Augmentative Communication News

INSIDE THIS ISSUE . . .

UPFRONT

Measurement! *Ready or not, like it or not, here it comes!* In the 1990s, opportunities for individuals with disabilities will continue to increase. So too, I expect, will the competition between and among disability groups for the limited governmental, public, and private support for assistive technologies and related services. Funding levels, however, are not likely to expand given the world economic situation. This should worry us!

Funding agencies, governments, administrators will expect "proof" that AAC services and technologies make a "functional," "measurable," and "cost beneficial" difference in the lives of citizens. Our opinions and testimonials do not constitute "proof." Proof is "in the pudding" *(so to speak)*. It's time to write the recipes and measure the ingredients to insure those with severe expressive communication disorders get their "fair share."

The decision to cover the topic of measurement in an issue of ACN is risky. The word conjures up associations of dread, guilt, frustration . . . I know, because I experience them also! However, the **issue** of measurement is not going away. So we might as well face it.

First, let's examine a framework within which functional status measures and rehabilitation outcomes in AAC may be considered.[1,2] Table I illustrates the classification scheme many feel *(cont. page 2)*

For Consumers
Societal Rehabilitation

In this section we examine attitudes of individuals in the community toward those who are disabled. Research tells us (in case you didn't already know) we have a problem!

An "attitude" is defined as "a general and enduring positive or negative feeling about some person, object, or issue."[6] Attitudes are comprised of:[7]

Beliefs (information about people, objects, or issues that result in a positive, negative, or neutral evaluation);

Affects (emotional feelings connected with beliefs); and

Behaviors (overt actions toward people, objects, or issues)

Adult attitudes

Warrick[5] and Gorenflo[6] summarize pertinent literature on attitudes of adult persons toward people with disabilities:

1) people look upon "the disabled" as a group whose main characteristic is their disability rather than their individuality. They respond more positively to certain types of disability than others.

2) Although verbalized attitudes may be "mildly" favorable, "evidence" suggests unverbalized attitudes are more critical.

3) Adults with generalized discriminatory attitudes towards minority groups are persons who show high anxiety and low self-esteem themselves.

4) People's rejection of a "disabled" person diminishes with increased exposure.

Children's attitudes

Attitudes of able-bodied children toward disabled children are a vital component of successful integration of special children in the schools. Initial research suggested that children with disabilities, like adults, *(cont. pg. 2)*

Upfront (from page 1)

Table I. World Health Organization's Classification of Disorders[3]		
IMPAIRMENT (*Disease/condition*)	**DISABILITY** (*Effect on daily activities*)	**HANDICAP** (*Effect on opportunities; Perception of community*)
Broken leg	Minimal (bathing, bus)	None (may even be an advantage in the bar of a ski lodge!)
HIV virus/Aids	For years, not ill; thus, no disability	Catastrophic (may lose job, health insurance, etc.)
Dysarthria, quadriplegia secondary to cerebral palsy	Unable to carry out most daily activities without assistance.	May be perceived as retarded. May be deprived of educational vocational, independent living opportunities.

"should form the underlying framework for evaluating the context of technology utilization (provision of technology services.)"[4]

A broken leg can be "fixed" or "cured," whereas some diseases and many conditions (e.g., cerebral palsy) persist and require intervention throughout a person's lifetime. AAC goals are always aimed at decreasing disabilities by enabling people to carry out daily tasks (e.g., expressing basic needs, conversing). But, communication is not an end. It is often a means to an education, to social and vocational opportunities, to creativity, self discovery, independence, and feelings of self worth. Many AAC professionals now see "individuals more challenged by social/relational inadequacies than by limitations imposed by their physical and/or cognitive functioning."[5] Thus, AAC interventions aim to reduce socioeconomic barriers that cause handicaps.

For Consumers reviews the literature on attitudes of able-bodied persons toward those with disabilities and discusses ways to measure and change attitudes. It also focuses on the need for AAC professionals to know more about what consumers (i.e., individuals who use AAC techniques and their caregivers) think and feel about AAC tools and techniques.

In preparing **Clinical News**, I spoke with 19 professionals about what variables and approaches they use to measure the effects of AAC programs and AAC interventions with individuals. Some current practices may help lead us to more meaningful, manageable ways to measure. . . Mmmm!

