Making Assistive Technology and Rehabilitation Engineering a Sure Bet

A comparison and contrast of leading taxonomies of assistive technology services and devices in use by State Vocational Rehabilitation Agencies

Linda McQuistion, PhD, PE, CPE; Ohio Rehabilitation Services Commission, Canton, OH; Researcher, Center on Effective Rehabilitation Technology.

Jurgen Babirad, MSA,ATP,CDRS, President - Rehabilitation Technology Associates, Kinderhook, NY; Researcher, Center on Effective Rehabilitation Technology.

Deepti Samant, MS, Senior Research Associate, Burton Blatt Institute, Washington, DC; Project Director, Center on Effective Rehabilitation Technology.

Marcia Scherer, Ph.D.; President, Institute for Matching Person and Technology; Professor, University of Rochester Medical Center; Co-PI, Center on Effective Rehabilitation Technology.

Meera Adya, JD, PhD; Burton Blatt Institute - Director of Research & Affiliated Faculty in Psychology at Syracuse University; Faculty, Consortium for Culture & Medicine (SUNY Upstate Medical University, Syracuse University, Le Moyne College); Senior Researcher, Center on Effective Rehabilitation Technology.

Brian McLane, MS; Executive Director Burton Blatt Institute, at Syracuse University, Syracuse, NY; Chair of Advisory Board, Center on Effective Rehabilitation Technology.

ABSTRACT

The categorization of assistive technology (AT) is often difficult to locate and different organizations and agencies use dissimilar terms and labels for organizing AT. The lack of a standardized taxonomy across disability related government programs impedes attempts develop comparative AT data in individual state VR programs. A common taxonomy, such as use of the ISO 9999 would greatly facilitate data sharing and comparison.

The purpose of this paper is to review different ways AT are categorized and coded and to discuss the potential of using the ISO 9999 as a common framework. The potential of the ISO

9999, as well as its limitations, will be presented along with recommendations for its use and future revision.

KEYWORDS
Assistive technology classification, vocational rehabilitation, Assistive technology coding

INTRODUCTION
In this age of diversity, we have identified a source of vast diversity that must be researched-the categorization of Assistive Technology (AT). Such categorizations, often referred to as classifications or codes, are often difficult to locate. When AT codes do exist, different organizations and agencies tend to develop unique systems with dissimilar terms and labels to meet internal or system specific needs. The purpose of this paper is to make a preliminary examination of existing classification methodologies, examine the role and effect these codes have in the State Vocational Rehabilitation Agencies, and address the potential role of the ISO 9999 AT codes.

BACKGROUND
Just as there are many classification schemes for AT, there are also many definitions, or variations thereof, for AT. For the purposes of this article, we will utilize those defined by the Rehabilitation Services Administration, the federal oversight organization of all State Vocational Rehabilitation (VR) Agencies. In the VR system, AT is also referred to as Rehabilitation Technology (RT) and Rehabilitation Engineering (RE). These definitions appear below. They recognize the fact that AT is actually comprised of multiple types of devices and services (e.g., mobility, communication, etc.).

Rehabilitation Technology
Rehabilitation technology means the systematic application of technologies, engineering methodologies, or scientific principles to meet the needs of, and address the barriers confronted by, individuals with disabilities in areas that include education, rehabilitation, employment, transportation, independent living, and recreation. The term includes the following:

Rehabilitation Engineering Service
Rehabilitation engineering is the systematic application of engineering sciences to design, develop, test, evaluate, apply, and distribute technological solutions to problems confronted by individuals with disabilities in functional areas such as mobility, communications, hearing, vision, and cognition, and in activities associated with employment, independent living, education, and integration into the community.

Assistive Technology Devices
Assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain, or improve the functional capabilities of an individual with a disability.

Assistive Technology Services

Assistive technology service is any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device. Services may include, evaluating, purchasing, leasing, selecting, coordinating and using other therapies and training or providing technical assistance for an individual with a disability or other allied professionals necessary for an individual with a disability to achieve an employment outcome.

