## Vocabulary selection and organisation – AAC system design

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Gayle Porter– Disclosure

- Senior Clinician, SLP – CPEC Melbourne, Australia
- Private Speech pathology practice
- Developer, Copyright & Trademark owner of PODD communication system resources
- Receives royalties from sales of PODD resources
- Honorariums for trainings on a range of topics
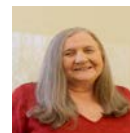
Selecting vocabulary

"A child who uses speech will independently select the words she wishes to use from the vast array of words she hears/sees used everyday.

A child who uses AAC will independently select the words she wishes to use from the vocabulary other people have chosen to model and, for aided symbols, made available for her to use."

Porter & Kirkland, 1995, p.93-94

We have to make the words available in aided language systems

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Autonomous communication

Being able to say

what I want to say,

to whoever I want to say it to,

whenever I want to say it,

however I choose to say it!

Vocabulary to Generate Own Messages

- Spelling to generate own words

- Whole word / symbol AAC systems
    - Degree of autonomy will be influenced by the size and diversity of the vocabulary pool
    - Larger the pool the more likely it is that the word I'm thinking will be there
    - Efficient organisation supports more frequent autonomous communication

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Vocabulary to create an aided language learning environment

Providing vocabulary to create an aided language learning environment

- For learning and use
- Partners to model
- Individual to use
- Express a range of meanings
- Throughout the day
- For a range of functional purposes
- To stimulate language development
- Enable individual to (learn to) meet their varied communication requirements

Varied communication functions

greet   manipulate   **relate information**

agree / disagree   answer   ask questions

instruct others   ask for things   joke

express an opinion   share information

express feelings   protest   describe

discuss interest   "make social contact"   bargain

comment   request / attract attention   complain

Purpose of AAC

To enable the person to meet all of his/her varied **communication requirements** as
- intelligibly
- specifically
- efficiently
- independently
- in as socially valued a manner as possible

To understand others and to be understood.

Porter, 1997

Different types of vocabulary
Beukelman & Mirenda, 2013

- Coverage and developmental
- Core and Fringe (extended)
- Messages of conversation
  - Greetings
  - Small talk
  - Narration: story telling & Public speaking
  - Procedural descriptions
  - Content-specific conversations
  - Wrap up remarks and farewell statements

Selecting Vocabulary for AAC systems

- Core vocabulary approach

- Developmental approach

- Environmental approach

- Functional communication approach

Banjee, DiCarlo & Buras-Stricklin (2003)

Core Vocabulary

- Frequently used across contexts
  - Needed throughout life

- Approx. 70 - 80% of what we say uses the same 200 core words
  - Depends on size of core and sample
  - Range of word types

- Common core / individual core

Core vocabulary approach

- Use common core vocabulary lists, e.g.
  - Grove & Walker (1990) Makaton key word sign
  - Banagee, DiCarlo & Stricklen (2003) Toddlers
  - Marvin, Beukelman & Bilyeu (1994) Preschoolers
  - Balandin & Iacono (1999) Adults at mealtimes
  - Stuart, Beukelman & King (1997) Seniors
  - Hill (2001) Fluent Adult Augmented communicators
  - Boenisch & Soto (2015) School age children
  - Etc, etc, etc
- Need to consider the similarities of the sample group to the individual
- Use other approaches to determine individual core and fringe vocabulary

Australian English – pre-school Core Vocabulary

you	I'm	get	here	up	out
I	in	what	he	just	big
the	this	look	gonna	can't	did
it	me	yeah	not	well	down
a	to	there	hey	I'll	of
no	one	we	it's	that's	were
and	do	is	got	c'mon	like
can	go	your	are	um	where
that	on	don't	oh	now	ah
my	have	let's	put	out	be

Trembath, Balandin & Togher (2007).
Vocabulary Selection for Australian children who use AAC
Journal of Intellectual and Developmental Disability 32:4, 291-301

Australian English – pre-school Core Vocabulary

Typical spoken language development 4 years

- Mean Length Utterance **MLU = 5.00 plus**
- **% of complex sentences 20% plus**
  - Expansion and increase in diversity of vocabulary continues throughout life.
  - Tense and number for verbs auxiliary and copula continues to develop.
  - Conjunctions expanding to include because, when, so
  - Sentences containing more than one type of complexity