The **University/Research** section highlights the Trace Research and Development Center at the University of Wisconsin. Then, it's on to **Equipment** where you'll read about the field of Human Factors/Ergonomics as it relates to AAC. Thanks to all I interviewed, including 8 communication aid manufacturers, for sharing information about how products are currently developed. Finally, this issue has a brief **Governmental** section, just to remind us of its role in measurement.

Spring has sprung in Monterey, California. Gary Poock (ACN publisher) and I hope you are taking time to smell the flowers. We are (now that this issue is in the mail)! For those planning to attend the RESNA/USSAAC conference in New Orleans (June 25-30), I hope to see you there. Remember the Hotline number is (408) 649-3050. Let us hear from you!

Societal Rehab. (from page 1)

were perceived in negative ways by able-bodied peers.[8] A recent epidemiological community-based study carried out by McMaster University and Chedoke-McMaster Hospitals in Canada corroborates some previous findings, challenges others, and adds additional information. To summarize:[9]

1) Gender seems to play a role. Females have more positive attitudes toward peers with disabilities.

2) As with adults, familiarity results in more positive attitudes.

3) Unlike adults, a child's feelings about himself and how he is judged by peers does not seem to affect his/her attitudes toward those with disabilities.

4) The nature of a disability (e.g., mental retardation, physical handicap) does not seem to influence attitudes.

5) There is no significant correlation between parent and children's attitudes. However, children whose mother's native langauge was English expressed more positive attitudes.

6) No differences were found between the education and socioeconomic status of parents and their children's attitudes.

Able-bodied speakers' attitudes toward AAC aids and techniques.

Studies that address the attitudes of able-bodied children and adults toward various AAC aids and techniques, and toward individuals who use them, are difficult to compare. Some measure attitudes and preferences of subjects after a brief exposure (e.g., watching a video) to someone using AAC techniques. Others study the attitudes of people who are "sensitive to" or have interacted directly prior to or during the study with a person who uses AAC. Research questions have addressed attitudes toward different output modes (*synthesized speech vs. communication aid vs. alphabet board vs. print vs. impaired speech and gestures*), as well as attitudes toward individuals themselves. Findings suggest:

1. After a brief exposure, adults who are not familiar with AAC express significantly more positive attitudes toward persons who use high technology than those who use non-electronic or unaided approaches.[6]

2. Unfamiliar listeners express negative attitudes toward most

synthesizers in communication aids. However, Crabtree[10] recently found that while younger and older subjects continue to prefer a "natural voice that is age and gender appropriate," subjects rated two newer synthesizers as "acceptable" (Smooth Talker 3.0 in the Touch Talker and ACS's Real Voice (female).

3. More "sensitized" and familiar partners prefer communication boards to high tech aids because they can be more actively involved in the communication process.[11,12]

Attitudes of individuals who use AAC

While the perception of "able-bodied" persons has received some attention, few systematic attempts have been made to determine what individuals who use AAC techniques and their caregivers **believe**, **feel**, and **do** as a result of the attitudes they have about AAC intervention.[13] For example, even though the "community" may be more willing to interact with those who use technology, electronic aids may not be the favored choice for some. Harrington[14] quoting from McDonald's book Re-inventing the Wheelchair writes, "*If technology made me normal, it would be great; as it is it makes me slower and less efficient and reduces the time I would otherwise spend with nondisabled people . . . I think most (AAC users) use technology because they've been brainwashed . . .*" Ouch! **I sure hope not!**

Measuring Attitudes.

Here's a list of some available attitude scales for which reliability and validity are well established:

1) Chedoke-McMaster Attitudes toward Children with Handicaps (CATCH) scale and the Parental Attitudes toward Children with Handicaps (PATCH)[15]

2) Measurement of Attitudes Toward Individuals with Severe Handicaps (ATISH) Scale[16]

3) Attitudes Toward Nonspeaking Persons Scale (ATNP)[6]

Other useful published tools are the Child and Adult Rating Scales in PACT.[17]

Changing Attitudes

Strategy #1. **Buddy Program.** Rosenbaum and his colleagues reported that a "buddy" program changed attitudes more effectively than an educational program (i.e., "Kids on the Block.")[18] Gender-matched pairs (a disabled child and an able-bodied peer volunteer) met at least 1x weekly during school for a 3-month period. At the end of the program, the able-bodied peers who participated in the Buddy Program expressed significantly more positive attitudes. At follow up (three years later), these differences were still significant.[19] That's good news!

