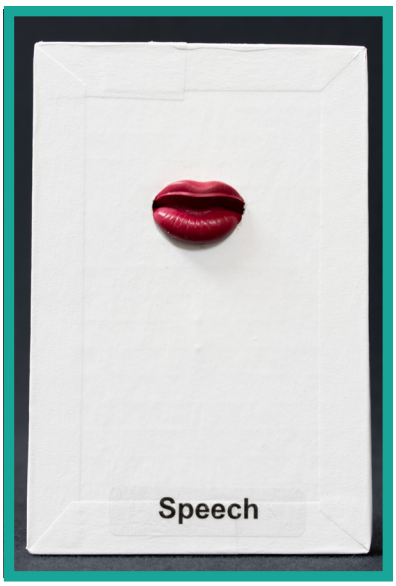
APPENDIX A

Library of **Standardized Tangible Symbols**

Bathroom



Gym



Speech

Yes

No

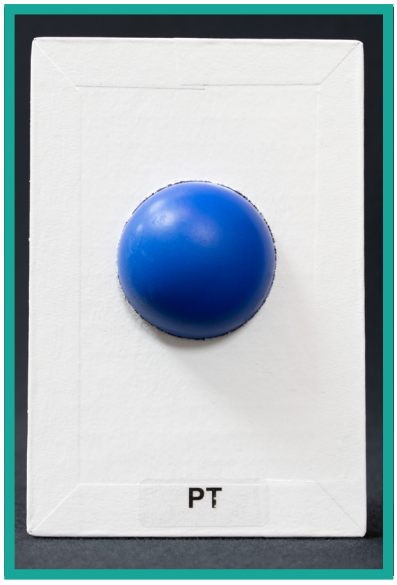
Classroom

Literacy

Circle Time

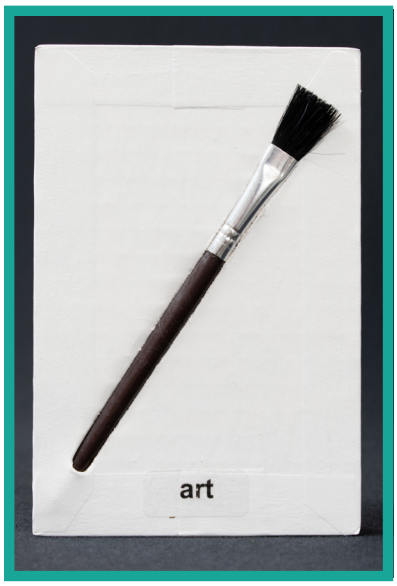
Music

Occupational Therapy



Physical Therapy

Snack



Art

Sensory

Rest Time

Toothbrush

Cooking

Drink

Lunchroom

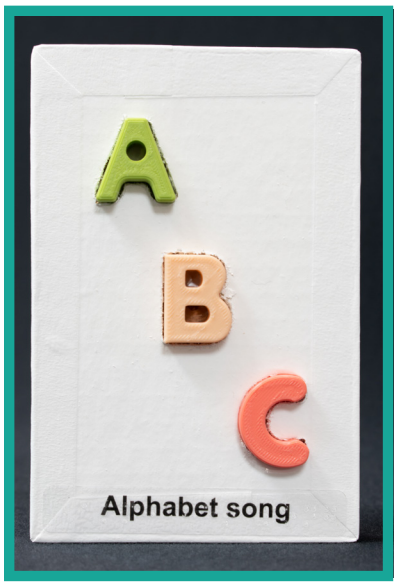
More

Food

Finished

Twinkle Twinkle Song

Wheels on the Bus Song



Alphabet Song

Blank

Blank

Objects embedded in the cards you receive may vary in color from the ones presented in this appendix.

Replacement STACS cards, blank cards, bespoke cards, and other ready-made cards are available for purchase from Adaptive Design Association, adaptivedesign.org.

Assign new meaning to a STACS card if original meaning is not age-appropriate for a learner.

APPENDIX B

Using Age-Appropriate Symbols
Reassigning STACS Cards

The research presented in this book supports the use of standardized tactile augmentative communication symbols. When possible, use each communication card for its intended use.

However, if your new learner is 12 years old and is just starting to use tactile communication cards, teaching the "Twinkle Twinkle Little Star" song may not be embraced by the learner. Consider reassigning the symbol card to communicate something more age appropriate.

Gently remove the assigned print-braille label and replace it with a new reassigned label. For example, the yellow star card could communicate another song, such as the "Star-Spangled Banner," or it could take on the meaning of a much-anticipated special event, or received as a reward for successfully meeting a goal or completing a job well-done. Make your new label with whatever you have available, such as braille paper, clear adhesive labels, black markers, slate & stylus, Perkins Brailler, and so forth.

Consult with the learner's team for appropriate and meaningful suggestions before renaming a STACS card.

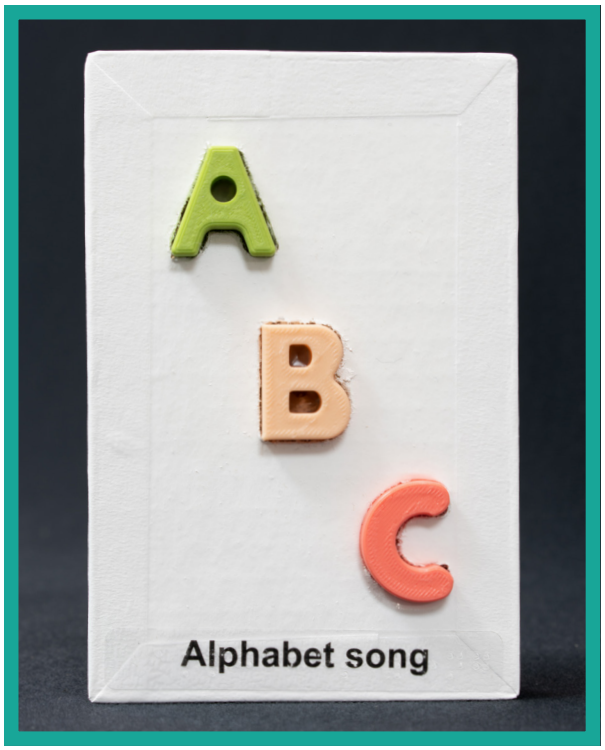
Replacement STACS cards, blank cards, bespoke cards, and other ready-made cards are available for purchase from Adaptive Design Association adaptivedesign.org.