Toddler US English Core Vocabulary

First 30 Words:

1. again	11. I	21. out
2. all done	12. in	22. put
3. away	13. it	23. some
4. big	14. like	24. stop
5. do	15. little	25. that
6. down	16. mine	26. there
7. get	17. more	27. up
8. go	18. my	28. want
9. help	19. off	29. what
10. here	20. on	30. you

©VanTatenhove, 2005

Banajee, M., DiCarlo, C., & Buras-Stricklin, S. (2003).
Core Vocabulary Determination for Toddlers,
Augmentative and Alternative Communication, 2, 67 - 73.

Top 10 first words
(excluding "mama" & "dada")

CDM	MTurk	Psycholinguists	Wordbank
Ball	**Dog**	Up	Baa Baa
Hi	No	More	Uh–Oh
Dog	**Ball**	**Hi**	Yum Yum
Uh–Oh	Bottle	**Cat**	**Woof Woof**
Duck	**Hi**	**Bye**	**Hi**
Car	**Bye**		Vroom
No	Kitty		This
Cat	Baba		Meow
Bye	**Cat**		Bottle
Up, More	Milk		**Ball**

Schneider, Yurovsky & Frank (2015).
Large scale investigations of variability in children's first words
First published: annual meeting of Cognitive Science Society 2015
https://langcog.stanford.edu/papers/SYF_underreview.pdf

Developmental vocabulary

Bloom (1993) suggests 3 main principles guiding word learning in spoken language development.

1. Relevance (relevant to current interests)
2. Discrepancy (enable description of events not known or evident to listener)
3. Elaboration (as children's mental representations expand, need words to express the complexity of the ideas that are represented).

Developmental approach
(Fristoe & Lloyd, 1980; Holland, 1975; Lahey & Bloom, 1977; Reichle, Williams, & Ryan, 1981)

- Developmental vocabulary lists
- Words chosen from developmental language inventories that have been developed on the basis of language acquisition principles.
- Development of different word forms (e.g., nouns, verbs), phrase and sentence structure
- Number of words that children typically use at a certain age or developmental level
- Typical development of semantics, syntax and morphology

Development of semantics & syntax

Core vocabulary	One word
• You have to go now	• go
• I can do it	• Me
• I see a dog	• dog
• You will do it	• you
• I will not do it	• no
• What is that?	• that?
• The lawnmower is on	• lawnmower

Development of semantics & syntax

Core vocabulary	Two words
• You have to go now	• you go
• I can do it	• me do
• I see a dog	• see dog
• You will do it	• you do
• I will not do it	• no do
• What is that?	• what that?
• The lawnmower is on	• lawnmower on

Fringe, extended Content* vocabulary

- Thousands of specific words, each specific word used less frequently
  - Includes coverage vocabulary
- Vocabulary related to the content of the message, topic or activity
- Content vocabulary is needed to:
  - to establish topic
  - be specific
  - express personality (via word choice)

Content* Musselwhite & Hanser

Environmental approach
(Beukelman & Garrett, 1988; Blau, 1983; Fried-Oken & More, 1992; Karlan & Lloyd, 1983; Mirenda, 1985)

- Ecological inventory process
- Looks at individual's communication requirements in the context of his or her life and lifestyle (activities)
- Words appropriate for individual's specific communication environments (i.e., fringe vocabulary) are identified
- Fringe (content) vocabulary is specific to each communication environment

Functional communication approach

- Select vocabulary to express a range of pragmatic functions
  - people need to communicate for same purposes using AAC as for speech
- May use typical development of pragmatics to guide the functions to be expressed
- Specific vocabulary, related to individual, determined by the team for each function
  - E.g. Request action – what actions may this individual want to request?