Strategy #2. **Social Interaction Training**. Aveno[16] reported that able-bodied adults, who participated in a training program and had an opportunity to interact with adolescents with severe disabilities at a picnic, formed more positive attitudes than adults that did not receive training. Training included: information about community integration, videotaped examples of interaction, strategies on how to facilitate interaction with someone who has a severe disability, and involvement in role playing situations.

Strategy #3. **Written information**. Gorenflo[6] provided written information about a man with cerebral palsy using AAC techniques to one group of college students prior to viewing a videotape. This group expressed significantly more favorable attitudes than the group that viewed the tape without receiving prior information.

Strategy #4. **Social Competency.** Persons with disabilities clearly play a role in affecting attitudes and behaviors within their own community. Thus, the development of communication competencies and social skills are critical. Schools and community professionals can provide opportunities for people with disabilities to develop these competencies and for others to learn about and interact with people with disabilities.

As Aveno[16] states, "community integration is not assured, simply because the community is now accessible . . . or *(an individual's daily living skills are)* enhanced. Community integration requires that normalized, respectful social interactions take place with other community members . . ." This often requires societal rehabilitation or "retracking," i.e., *discarding cumulative and unhelpful stereotypes, both over-positive and over-negative, in a search for a more authentic mode of perception, reflection and social action.*[20] AAC professionals are in a position to provide opportunities and to act as role models, promoting friendly and accepting atmospheres for individuals with communication disorders.

Clinical News
M & Ms: Meaningful manageable, measurement

Professionals need to measure the effects of their AAC interventions with individual clients and the effectiveness of their AAC programs. This is not disputed. Why then, does the topic make us uncomfortable? And, what's to be done?

To address these questions and explore the state of the practice, I interviewed 19 professionals (*12 speech-language pathologists, 4 educators, 2 occupational therapists, 1 psychologist*) from 16 different facilities in the U.S. and Canada.[21] A majority of those interviewed work almost exclusively with AAC clients. Most (75%) serve all ages and disability types; others work only with children. One questionnaire per facility was completed (N = 16). Facilities were described as multifunctional and included: Schools (9); Rehabilitation centers (4); Out patient clinics (4); University clinics (3); Agencies (3); Hospitals (2); Private practices (2); Assistive device centers (2); Workshop (1); Day treatment program (1).

Measurement of program effectiveness

Only 38% of the facilities specifically measure the effects of their AAC program. Most who do are required to by State departments of education. Others measure to "fulfill quality assurance" and "make sure what we do is relevant and functional." Some say they "indirectly" measure effectiveness by monitoring their funding levels and/or number of referrals.

The major barrier to measurement at this "macro-level" seems to be a lack of incentive. Because program effectiveness measures are typically done once a year, the process is not considered "time consuming." Those who do measure report results are both rewarding and helpful. Here is an example, *which administrators like,* of how measurement saved staff time and money:

The Hugh MacMillan Center in Canada emphasizes facilitator training. Originally, this training was done in small groups. Staff began to question whether training should be more individualized. Prior to deciding which way to go, they administered a short questionnaire to facilitators

Table II. Variables and Measurement Approaches: Macro-Level

Variables Currently Measured	Measurement Approaches
Types of services provided	Review of data from charts
Types of aids recommended	Patient contact/referral information
# and type of clients served	Peer review of prescriptions, strategies, selected clients
# of clients who now use recommended aids	Single subject research designs
# of workshops presented, cost per person	Group process techniques (e.g., Yearly staff retreat to review program and set goals)
# of information requests	External evaluation (Advisory boards)
Professional satisfaction (Was report received? recommendations understood? implemented?)	Questionnaires, mailed or phone interview (see For Consumers)
Client satisfaction	
Parent/caregiver satisfaction	

Figure 1. Measurement Problems

who had completed training.. Results? Group training was just as effective![2]

Table II lists some of the variables and approaches currently being used to measure program effectiveness.

Measurement of the progress and outcome of individual clients

All respondents "measure" the effects of intervention with individuals. Although everyone is "doing it", only 56 percent say they are "required to" by federal and state law, funding and accreditation agencies, or administrators. Primary reasons given for "micro-level" measurement were to: *1) monitor progress so as to modify intervention strategies; 2) determine outcomes; and 3) provide required documentation*.

Respondents listed 40 problems they encounter in measuring the effectiveness of intervention with individuals. These are illustrated in Figure 1.