ADA and APH, 2024

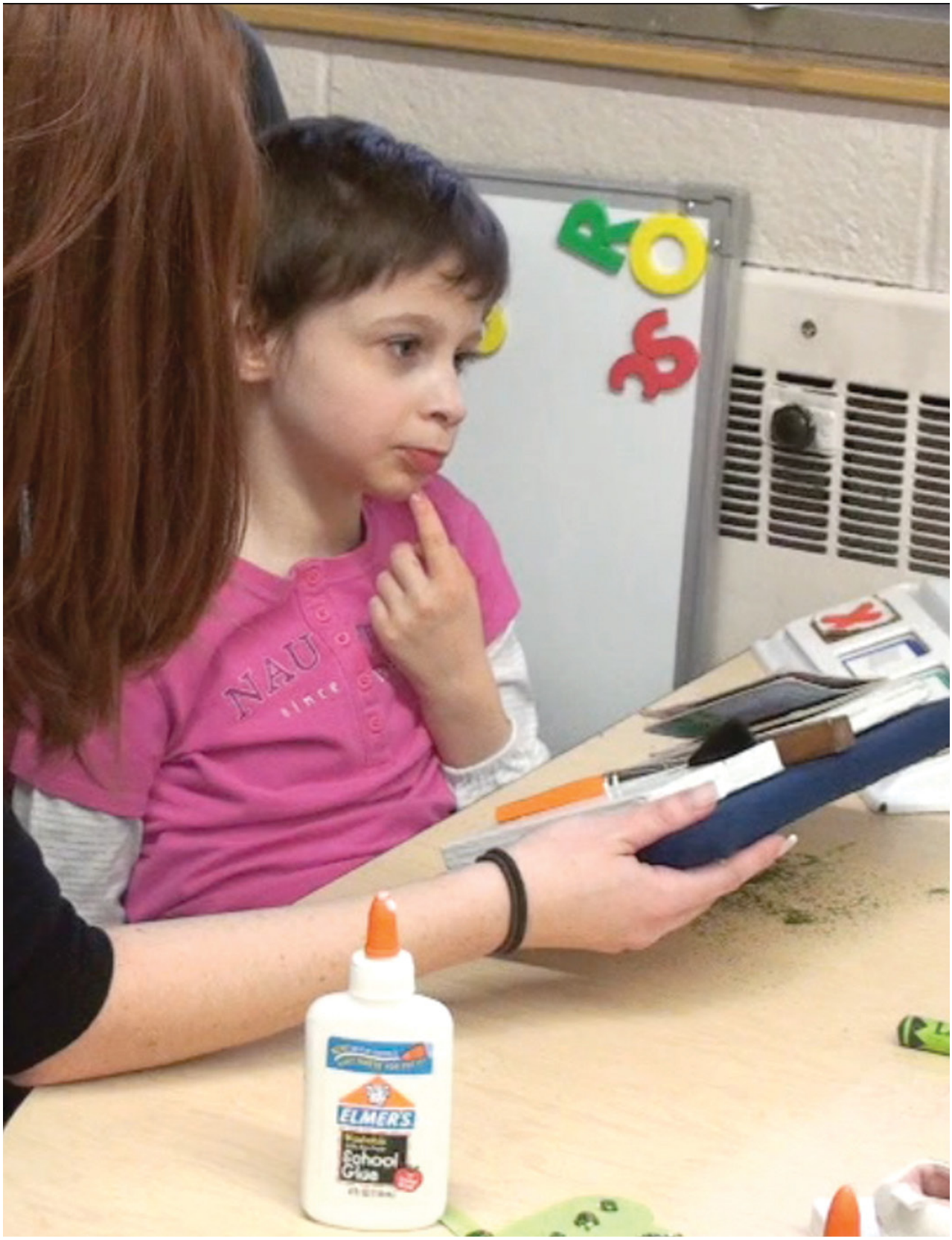
New Meanings

Twinkle Twinkle Little Star song becomes special event

Wheels on the Bus song becomes school



Alphabet song becomes library



A learner uses STACS with an art activity.

APPENDIX C

Evidence-Based **Studies on STACS**

Unfortunately, there are only a handful of research studies in the literature that look at how learners with multiple disabilities use tangible symbols as one tool for communication.

Trief, Bruce, Cascella, and Ivy (2009) administered a survey to 29 teachers and speech-language pathologists (SLPs) from four New York City schools with subsequent input from a 14-member advisory board comprised of administrators and SLPs from the four schools, university professors, faculty from the Perkins School for the Blind, the designer and manufacturer of the symbols, and a graduate research assistant. The advisory board used the survey information to determine the potential need for a standardized set of tangible symbols for school use. The teachers and SLPs suggested 48 referents for representation in tangible symbols, and the advisory board identified an additional seven, for a total of 55 identified referents. Teachers and SLPs most often requested representation of the following referents: dismissal, bathroom, gym, speech, music, classroom, literacy, circle time, outside, Occupational Therapy (OT), Physical Therapy (PT), snack, computer, art, sensory, and rest time (Trief et al., 2009).