Development of Pragmatics

- 18 months spoken language development
  - attention seeking
  - request objects, action,
  - request information
  - reject, protest
  - greet
  - name
  - responds/ acknowledge
  - inform (draw attention to something)
  - comment on action / object (opinion)
  - answer

Communication competence for people who use AAC
(Light, 2003; Light & McNaughton, 2014)

Sufficient knowledge, judgment and skill
- linguistic competence
- operational competence
- social competence .
- strategic competence

Psychosocial factors
- Motivation
- Attitude
- Confidence
- Resilience

Goal: "to be more interesting"

- Varied vocabulary and messages
- Personality
- Style
- Relatedness

Need both core and content

"I want to go there"

"I want to go to Australia"

Vocabulary organisation core and content

- Fast access to core vocabulary for use
  - within context, established topic
  - combined with content in multiple messages

    AND
- Content vocabulary to express a range of messages
  - Frequently used content (coverage)
  - Occasionally used content
  - Rarely used content

Pragmatic approach
(Porter, 2007)

- Uses a combination of developmental, ecological, functional communication and core vocabulary approaches.
- Vocabulary for autonomous communication
  - Selecting vocabulary for partners to model – individual selects the words they want to use from the vocabulary modeled and made available by others
- Strategies to "collect vocabulary" during interactive communication
  - Use of generic templates, LISTS, blank spaces
- Considers multi-model communication & influence of the AAC form on vocabulary requirements
  - Efficiency, pragmatic use, strategic competencies

Aided language form

- No intonation
- Cannot produce actions / gesture at same time as say WORD
  - Would have to do sequentially
- Voice output? (electronic / non-electronic)
- Vocabulary has to be predicted and made available in physical form
- Vocabulary has to be laid out spatially
  - Cannot access all words on one level
- Speed of communication

Single words

- Single words to produce spontaneous, novel messages
- Single words needed for language development
  - Combining words to create different meanings
- Single words –can be used more flexibly
  - Meaning interpreted from the context
  - Partner expands for language development
- SNUG Spontaneous Novel Utterance Generation
  - http://www.aacinstitute.org/Resources/Press/ AssessmentModelpaper/aacsucc.html

Phrases and prepared messages

- Phrases to increase rate for commonly expressed messages
  - Sentence starters
  - Social messages, communication control
- Preparing and storing whole messages "ahead of time"
  - For a particular situation
  - Presentations
  - Current messages
  - Personal Stories

PODD

AARCH

Communication
- Autonomy
- Accessibility
- Requirements
- Competence
- Habits – for communication AT ANY TIME

Generic templates
Porter, Tainsh & Cameron (2008)

- Saves time!!
- Experienced designers - incorporate vocabulary and layout features found to be effective
- You can begin providing language stimulation immediately
- Collect individual specific vocabulary during ongoing interactions
- Provide opportunities to observe and learn with the individual.

Vocabulary, page sets

AAC system design for efficient, autonomous communication at ANY TIME

- Vocabulary pool

- Organisation of vocabulary

- AAC system features

See Porter & Burkhart (2012)
ISAAC Preconference Seminar handout
lindaburkhart.com/wp-content/uploads/2016/06/precon_ISAAC_12_handout.pdf

Vocabulary pool supports autonomous communication

- Full range of functions

- All types of vocabulary (core, content, coverage, developmental, messages of conversation)

- Language acquisition & use
  - Semantics, syntax, morphology
  - Efficiency for combining words
    - Navigation and page layout
  - Partner models and expansion
    - Planned for efficient use for discourse (multiple turns using aided language)
  - Supports development over time
    - Without completely changing system

Vocabulary & Organisation for language development

Big enough to grow into (learn), but not so big they trip over it

Goossens', Crain & Elder (1992)

Big enough to grow into (learn), but not so big they trip over it

- Development
  - Pragmatics
  - Semantics, syntax, morphology

- Aided language Stimulation
  - Supports others to provide receptive input using AAC to express genuine messages during interactions in any situation.
  - Conversational discourse using AAC

Big enough to grow into (learn), but not so big they trip over it

- Visual and motor access
  - Successful without concentrated effort on the operation
  - Juggling – When visual motor access is easier, individual can focus on communicating
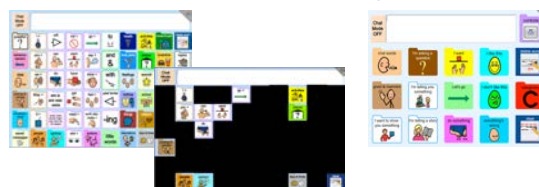
PODD

Within PODD

- Aided language development is supported through the provision of multiple page sets (communication books).

- The range of page sets reflects a developmental process as reported in the literature on both typical and aided language development.