* 1. Time and Money. Time (to develop and implement measurement protocols) and money (people to do it).
* 2. Validity of measurement. Current measurements are "too subjective." Professionals want to measure functional changes and operationalize communicative competence.

* 3. Reliability of measurement. Major concerns are: a) the inconsistent performance of individuals who use AAC and b) problems collecting reliable data. Respondents also are struggling with how to deal with multiple behaviors occurring at one time.
* 4. Tools. The lack of validated measurement tools.
* 5. Service delivery model. Professionals at AAC centers find it difficult/impossible to measure effects "where they count, i.e., in the home, community and school settings."

Despite these problems, respondents currently measure a large number of functionally-oriented variables, as reported in Table III. Note also the list of measurement techniques being used. To summarize, respondents do not find standardized tests useful in measuring the effects of AAC interventions. Professionals rely on informal approaches to monitor progress and measure outcome (i.e., verbal reports in hallways, classrooms, phone calls). Although video/audio tapes are collected, they are <u>almost never analyzed</u> because it is "so time consuming." Tapes are used for a quick "eyeball" of progress, or for training purposes. Online observations of behavior are used by more than 80 percent of those interviewed. While professionals find
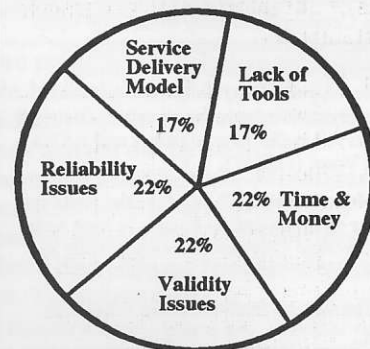
these direct observations valuable, few collect information systematically. The prevailing practice is to describe rather than count or time target behaviors.

Questionnaires, checklists, and pre/post measures (e.g., needs assessments; baseline/repeated measures) are used also. Respondents feel they result in much more meaningful and useful information because of the objective data they provide.

Criterion-based measures prevail in U.S. schools because objectives (I.E.P.s) are written in this form. For example:

During 4 out of 5 visits to McDonalds, Robin will appropriately order lunch (after 1 physical prompt) using a miniboard.

Measurement guidelines

Progress and outcomes with individual clients are not necessarily reflected on available scales. Realistically, there may never be validated tools measuring the effects of all our AAC interventions. Does that mean we can't measure progress, outcome, or determine the effective-

Table III. Variables and Measurement Approaches: Micro-level

Variables Currently Measured		Measurement Approaches	% Who Use
Linguistic (comprehension, written expression)	**Partners behaviors**	Informal reports	100%
Type & frequency of communicative functions expressed	# and type of partners	Video/audio tape	88%
# symbols or symbol combinations used per task	Level of support given, e.g. modelling	Online observations (descriptive)	82%
Vocabulary size	Type of linguistic behaviors		
# of different modes used (e.g., gestures, aid, etc.)	**Consumer satisfaction**	Questionnaires	75%
Social (functional uses, partners, contexts)	Parent/teacher ratings of progress	Criterion-based measures	75%
# and type of partners (familiar, etc.)	Rating of system features (speech)	Pre/post measures (designed for intervention)	69%
# and type of communication tasks accomplished in contexts	User reports re: fatigue, ease of use		
# of opportunities to communicate & resulting behavior	**Academic performance**	Checklists	56%
Type of repair strategies used, with whom, where? etc.	# assignments completed	Consumer satisfaction	31%
Time required to accomplish tasks		Standardized test results	25%
Level of support required to complete tasks (e.g., prompting)		Listener reactions	12%
Operation of Communication Aid			
Rate/accuracy/efficiency of access to aid/messages	Familiarity with device features and/or application program		
Amount of time aid used across environments	Integration with other equipment		
Level of assistance individual needs to use equipment			

ness of our intervention programs? Certainly not!

1. <u>Make measurement meaningful.</u> Professionals have a knowledge and skill base to measure effectiveness. When we need help (and we often do), we can generally find it. For example, there are several well-written manuscripts addressing measurement issues in AAC.[2,23,24,25] And, we have each other. It is time to get moving. **First, make it a priority.** Convince yourself and the "powers that be" that measurement is critical to doing your job. The purpose is not to "get it done," but to <u>learn</u> something. Don't try to measure everything. Measure only what you need to know. If you only measure 1 thing, that's ok. In the end, you will save yourself time by spending it upfront. For example:

Light[22] suggests that each time you use a new intervention strategy (or try something with a new population) take the time to focus on how you plan to measure whether the strategy is effective. Talk to colleagues and get their input. Then try our your tool (might be an observation check list or a questionnaire). Modify it, try again until you have a reliable way to reflect changes you are looking for. And, you (and your colleagues) can use it with other clients working toward similar goals!