During an intervention study on the implementation and mastery of tangible symbols, Trief, Bruce, and Cascella (2010) measured the selection of mounted tangible

symbols from a standardized set of 48 commercially produced symbols by 29 teachers and SLPs. The learners (3-21 years old) were pre-intentional to presymbolic communicators who used no more than five expressive words, signs, or pictures. Forty-six of the 48 symbols were selected for use across the four participating schools. The following 12 symbols were introduced to at least 50% of the learners: circle time, music, food, bathroom, drink, literacy, OT, gym, speech, PT, art, and snack. The learners were introduced to the tangible symbols for daily activities and objects. Differences in the selection of tangible symbols occurred by age group, with tangible symbols for songs (that were experienced daily) selected for the youngest group of learners (3-6 years old) and a larger and more diverse set of symbols (including those for locations, transitions, and varied pragmatic functions) selected for the oldest group (12-21 years old). The educators in this study selected individually appropriate tangible symbols from a set of commercially produced standardized symbols.

It is best to make tangible symbols readily accessible to the learner and integrate them into instruction across the school day. Their use in the daily schedule facilitates conversations that occur each time the learner makes a trip to the schedule display. Interactions with tangible symbols in the daily schedule encourage the learner to express anticipation, develop memory, and reduce stress (Van Dijk & De Kort, 2002). Other applications of tangible

symbols include story boxes, experience books (also known as memory books), and interactive home-school journals (Bruce, Randall, & Birge, 2008). Throughout the day, learners should be taught to use tangible symbols to express a variety of communicative functions (Downing, 2005). Some of the earliest communication functions include directing another person's actions, protesting, making a request, labeling, and establishing social closeness.

Although tangible symbols are regarded as an important communication form for learners with visual and multiple impairments, very few research studies have been conducted on the effectiveness of this type of intervention. Rowland and Schweigert (2000) implemented the use of tangible symbols with 41 learners with intellectual disability (including 23 who also had visual impairment), with an average intervention period of 6.5 months per individual. The intervention generally began with a single symbol and moved to multiple symbol arrays as learners progressed. The tangible symbols selected for instruction were based on each individual's object and activity preferences. Thirty-five participants learned to use tangible symbols, and five also learned to communicate with tangible symbols of abstract concepts. All 35 mastered the expression of requests, and nine learned to express at least one additional communicative function. Those who were pre-intentional communicators required a longer period of time

for learning and learned fewer symbols, while some did not learn to communicate with the tangible symbols at all.

Trief (2007) introduced whole or partial object embedded symbols to 25 participants with visual and multiple impairments (including 10 who were completely blind) in the context of transitioning from one activity to another. During the 9-month intervention period, participants were asked to identify the symbol for the next activity multiple times each day. Five learners (including two who were completely blind) learned all 28 possible symbols, 10 learned at least 1-20 symbols, and 10 did not learn any symbols. The 10 who did not learn any symbols had more severe intellectual, visual, and physical disabilities.

Turnell and Carter (1994) taught an 8-year-old boy with multiple disabilities to use mounted partial objects to communicate requests. Fifteen opportunities per day were provided for two consecutive days. The boy learned to make meaningful requests with all three of the introduced tangible symbols within 29 sessions.

The Picture Exchange Communication System (PECS; www.pecs-usa.com) was applied in two research studies on tangible symbols. Lund and Troha (2008) applied PECS to teach three learners with autism and visual impairment to use tangible symbols with all three mastering symbols within a 2-month intervention period. Parker, Banda,

Davidson, and Liu-Gitz (2010) also applied the first four phases of an adapted PECS process to teach a 7-year-old girl with autism and visual impairment to use mounted tangible symbols. She learned to use 24 tangible symbols in a 10-week intervention. The expression of requests was emphasized within the Rowland and Schweigert (2000), Lund and Troha (2008), and Parker et al. (2010) studies.

Development of the STACS Set

In 2007, the Lavelle Fund for the Blind funded a 3-year research project to study the efficacy of using a standardized set of tangible symbols for a population of learners who are visually impaired or blind with additional disabilities specifically in the area of receptive and expressive language. Ellen Trief, the project investigator and Professor in the Blind and Visually Impaired and Severe/Multiple Disabilities Special Education Departments at Hunter College, put together a research team and an advisory group to design and implement the study. Paul Cascella, Professor and Director of the Speech-Language Pathology Department at Hunter College; Susan Bruce, Associate Professor in the Department of Teacher Education/Special Education at Boston College; and Sarah Ivy, Teacher and Hunter College Graduate Assistant were all members of the research team. In addition, a 14-member advisory panel comprised of program directors, college professors, and speech-

language pathologists met three times during the study to discuss and decide on the type of symbols, the protocol for instruction, and evaluation of the results after data collection. Three advisory members were from the Perkins School for the Blind, one was from the American Printing House for the Blind, and the remaining members were from various programs and colleges throughout New York City.

The initial impetus for the grant came from many site visits to schools serving children with visual and multiple impairments. Many of these schools already used tangible symbols with some of their students. However, most of the symbols were handmade by teachers, and the decisions for which icon/referent to use for each symbol varied within and across the schools. For example, the symbol for bathroom was represented by a diaper, a tile, a partial roll of toilet paper, or a miniature toilet bowl. There was no continuity across classes or schools as to which icon should be used to represent bathroom. As a result of this observation, a pilot study took place between September 2004 and June 2005 in which teachers at the Lavelle School for the Blind introduced 25 students to a standardized set of symbols (Trief, 2007).