CLASSIFICATION SYSTEMS

AT is currently classified in many ways. Several of these methodologies are summarized here:

CPT Codes

Current Procedural Terminology (CPT)… is a listing of descriptive terms and identifying codes for reporting medical services and procedures. The purpose of CPT is to provide a uniform language that accurately describes medical, surgical, and diagnostic services. CPT is trademarked by the American Medical Association (AMA) and was first published in 1966. RESNA has worked with the AMA to have two AT related codes incorporated into the CPT. Other CPT codes also relate to AT, such as those for mobility and community/work integration.

The primary purpose of the CPT codes is to quantify and qualify the services of healthcare professionals for payment or reimbursement through various third-party insurance systems. The variables collected will differ, but may include the professional classification of the provider (since not all licensed healthcare professionals are licensed to do all things), the length of time the service was provided (some services are allowed for different increments of time), and the nature of the service (typically reflected in a code number).

The CPT incorporates no definition of disability, since this relates to medical services that may be provided to people with or without disabilities. Eligibility (that is, for payment or reimbursement, but not for the service itself, since that could always be provided without regard to payment or on specification) depends on the certification of the provider, the relationship of the provider or provider organization with the insurer, the insured status of the service recipient, and the sufficiency of the description of the service.

In the CPT system, outcome variables are not generally taken into account in the determination of whether or not to pay. They are subsumed to some degree in the coverage decisions made about the particular service before the individual ever receives it. The key environmental variable to be considered here is the relationship to AT. Some of the services provided will be AT services, though rarely categorized in that fashion since few if any insurers recognize AT as such, and some of the services will result in the assessment for, prescription of, evaluation or repair of AT devices.

Beyond the non-recognition of AT in insurance nomenclature, its existence, as a distinct category, is not widely recognized by service-providers, service recipients or other intermediaries.

With respect to how the data is collected: There is little systematic data collection about AT for the reasons noted above. You cannot collect data on something that does not exist or is buried within a system. What data particular providers or payors retain on their work will vary with the individual or organization in question. CPT codes are subject to annual revision, and some codes pertinent, if not expressly mindful of, AT have been added, as stated above.

Data that does exit has varied uses. (Reports to legislators, indicators, program evaluation, and research): The data is not known to be used in any systematic way.

AbleData Product Database

Another common AT classification is covered under the AbleData equipment database. The ALEDATA database of assistive technology is classified by each product's intended function or any special features it possesses. The products are classified in 20 broad categories. The system is widely known but not specifically utilized as an external centralized taxonomy.

International Organization for Standardization ISO 9999 – Assistive products for persons with disability – Classification and terminology

The ISO an international-standard-setting body composed of representatives from various national standards organizations. Founded on 23 February 1947, the organization promulgates worldwide proprietary industrial and commercial standards. It has its headquarters in Geneva, Switzerland. While ISO defines itself as a non-governmental organization, its ability to set standards that often become law, either through treaties or national standards, makes it more powerful than most non-governmental organizations. In practice, ISO acts as a consortium with strong links to governments. The ISO has established an extensive classification system that covers the widest scope of AT currently in use. ISO classifications are international in scope but do have limitations when overlaying them with state VR systems.

METHOD

All state Vocational Rehabilitation Agencies are required to report assistive technology data to the Rehabilitation Services Administration (RSA). The RSA -911 report is an annual compilation of data submitted by state vocational rehabilitation agencies that reports all case closures during a given fiscal year, and includes data on RT, which includes the provision of rehabilitation engineering, assistive technology (AT) devices, and AT services. We were able to conduct an early survey of 4 states that have distinct AT service codes that are used to compile their RSA 911 data. Our review team was charged with identifying select state vocational rehabilitation (VR) programs and examining their AT service codes. The intent was to generate a list of standardized AT codes. Additionally, the state-based Alternative Financing Programs (AFP's) were used as a more broadly utilized comparative taxonomy for AT equipment loan programs. The International

Standards Organization 9999 Assistive Technology Codes were used to develop code matching with the codes classified by each representative state. A summary of these matches can be found in Appendix A.