Romski and Sevcik[26] have refined 3 tools to measure progress and outcome with their moderate to profoundly retarded students. One scale assesses information about a child's pattern of use, another, the partners' perceptions of progress, and the third measures the child's symbol knowledge.

2. <u>Make measurement manageable.</u> **How often do you expect change to occur?** The answer may be weekly, monthly. That's when you measure! If you do not see change, it is time to modify your program. If someone else collects the data, train them to do it reliably. Again, upfront planning will make the difference. Some tools are:

<u>A protocol for the assessment of the communicative interaction skills of nonspeaking severely handicapped adults and their facilitators.</u> Easter Seal Comm. Inst. 24 Ferrand Dr., Don Mills, Ont., Canada M3C 3N2

<u>Clinical Resource Manual.</u> Contact Kathy Lee (416) 424-3805

<u>Communicative interaction between aid users & others- An IPCAS study report.</u> (Toronto: Canadian Rehab. Council.)..

Note: Boyce et al.[27] in Ontario have an instrument to measure relevant aspects of the quality of motor function in children with cerebral palsy and are currently validating it.

The Trace Rehabilitation Engineering Center (REC) on Access to Computers and Electronic Equipment is part of the University of Wisconsin-Madison and perhaps the best known of all NIDRR funded RECs. It is located in the Waisman Center and benefits from the administrative, financial, and technical services and academic and research resources within the University. Trace has maintained a leadership role since its inception in 1971. Its mission and challenge are to help society avoid inadvertently making itself inaccessible to those with disabilities. For example, new input devices (e.g., mouse, lightpen, touchscreen) and graphic-based screen displays hamper usability by individuals with movement, sensory, and/or cognitive impairments.

Trace's Director, Gregg Vanderheiden, Ph.D., has degrees in Electrical, Computer, and Biomedical Engineering, and Technology in Communication Rehabilitation and Child Development. He also brings expertise in Human Factors Engineering and years of clinical experience to the field.

The Trace staff (15 professionals plus students, secretarial and clerical personnel) are affiliated with: Departments of Industrial Engineering, Rehabilitation Medicine, Occupational Therapy, Communication Disorders, Psychology, Educational Psychology, Health Systems Engineering, Physical Therapy, and Electrical and Computer Engineering.

The cross fertilization process within Trace extends beyond Madison to collaborative relationships with multiple Centers, universities, professional and consumer organizations, manufacturers and researchers throughout the world.

The Center's major goal is to *"design and develop alternative access systems for standard computers and electronic devices."* Objectives include influencing the development of new products by industry to insure maximal access, and developing special interfaces or accessories to enable persons with disabilities to use standard products.

Plans for the next 5 years focus on accessibility issues for individuals with movement, sensory, cognitive and multiple impairments. Trace is also expanding its active dissemination and training program.

1. **Movement Impairment:** Project managers: G. Vanderheiden, R. Radwin; Team members: Y. Hu, D. Kelso, M. Lin, and R. Smith. Staff will develop alternate input techniques for newer, continuous movement input devices (e.g., mice, touch screens). To do so, information will be collected about what movement patterns (e.g., clicking, dragging) are used how often (e.g., 1x per day vs. every 5 minutes) to operate various input devices. Usage patterns of non-impaired and disabled subjects on standard tasks using discrete (i.e., keyboard) and continuous (e.g., mouse) input devices will be tracked and used to evaluate the importance of speed and accuracy during various tasks. The efficiency with which disabled individuals use special interfaces will be compared to the performance of able-bodied persons on standard input devices. A General Input Device Emulating Interface (GIDEI) is being developed for use with the MacOS, AUX/2, DOS, OS/2, UNIX, etc.

2. **Sensory Impairment:** Project managers: G. Vanderheiden, C. Lee; Team members: J. Gunderson, D. Kunz, K. Johnson, J. Schauer, C. Thompson. In October, 1988 Trace hosted a State-of-the-Art and planning conference in an effort to coordinate visual impairment research and development. As a result, several commissioned papers will be assembled in a post conference publication. Currently, the project team is exploring alternate display techniques and working on an interface which would allow individuals with severe visual impairments to use the MacIntosh and OS/2 Presentation Manager.