In this pilot study, teachers and therapists identified 28 tangible symbols and their corresponding referents, which were then manufactured by the Adaptive Design Association and used by all 25 students in the study. The

teachers and therapists involved in the study received training by the project director on how to introduce the symbols to the students and then how to collect data on whether or not they were learning these symbols. The results showed that there was an increase in symbol acquisition, which climbed from 3% in September to 73% in June. It is important to note that 15 of the 25 students learned one or more of the symbols and that five of the students learned all 28 symbols. The 10 students who did not learn any symbols were the most severely delayed in cognitive, motor, and visual skills as measured by psychological and educational evaluations. All of the students in the study had less than a five-word expressive vocabulary at the beginning of the study (Trief, 2007).

A direct result of the pilot study was the award of a 3-year grant to conduct a larger study. The new grant provided funding to purchase all of the symbols for the participating learners and to develop a training manual and DVD for the participating teachers and therapists. Four schools in New York City participated in the new study: Lavelle School for the Blind, The Jewish Guild for the Blind, Helen Keller Services for the Blind, and Lighthouse International. The learners in the study ranged in age from 3 to18 years.

Five research questions were addressed during the 3-year study:

1. Which tangible symbols would you like to see as part of a standardized set of symbols for the children you serve? Which icon/referent would you use to manufacture each symbol (Trief et al., 2009)?
2. Which of the 48 symbols were selected by the 29 educators and therapists to use in the classroom with their students and with what frequency (Trief et al., 2010)?
3. What are the teachers' and therapists' perceptions about the tangible symbol intervention in terms of efficacy, generalizations and recommendations (Bruce, Trief & Cascella, 2011)?
4. What is the comparison between parent and teacher ratings of the frequency and diversity of communication among children with visual impairments and severe disabilities (Cascella, Trief, & Bruce, 2012)?
5. Do students with visual impairment and multiple disabilities benefit from the use of tangible symbols for communication? Which factors (intentionality/ symbolism, vision, hearing, ambulation and/or play) have the greatest effect on the acquisition of the symbols (Trief, Cascella, & Bruce, submitted for publication)?

Question 1

Which tangible symbols would you like to see as part of a standardized set of symbols for the children you serve? Which icon/referent would you use to manufacture each symbol (Trief et al., 2009)?

Action and Results

A survey was developed and completed by 29 educators and SLPs along with the 15-member advisory board. The results of the survey produced a total of 48 symbols for school use and an additional seven symbols that were unique for home use. The most frequently requested symbols were the following:

- Dismissal
- Bathroom
- Gym
- Speech
- Music
- Classroom
- Literacy
- Circle Time
- Outside
- Occupational Therapy
- Physical Therapy
- Snack
- Computer
- Art
- Sensory
- Rest Time

The uniformity of a standardized set of tangible symbols allows teachers, therapists, and parents to easily access symbols for the students they serve while maintaining consistency across classes and programs. In addition, the set of commercially-purchased tangible symbols will not replace additional individualized symbols designed specifically for each child (Trief et al., 2009).

Question 2

Which of the 48 symbols were selected by the 29 educators and therapists to use in the classroom with their students and with what frequency (Trief et al., 2010)?

Action and Results

Multiple sets of the 48 symbols identified in the previous study were distributed to 29 educators and therapists who were directly involved in communication-based programs at the same four schools. Fifty-one children from these schools participated in the study. All of the participants were visually impaired or blind with additional disabilities. All of the participants communicated at the pre-intentional level to early symbolic level with five or fewer words, signs, or pictures. These symbols were manufactured by the Adaptive Design Association and represented commonly occurring words in school vocabulary. The Institutional Review Board (IRB) at Hunter College approved the study.

At the beginning of the 2008-2009 school year, the 29 educators/therapists participated in a workshop to learn how to select, introduce, and collect data on outcomes of the use of the symbols. Each teacher/therapist was encouraged to identify at least five symbols that would be highly motivating for each of their learners and to gradually increase the total number of symbols introduced from 5 to 15 over the 7-month intervention period. In addition to the individual data collected on each learner's progress, data were collected on how frequently various symbols were utilized across three age groups: preschool, young school-aged, and older school-aged. This tally system allowed the researchers to analyze which symbols were used most frequently within each age group and across all age groups. Across all age groups, the following 12 symbols were introduced most frequently to at least 50% of the learners in the study:

- Circle time
- Food
- Music
- Bathroom
- Drink
- Literacy
- Occupational therapy
- Gym
- Speech
- Physical therapy
- Art
- Snack

The following 11 symbols were identified as frequently used within the age groups:

- Sensory
- Rest time
- The Alphabet song
- The Wheels on the Bus song
- Twinkle, Twinkle Little Star song
- Finished
- More
- Cooking
- Classroom
- Lunchroom
- Toothbrushing (Trief et al., 2010)

Question 3

What are the teachers' and therapists' perceptions about the tangible symbol intervention in terms of efficacy, generalizations, and recommendations (Bruce et al., 2011)?

Action and Results

A qualitative study was conducted to investigate the teacher and therapist perceptions regarding the efficacy, generalizations, and recommendations about the tangible symbol intervention for learners who are visually and multiply impaired. Each participant had a face-to-face interview that was audio-taped by the primary investigator

and transcribed verbatim by a graduate assistant. The following questions were raised:

- How do you feel this communication form (the tangible symbols) helped the learners in the study?
- What do you see as a future direction in your classroom for the use of the tangible symbols?
- Do you feel that the symbols should be sent home to the parents?
- If so, how can we encourage the parents to use the symbols in their home?
- Do you have any comments or suggestions for future use of the symbols?