Information regarding classification and coding of AT was obtained from the VR agencies in Ohio, Indiana, Kentucky, and North Carolina. All are subject to the same federal regulations under the Rehabilitation Act and the oversight of the Rehabilitation Services Administration (RSA). Individuals with disabilities are eligible for services from these agencies if they: have a physical or mental impairment which constitutes or results in a substantial impediment to employment; can benefit from services in terms of an employment outcome; and require VR services to retain or gain employment. Some state VR agencies, such as Ohio and Kentucky, have also been compelled to establish what is known as Order Of Selection (OOS). When a VR agency cannot provide services to all applicants who are found eligible, federal law requires the establishment of an OOS. OOS is the method of determining which consumers will be served based on a determination of the level of significance of the disability in terms of an employment outcome. The systems used in Ohio and Kentucky are based on the number of limitations in functional capacity area and major life functions, respectively. Indiana and North Carolina do not currently have an OOS.

Currently, Ohio's VR agency has one general code for Rehabilitation Technology /Engineering Evaluation and ten distinct codes for types of technology devices/services. These are: Augmentative Communication, Blind and Low Vision (including CCTVs), Computer Access, Deaf and Hard of Hearing (no hearing aids), Home Modification, Job Site Modification and Ergonomics, Rural/Farming, Vehicle Modifications, Wheelchair and Scooters, Assistive Technology Devices or Services-Other.

The Kentucky codes were as follows: Specialized Aides/Appliances for the Blind, Vehicle Modification (3 codes: Over $5000, Repair/upgrade, Less than $5000), Home Modification, Other Property Modification (e.g. Jobsite), AT Devices, AT Services, RE, Telecommunication Devices for Deaf (TDD, amplified phone, etc.), Assistive Listening Devices, Alerting Devices for Deaf (flashers, etc.), Adaptive Computer Software, Adaptive Computer Devices, Driver Evaluation, and Driver Training.

The North Carolina VR agency utilizes a system of coding based on type of service and when the service was provided to the consumer. They define four distinct stages-Diagnostic, Restoration, Training, and Placement, thus-D,R,T,P. Codes include: Vehicle Modifications, Residential Modifications, Computer Access/AT Evaluation, Assistive Technology Training, Job Site Modification, Manual Wheelchair or Manual Mobility Device, Power Wheelchair or Powered Personal Mobility Device.

Indiana VR uses 9 categories with a total of 51 AT codes to classify their assistive technology utilization. Categories include diagnostic and evaluation services, prosthetic and orthotic

appliances, small business enterprises, personal and vocational adjustment, tools and equipment among others.

DISCUSSION

Analysis of various State AT coding mechanisms is essential to understanding the range and scope of assistive technology programs and services. AT is such a broad and diverse field of services that a better grasp of the common elements is essential to further the study of AT service provision and outcomes.

Each VR Agency develops its own classification scheme for AT to track services and devices as it sees fit. There is no federally mandated set of AT Tracking codes. Although only 4 states VR AT tracking codes were sampled it was found that none adopted existing coding schemes such as those already reviewed.

All AT device and service information tracked by each VR agency is forwarded to RSA in what is known as an AT "data dump" This information is used to generate comparisons between/among fiscal years and states. The drawback – there is no specificity with respect to individual AT services/devices. All AT is lumped together in a single aggregate figure. In addition comparison between and among states do not compare apples to apples.

Working toward the development of a uniform taxonomy would be helpful in providing consistent comparable data for future analysis. A comparative taxonomy would help with the transition from school to post secondary education and finally in to the world of work. The ISO was viewed as a potential source for coding. Careful mapping of select ISO codes would need to be established and new unique employment codes (agricultural modifications) would need to be added. Excessive length and detail of the ISO are challenges for VR agencies to independently create the required match. Further investigation is required.

REFERENCES

1. RESNA – National Assistive Technology Technical Assistance Partnership, "Addressing the Assistive Technology Needs of Individuals with Disabilities through financial loans" October 2006.

2. International Standardizations Organization, "Classification and terminology for the fourth revision, ISO/TC 173/SC2/WG11" May 10, 2006

3. Indiana Vocational Rehabilitation Services under the Division of Disability and Rehabilitative Services of the Indiana Family and Social Services Administration (FSSA) "Assistive Technology CC Codes" January 2010.