To insure continued access to new technologies for those with severe hearing impairments, Trace is working in cooperation with Gallaudet College to design guidelines for standard products to provide alternate presentation of information from computers (e.g., a visual rather than auditory beep, when you make a mistake).

3. **Cognitive Impairment:** Project manager: C. Cress; Team members: C. Goltz, J. Miller, K. Odell, G. Vanderheiden. Obviously, access to computers (and communication aids) is not simply a sensorimotor task. This project will result in a "State-of-the-Art" paper and bibliography that identifies and quantifies cognitive factors affecting control of interface techniques. A task complexity hierarchy for computer interfaces also will be tested.
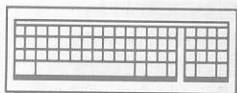
Equipment
The Human Factors of AAC

Many are unfamiliar with what manufacturers go through in developing communication devices. This article may help you better understand the manufacturing process, as well as the related field of Human Factors.

Human factors engineering/ ergonomics (HF) is a branch of science and technology that serves as a source of data and principles on human performance that can be validly applied to the specification, design, evaluation, operation, and maintenance of products and systems."[28] HF professionals *(many are experimental psychologists and industrial engineers)* are concerned with all aspects of the human in its environment. They are educated and trained to consider the capabilities of the human visual, auditory, information processing, and muscular systems. They know what happens to the body under various environmental conditions and are trained to design systems and equipment around the user's needs. While few HF professionals are knowledgeable about AAC, their ability to assess user needs with a fair degree of precision and translate those needs into specific recommendations for designers, developers, researchers, and practitioners is of value to us.[29,30]

Shein[31] says there is a "tremendous amount of work in HF that relates to AAC. He specifically points to the areas of Operations Research (which has developed techniques and models to aid in decision making), Man-Machine Interaction, and Graphic Design (a field that deals with designing visual displays). He (and others with whom I spoke)[32] generally feel AAC professionals should become more aware of what exists in industry and other fields, particularly in the area of Human Factors. We can all agree that "reinventing wheels" makes no sense.

Large companies like IBM and Apple employ HF professionals to assist in all phases of product design, development, evaluation and training. However, small companies, including those who manufacture communication aids (CAs), typically do not.

To learn more about how companies develop CAs, I interviewed 8 manufacturers.[33] Smaller companies employ 6 to 10 people, while larger companies employ up to 85 people directly involved with CA manufacturing. Only 1 company currently employs an HF professional (on a consultative basis). One manufacturer reports having HF training. Half of the respondents indicated familiarity with HF (defining it as man-machine interaction). Others said "What's that?"

Nearly all respondents replied, "Yes . . . but" to the question *"Does your company follow a formal research and development (R&D) process in developing equipment."* Because R & D takes time (and time IS money), CA manufacturers tend to depend on the observations, experiences, and opinions of their staff, distributors, master clinicians, and to a lesser degree clients who "show an interest." CA manufacturers can not afford to spend the time (or money) larger companies do to bring a product to market. Here's an overview of the process they go through:

1. **IDENTIFY AN UNMET NEED.** Ideas may come from individuals in the company and from the field.

2. **CONDUCT MARKET RESEARCH.** Is it a feasible product? Although 75% say they "depend on research data" when making decisions, "data" are empirical, i.e., largely based on experience. A few mentioned keeping in touch with researchers at universities and rehabilitation engineering centers. Respondents "keep up" by reading. Publications mentioned were: AAC (63%); Communication Outlook (63%); Closing the Gap (50%); Communicating Together (38%); Technical Journals (e.g., NASA reports, Electronics Today, etc.); Professional organization publications (e.g., ASHA, RESNA, TASH, UCP, CEC); Electronic mail networks (CONFER); NARIC, Product catalogs; Book reviews; and of course, Augmentative Communication News (I am proud to say that all, but 1, are ACN subscribers!)

3. **SET PRIORITIES.** Based on market and product research, decisions are made and priorities set. Larger companies assign CA projects to teams.