The educators and therapists concluded that many of their students did learn the meaning of the tangible symbols as part or all of their daily routine. The use of the symbols improved the students' behaviors by offering a purposeful way to communicate as well as providing for smoother transitions from one activity to another. In addition, the symbols improved other forms of communication and choice making for many of the students. All of the participants said they plan to use the symbols in their future classrooms. They suggested that the symbols be sent home to parents and that training for the parents be provided with the symbols labeled in the primary language of the family (Bruce et al., 2011).

Question 4

What is the comparison between parent and teacher ratings of the frequency and diversity of communication among children with visual impairments and severe disabilities (Cascella et al., 2012)?

Action and Results

A 58-item parent and teacher rating scale was developed to assess receptive communication, expressive communication forms, and expressive communication functions. Parents and teachers recorded the frequency with which learners demonstrated each skill on a 5-point Likert scale from always to rarely. The parents completed the scale in English or Spanish; the teachers completed it in English.

The first author developed the rating scale, and it was based on past protocols including the Functional Communication Profile (Kleinman, 2003), The Communication Matrix (Rowland & Schweigert, 2004), Downing's assessment chapter (2005), and earlier articles on communication forms and functions for learners with severe disabilities including Cascella (2004; 2005); McLean, Brady, and McClean (1996); McClean, Brady, McLean, and Behrens (1999); and McLean and Snyder-McLean (1987). The current scale was reviewed and edited by 13 SPLs and special educators at a regional school in Connecticut.

Results from the comparison between parent and teacher reports were a 70.9% match for receptive communication, a 72.4% match for communication forms, and a 70.3% match for communication functions. The findings indicate a consensus on how parents and teachers rate the individual learner's communication skills at 70% of the time or more. The authors suggest that the 30% discrepancy might be due to the variations between home and school discourse. Forms of communication yielded the greatest similarity between parent and teacher ratings. Forms of communication include the child pointing, reaching, or any physical action that marked an interest or attempt to communicate. In general, more parents marked the category of unknown more frequently than teachers did. This communication rating scale allowed teachers and parents to share their impressions about a child's communication as well as the types of skills or goals that could be worked on (Cascella et al., 2012).

Question 5

Do students with visual impairment and multiple disabilities benefit from the use of tangible symbols for communication? Which factors (intentionality/symbolism, vision, hearing, ambulation, and/or play) have the greatest effect on the acquisition of the symbols (Trief et al., submitted for publication)?

Action and Results

The factors that were analyzed for this question included intentionality/symbolism, vision, hearing, ambulation, and play skills.

Our results indicate that 43 of the 51 learners enrolled in the study responded positively to the tangible symbols. Three showed no response, and five learners yielded a 10% or less response. The range of correct responses during the probe phase was 10.1%-92%.

The only statistically significant factor that was associated with learning the symbols was ambulation. Learners who had some ambulation did better than those who were non-ambulatory. The mean difference between the ambulatory and the non-ambulatory group was significant at the .05 level. Vision, hearing intentionality, and play skills showed no significant statistical differences in the acquisition of the tangible symbols. It is important to note that a month-by-month analysis of the correct percentage of responses was calculated, and from October to April the percentage of correct responses increased from 26% to 45% (Trief et al., submitted for publication).

The culmination of this research led to the development of a starter kit of 25 STACS: Standardized Tactile Augmentative Communication Symbols and this training manual.

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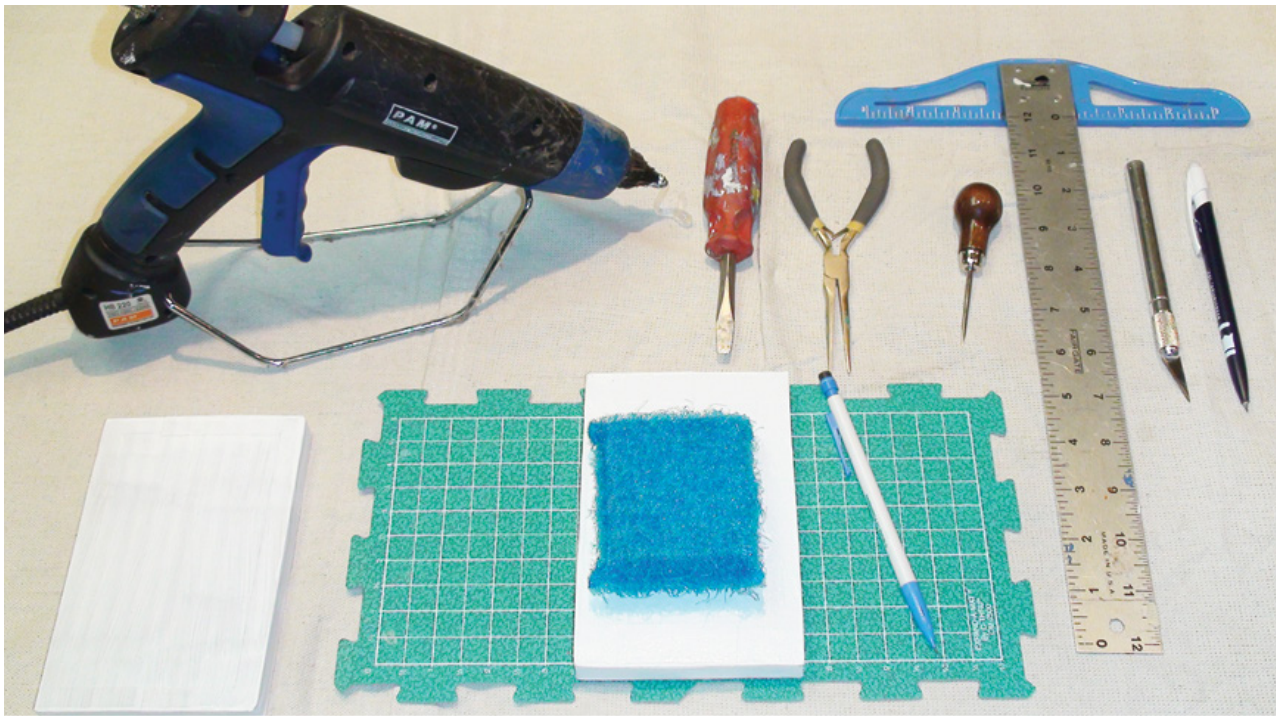
Teacher creating STACS card.