4. Ohio Rehabilitation Services Commission (ORSC), "Guide to Rehabilitation Technology Service Codes" October, 1, 2001.

5. Kentucky Office of Vocational Rehabilitation Expenditure Codes. October 2006.

6. North Carolina Rehabilitation Technology Codes. November 2009.

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Author Contact Information:

Linda McQuistion, PhD, Rehabilitation Engineer, Ohio Rehabilitation Services Commission, Rehabilitation Technology Support Unit, 401 Market Avenue, North, Suite 200, Canton, OH 44702, Office Phone (330) 438-0500. E-Mail Linda.McQuistion@rsc.state.oh.us

APPENDIX A AT CODE COMPARISON OF VR AGENCIES, 1SO-9999, ATF BORROWS

ISO 05.12 Assistive products for training in cognitive skills
RESNA Practice area technology for cognitive disabilities

ISO 09 Assistive Products for Personal Care and Protection
RESNA Electronic aids to Daily living (EADL's or ECU'
Indiana – Environmental Control System Devices
Ohio – Environmental Control Evaluation, Purchase controls, setup of controls
ATF Borrowers – AT for Environmental

ISO 12.10 Cars
RESNA Personal Transportation – Vehicle Modifications
Ohio – Vehicle Modifications
Indiana – Vehicle Modification Evaluation, Vehicle Modification, Vehicle Modification Inspection
Kentucky – Vehicle Modification > $5,000, Vehicle Modification repair/upgrade, Vehicle Modification <$5,000
North Carolina – Vehicle Modifications Restoration, Training, Placement
ATF Borrowers – AT for adapted transportation

ISO 12.22 & .23 Human driven wheelchairs & powered wheelchairs
RESNA Seating, Positioning and Wheeled Mobility
Ohio – Wheelchairs and Scooters
Indiana – Wheelchairs – Purchase, rental and repair, seating assessment and purchase
Kentucky – Wheelchairs – Purchase and repair
North Carolina – Power and manual wheelchairs
ATF Borrowers – AT for mobility equipment and AT for Seating and positioning

ISO 15 Assistive Products for Housekeeping
RESNA Architectural accessibility (including home and outside buildings)
Ohio – Home Modifications
Indiana – Ramps, structural modifications
Kentucky – Home modifications
North Carolina – Residential modifications, restoration, training, placement
ATF Borrowers – AT for building modifications

ISO 18 Furnishing and adaption's to homes and other premises
RESNA – Job/Workplace Accommodations
Ohio – Jobsite Modification and Ergonomics
Indiana – Word processing/ data entry, small business enterprises services
Kentucky – Other property modifications (eg. Jobsite)

North Carolina – Jobsite modifications – Placement
ATF Borrowers – AT for work or school and AT for farm modification

ISO 22 Assistive Products for Communication and Information
RESNA – Augmentative/Alternative Communication
Ohio – Augmentative Communication, Blind and Low vision including low vision
Indiana – Augmentative Communication devices, low vision systems
Kentucky – Specialized Aids/Appliances for blind
ATF Borrowers – AT for computer access, AT for communication

ISO Assistive products for hearing
RESNA – Technology for hearing loss
Ohio – Deaf and Hard of hearing (no hearing aids)
Indiana – Hearing aid purchase devices and dispensing
Kentucky – Telecommunication devices for deaf, assistive listening devices, alerting devices for deaf
ATF Borrowers – AT for hearing aids

ISO 22.36 Input devices for computers
RESNA – Computer Applications
Ohio – Computer Access
Indiana – Computer equipment
Kentucky – Adaptive Computing
North Carolina – Computer Access AT Evaluation – Diagnostic
ATF Borrowers – AT for Computer Access and Equipment

General Classification not identified in ISO
Ohio – Rural Farming
North Carolina – AT Training – Diagnostic, Restoration, Training, Placement
Indiana - Prosthetic and Orthotic appliances – Various and coding needed (16 count)