4. **DESIGN AND MAKE A "MOCK-UP."** Engineers design and "mock up a prototype," which (at this stage) often doesn't resemble a device. Clinicians/teachers and users are rarely involved at this stage. However, one company has a Users Group comprised of 6 consultants; another company has a full-time employee who uses a CA and is available to consult with the design team. Five respondents (63%) stated they consider "anthropometric data." However, the data they use is "experiential." Note: Anthropometrics is concerned with the static and dynamic measurements of the body and its range of capabilities. Much data is available to describe the "able-bodied" population. For example, airplane manufacturers design the cockpit around the physical dimensions of 95% of young, adult males. This type of data is needed to describe various disabled populations so manufacturers have a database on which to rely when designing new products.

5. **"ALPHA TEST."** The initial "mock up" is evaluated internally (with occasional input from distributors or a Users Group).

6. **"BETA TEST."** In this second stage, companies depend on distributors and master clinicians for feedback, which is often received at conferences and during demonstrations. Manufacturers may send 5-15 prototype aids to distributors, AAC Centers, and occasionally to users. Three companies (38%) ask evaluators to fill out a brief questionnaire. Most rely on more informal ways of receiving feedback, i.e., phone.

7. **PRODUCE A "LIMITED RUN."** Companies again modify the device. Then, they prepare to market it. Initially, only a limited number of devices are made and sold. This limited "first run" often serves as a kind of "field test." If problems are discovered, they still can be easily corrected.

8. **MANUFACTURE AND MARKET:** This is the part of the manufacturing process most AAC professionals are familiar with. Companies actively sell their finished product, distribute catalogs, exhibit at conferences, do demonstrations, provide training, and so on. They all have service departments; some have 800 numbers to provide support. "If problems are serious, we respond immediately; otherwise changes are made periodically (or when there's time)."

In response to the question *"Do you feel your CA products are being used appropriately,"* only 25% responded unequivocally "yes." Seventy five percent feel at least some products are underutilized or inappropriately used. Reasons cited include:

* Limited knowledge of equipment by clinicians

* Goals not being properly set by clinicians who become focused on the equipment rather than teaching it as a tool that can help accomplish communication tasks.

* Inappropriate purchases, e.g., device may be bought because of cost factors rather than to fit an individual's communication needs.

* Poorly designed/inadequate vocabularies (both with regard to content and form)

* Poor seating or inoperable switching mechanisms, making the CA too difficult to operate.

Available follow up studies support the need to improve the actual

use of recommended communication aids. For example, Culp's followup study[33] reported very limited use of aids by many adults and children.

One problem I observe is a tendency for prescribers to recommend equipment based on their own familiarity and comfort with a particular device or company, rather than on a thorough knowledge and consideration of all the options. Because CAs are far from "transparent," prescribers must make sure training is not only available, but provided until operational and communicative competencies are achieved.

Note: Assessment and prescription are not the focus of this article, however, clinical tools that may help us make these complicated decisions more responsibly are becoming available. If you want information, use the Hotline. We will cover the topic in a future issue of ACN. No room here, sorry!!

Some responded "yes" and others responded "no" to the question "*Do you have a mechanism in place to assess consumer satisfaction and device performance after purchase.*" Here's the 2 mechanisms all use:

1) Listen to reports from distributors and others.

2) Take phone calls from the field. Note: Phone calls appear to fall into 4 categories: requests for repairs, complaints, confusions, and a need for education. Most companies do log phone calls. One has a computerized database so information specific to each device/product can be reviewed periodically.

Obviously this "no news is good news" approach is likely to provide an incomplete and possibly inaccurate view of consumer satisfaction and device performance.

All but one company anticipates changing how they do things in the 1990s. As one respondent said, "It is a changing business. It's hard to know when things will change, but, they will." Planned changes include: increasing the use of training videos, adding TV advertising, setting up a distributorship, making devices more transparent (i.e., to decrease the time required to provide training), and assessing consumer satisfaction in a "more systematic way."

I asked each manufacturer, "*If you could add 1 professional to your staff, what expertise would they bring to your company.*" Three would hire a speech pathologist (1 with a degree in Business). Others want an Engineer (with a strong background in AAC), a general purpose individual that is creative and an "open ended thinker," an Operations manager, or someone with expertise in vocational rehabilitation.

Might I also suggest a HF professional. In the 1990s, companies that make assistive technologies may be asked to follow certain equipment design standards and/or have equipment evaluated and approved for placement on a "list" for a funding agency.

Competition is increasing. As the number of individuals with dis-

abilities increase, so too will the attention of industry to the generation of data about disabled populations. Some are predicting "design tools and evaluation methodologies equivalent to those used in developments for the able-bodied population will begin to be used."[34]

People with disabilities are "on a march towards greater independence, self determination and integration. Technology will have an increasing role to play, especially within community, educational, and vocational environments."[34] The 1990s shall undoubtedly continue to challenge us all.