APPENDIX D

Building Your Own STACS Cards
Instructions for Embedding Objects

Alex Truesdell, Founder
Antoinette LaSorsa, Fabrication Director
Adaptive Design Association



Basic Tools and Materials Needed

White Symbol Cards
Hot Glue Gun
Hot Glue Sticks
X-ACTO® or Precision Craft Knife
Utility Knife
Flat Blade Screwdriver
Awl
Wire Cutters
White Latex Enamel
Touch-up Paint
1- and 2-inch Sponge Paint Brushes
Mechanical Pencil
T-square
Ruler

Additional Supplies For Securing Complex Objects

Thin, Strong String or Wire
Epoxy Glue
Wood (i.e., 1/8-inch to 1/2-inch thick poplar wood)

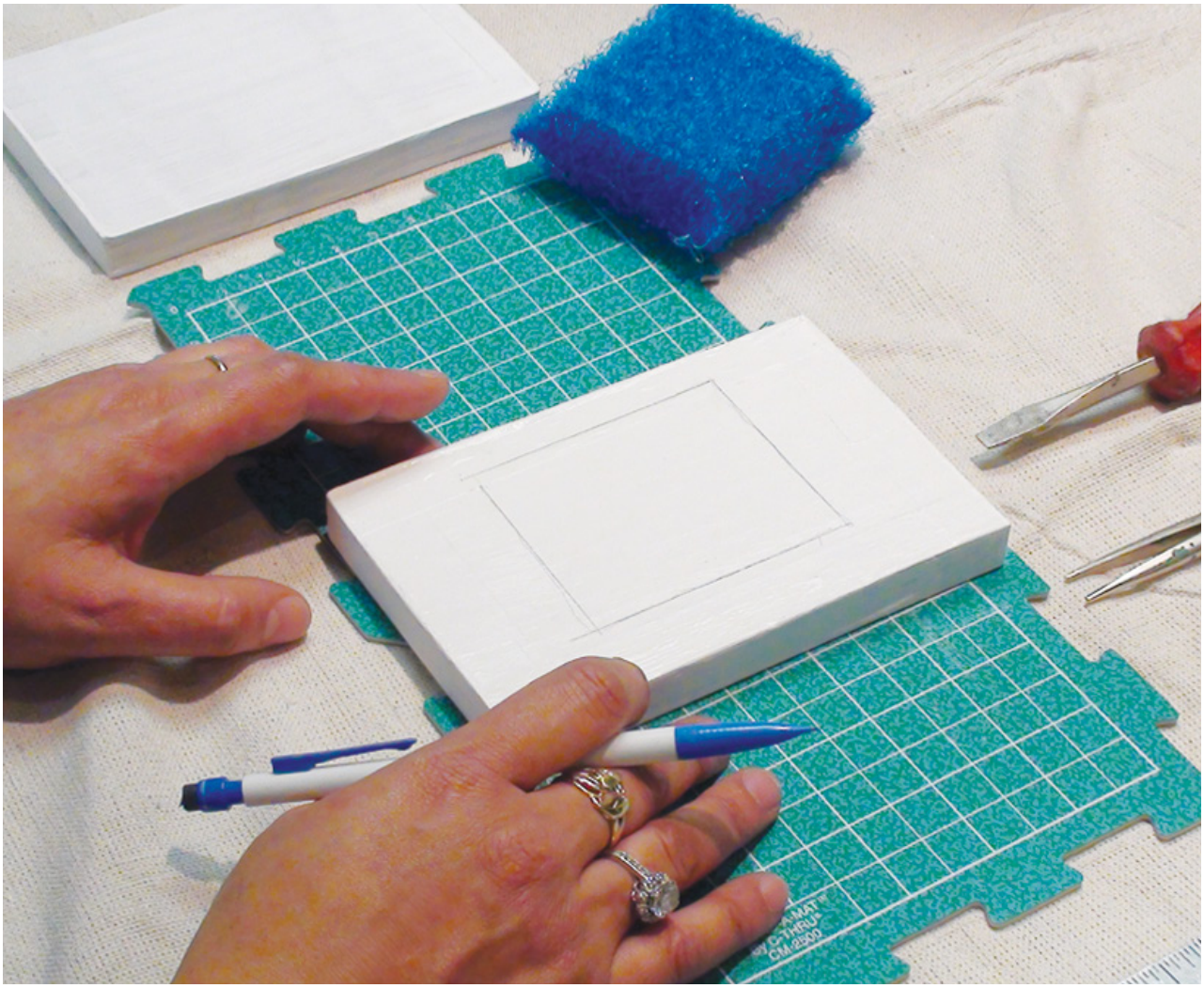
Directions

Step 1

Select 3-dimensional objects (such as a hairbrush, fork, or a personal item to represent a person) to represent specific activities, places, things and people.

Step 2

Place the object on a white symbol card and trace a line around the outside edges of the object.