- Page sets are selected to enable the use of aided language stimulation that leads the individual's development.

PODD
Full range of vocabulary and language complexity using different access methods and presentations

- Increasing complexity of pragmatics, semantics, morphology and syntax.

  - Early functions
  - Expanded functions
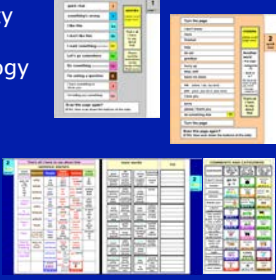 - Key word
  - Expanded key word
  - Complex syntax

PODD

Full range of vocabulary and language complexity using different access methods and presentations

- Increasing complexity of pragmatics, semantics, morphology and syntax.

  - Early functions
  - Expanded functions
  - Key word
  - Expanded key word
  - Complex syntax

PODD

Full range of vocabulary and language complexity using different access methods and presentations

- Increasing complexity of pragmatics, semantics, morphology and syntax.

  - Early functions
  - Expanded functions
  - Key word
  - Expanded key word
  - Complex syntax

PODD

Vocabulary Organization to scaffold communication at earlier stages of development and compensate for the limitations of AAC:

- Pragmatic branches
- Predictive links
- Tense clues
- Yes/no question marker
- Information chunking for narrative
- Vocabulary to manage interaction – provide feedback to partner (OOOPS)

Does the individual understand spoken language?

Two main developmental paths for aided language acquisition

1. Based on the comprehension of speech. Similar to <u>second language learning.</u>

2. Very limited or no comprehension of spoken language and acquire a communication system without reference to speech. **Independent creation of a meaning system with AAC language forms.** (similar to <u>first language learning</u>)

(von Tetzchner & Grove 2003)

Individuals who have limited comprehension of spoken language

- Need others to use a range of aided and unaided AAC modes and strategies to **support their understanding**
  - Need additional vocabulary for others to use to support understanding and language learning

- Need more models of AAC use prior to expressive use
  - Limited pre-existing understanding of language
  - Unable to re-code meaning
  - Learning AAC modes as a first language

- Support receptive language without adding too much complexity to the AAC display for the individual

Vocabulary pool supports autonomous communication

- Enables individual to **select** the words they want to say from the words they hear/see used around them

- Allows for **individual style**

- Strategies to **collect new vocabulary** "on the spot"

Porter & Burkhart, 2012

Strategies to collect vocabulary

PODD Books
- LISTS

Electronic PODD
- Blank spaces to collect vocabulary

Vocabulary pool supports autonomous communication

- Communication management, breakdown and **repair strategies**

- Strategies to manage **limitations** of aided AAC, e.g. I'll give you a hint

- Considers individual's **multi-modal** communication strategies

- Able to (learn to) **spell** own messages

Porter & Burkhart, 2012

Vocabulary organisation supports more efficient, autonomous communication

- Access to vocabulary ALL THE TIME for communication at ANY TIME

- Considers pragmatic use
  - Discourse patterns for different functions
  - Real world interactions

- Supports both individual and partner use (interaction)

Porter & Burkhart, 2012

Vocabulary usage patterns

- Vocabulary usage patterns also influence the most efficient organisation of large vocabularies within personal AAC systems.
- Different approaches to vocabulary organisation in AAC systems are more (or less) efficient for different vocabulary usage patterns.
- The purpose (pragmatic function), current language skills and environment will all influence the most efficient organisation for individual to generate their autonomous message.

Vocabulary usage patterns

Vocabulary Organisation

- Accommodate for differences in aided form
  - Non-electronic PODD book & Electronic PODD page set on speech generating device

Similarities (transparency) support ease of use / learning

No one taught me to communicate "I just learned it"
(Kim at 13 years old).

How?:

Aided language stimulation during genuine interactions
- multiple environments
- multiple partners
- robust language system

•Development over time
- pragmatics
- semantics
- syntax
- morphology

When considering the range of approaches to vocabulary selection and organization we need to remember the purpose of AAC to enable the individual to autonomously communicate to meet all of their varied communication requirements.

Combining multiple approaches for vocabulary selection and organisation are needed to enable the individual to efficiently select the words they require to say what I want to say, to whoever I want to say it to, wherever, whenever I want to say it, however I choose to say it!

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