ATTENTION

CEUs: To subscribers around the world who are planning to receive ASHA CEUs. In the November issue of ACN you will receive the CEU Test. Don't throw away any issues. You are going to need them!

USSAAC First National Conference is being held in conjunction with the annual RESNA Conference in New Orleans, June 25-30, 1989. USSAAC members pay reduced RESNA rates. For information call (202) 857-1199.

Comments

January issue on Literacy. **Paula Cochran (816-785-4677)** sent a handout "*Survey of talking word processors and applications in speech-langauge pathology.*" The authors compared desirable features of 5 software programs. Very useful. Thanks.

March issue erratum. CATT information is available from *F. Keep Co., 22501 Mt. Eden Rd., Saratoga, CA 95070.*

Governmental
AAC's Piece of the Pie

Countries around the world are increasing their commitment to individuals with disabilities. Motivating forces are both humanitarian and economic. Technical solutions to problems caused by disabilities can lead to less dependence and care.

In Sweden, a person who needs a device contacts the Technical Aid Center in his community. These Centers have the expertise to analyze needs and recommend approved augmentative communication aids and other assistive devices *free of charge*. Citizens are entitled to devices for school, home, or work. In the United Kingdom and Canada, some comparable situations exist. A well-known example is the Province of Ontario's Assistive Device Program. New legislation in the United States also promises to have a long awaited, positive effect on the delivery of technology to address disabilities and handicaps. Governments are paying attention. However, government agencies don't know who is qualified to prescribe and/or what devices 'best' meet needs. So, when they accept responsibility for providing assistive technologies to citizens, they soon institute some *quality control* measures, i.e., accreditation for facilities, certification for providers, and approval on equipment lists. The truth is. . . measurements made by professionals are increasingly going to determine whether individuals with severe speech and/or writing impairments get what they need.

(continued from page 5)

4. Cross Impairment: Project managers: G. Vanderheiden, R. Smith; Team members: J. Berliss, P. Borden, D. Kelso, C. Lee, M. Lin, C. Thompson. Work in this area includes the development of product design guidelines for accessibility to computers, consumer electronic products, software, and electronic office equipment. Standards for computers are already disseminated to companies who manufacture equipment for "able-bodied" persons.

5. Dissemination/Utilization: Project manager: P. Borden; Team members: J.Berliss, J. Gamradt, K. Johnson, D. Kelso, R. Smith, C. Thompson, G. Vanderheiden. Trace continues to provide information in printed and electronic form and give advanced workshops on computer accessibility. A 1989-90 revision of the Resource Book Series will be available this June. Reprints are also available. In addition, two user-accessible databases [TraceBase (contains information from Resource Books) and AbleData] are being developed for the MacIntosh (using HyperCard) and for IBM environments. Co-Net, a cooperative network established by Trace, will provide a mechanism for rapid and low-cost dissemination of selected electronic, public domain databases. It will include a service delivery directory. For additional information about Trace projects, contact Peter Borden (608) 262-6966. Note: Trace's REC application provided information for this article. It is well-worth reading!

31 Shein, F. (April, 1989) personal communication.

32 Al Cook, Jan Galvin, Lorie Miller, Gary Poock, Mike Rosen, Carol Sargeant, Elaine Trefler, Gregg Vanderheiden. Thank you!

33 Walt Woltosz (Words +, Inc., CA); Larry Weiss (Zygo Industries, OR); Greg Turner (AdamLab, MI); Lee Shough (Phonic Ear Co.); Barry Romich (Prentke Romich Co., OH); Jeri Hoffman (Innocomp, OH); David Gordon (Adaptive Communication Systems, PA); Dan Bensing (F.Keep Co, CA). Thanks to all.

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21 Marilyn Buzolich, Faith Carlson, Barb Collier, Delva Culp, Melanie Fried-Oken, Coleen Haney, Sue Healey, Kathy Lee, Janice Light, Dick Lytton, Nola Marriner, Pam Mathy-Laikko, Shirley McNaughton, Pat Mirenda, Barbara Read, Mary Ann Romski, Sue Sansone, Elaine Trefler, Carol Zellhofer. Thanks!

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(cont. column 1)

PLEASE FORWARD