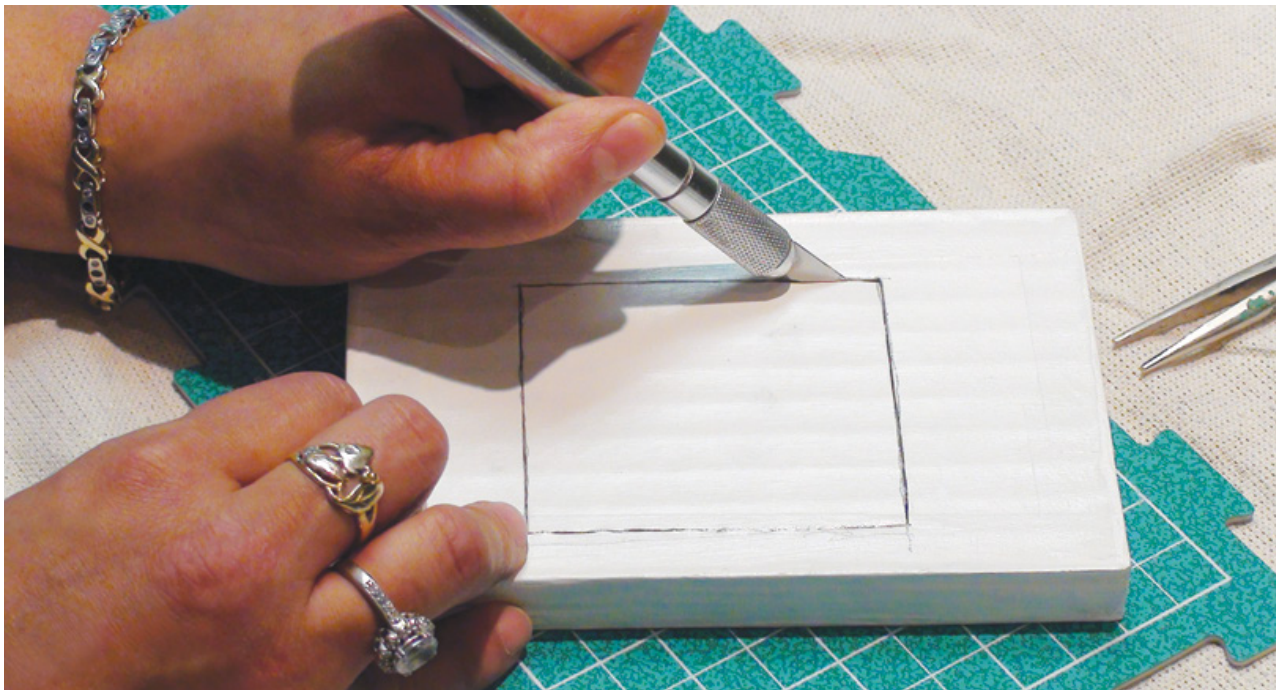


Directions Cont'd

Step 3

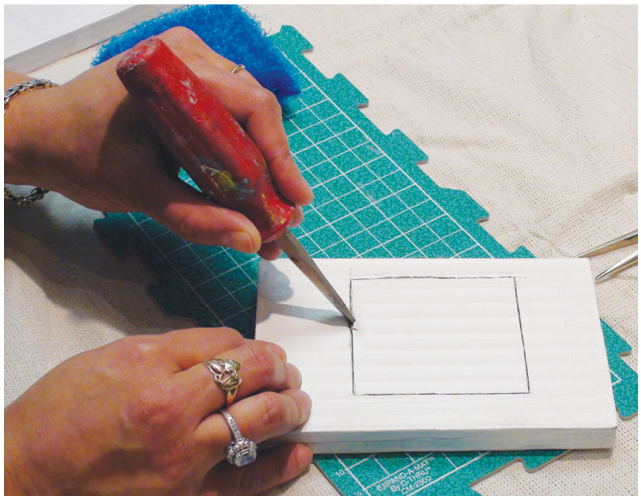
Carefully cut along the line with a craft knife (X-ACTO®) and penetrate the top one or two layers (depending on the object) of the white symbol card.

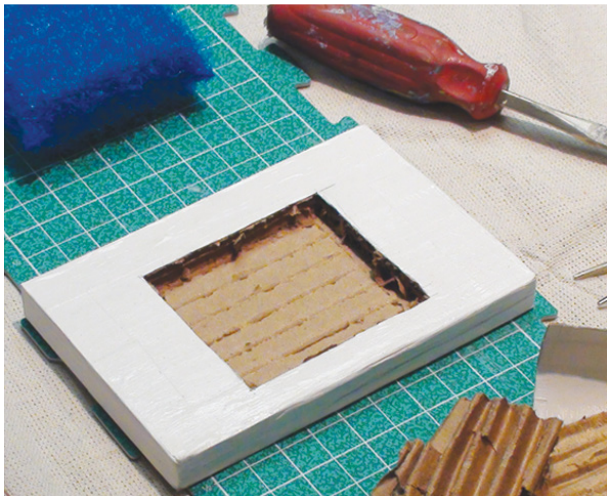
Note: The interior of the white symbol card is composed of three layers of corrugated cardboard. For a thinner object, such as a toothbrush or a tile, only remove one layer of corrugate; whereas a thicker object, such as a ball or a cup, will require that you remove two layers of corrugate. Removing the bottommost layer is not recommended because this layer is instrumental in supporting and fastening the object to the symbol card.

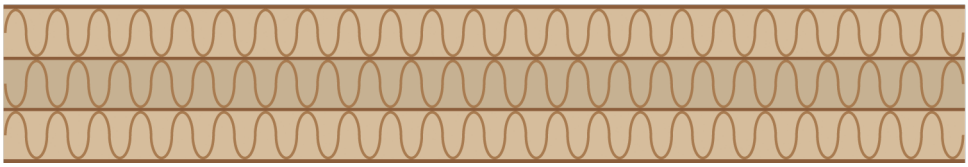


Step 4

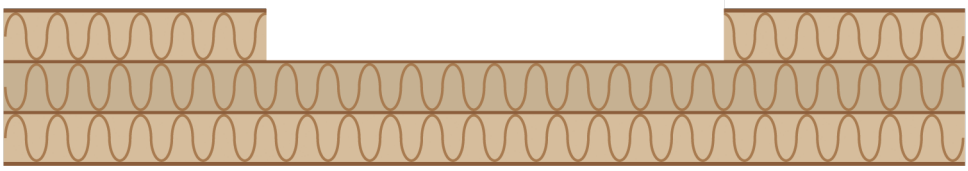
Use the flat blade screwdriver to carefully remove the top one or two corrugated layers from the card in order to create a clean, flat recessed area the exact shape of the object.



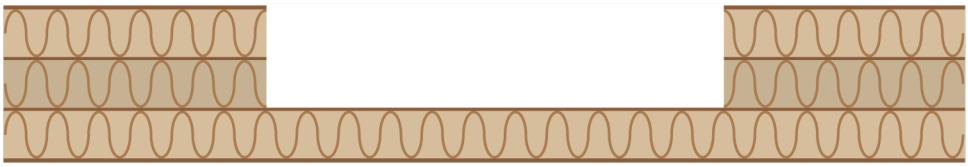




Corrugated cardboard (no cuts)



Corrugated cardboard (one layer removed)



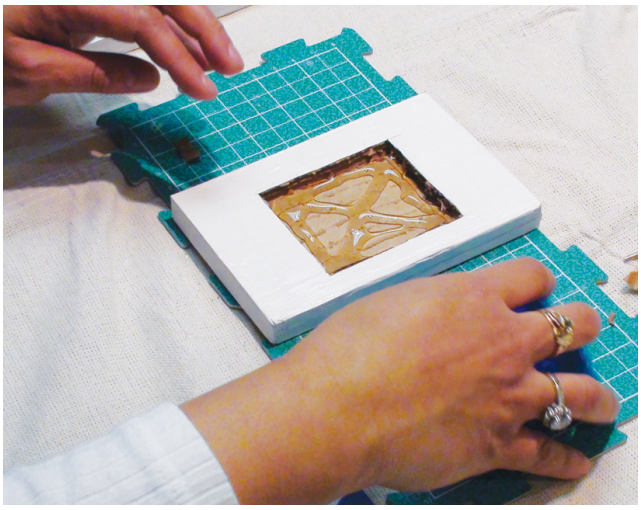
Corrugated cardboard (two layers removed)

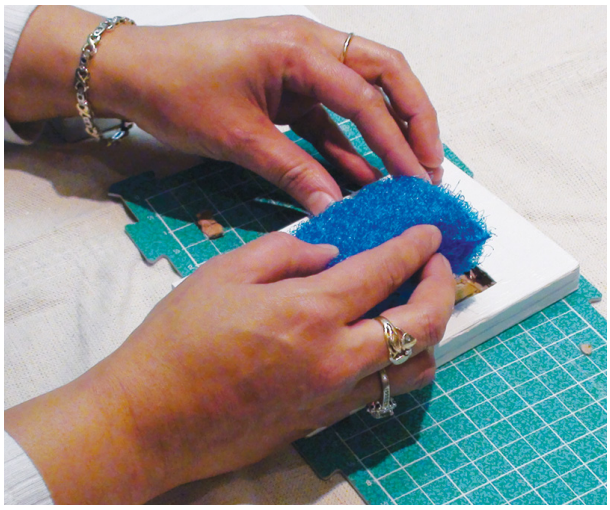
Step 5

Secure the object firmly into the recessed area. Hot glue works well for most objects.

Note: Some objects require additional reinforcement.

- Embed the wire ends discreetly in the pool of hot glue beneath the object.
- Smooth plastic objects can easily pop out of a hot glue setting. To add texture and bond strength, wrap string or wire securely around a section of the object.
- Some objects should be affixed to a wood base (1/8-inch to 1/2-inch thick poplar wood) with epoxy or screws before embedment in the white card. A wood base will bond well with hot glue.



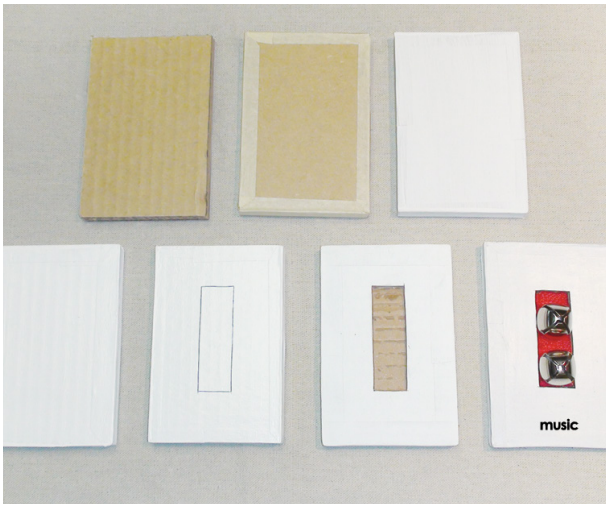


Step 6

Touch up scratches (created in the embedding process) with white latex enamel.

Step 7

Affix a 22-point, sans serif print label and an uncontracted braille label to the card below the object.



1839 Frankfort Avenue
Louisville, Kentucky 40206
502-895-2405 • 800-223-1839
aph.org • info@aph.org

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