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Occupational Therapy: Creating a Way to Determine College Students' Assistive Technology Needs

Jeremiah Otteson
University of North Dakota

Stephanie Suedel
University of North Dakota

Kjersten Swanson
University of North Dakota

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Creating a Way to Determine College Students'

Assistive Technology Needs

A Scholarly Project

by

Jeremiah Otteson, MOTS; Stephanie Suedel, MOTS; and Kjersten Swanson, MOTS

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CHAPTER ONE

INTRODUCTION

Disability Support Services (DSS) personnel from North Dakota State University (NDSU) requested assistance from the University of North Dakota's Occupational Therapy Program in developing a process that could be used by their department to meet federal mandates. They were interested in having occupational therapy (OT) students assist in developing a protocol to identify assistive technology (AT) devices and training needs of individual students with disabilities in order to maximize their educational potential in higher education. NDSU DSS personnel also requested that the OT students assist in the development of a resource manual for their use. The overall goal of NDSU DSS personnel is to facilitate use of the AT lab and services on campus. The purpose of this project was for a team of three OT students to assist the DSS staff at NDSU to meet their goal.

A literature review was conducted to determine what current trends in higher education settings to meet the needs of students with disabilities through assistive technology and to review available resources. Two protocols for identification of student needs and training were developed based on literature and through feedback from DSS personnel at NDSU. In addition, a resource binder has been compiled for future use by the DSS staff and recommendations were made to enhance the availability of AT devices and services at NDSU.

CHAPTER TWO

REVIEW OF LITERTURE

Introduction

Assistive technology (AT) is an emerging area to address the educational and independent living needs for individuals with a wide range of disabilities in post-secondary educational settings. An AT device is “any item, piece of equipment or product system whether acquired commercially, modified or customized, that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities” (Protection & Advocacy Project, 1999, p. VI-1). AT devices can be used to promote students’ academic skills, independence, self-worth, and productivity despite a disability (Bryant & Bryant, 1998). A disability is “a physical or mental impairment that substantially limits one or more major life activities, or a record or history of such an impairment” (Protection & Advocacy Project, 1999, p. III-1). However, the common social definition of "'good health' as being the absence of illness, injury, and disability, and the presence of the ability to achieve greater choice and control in life" contradicts the experiences and status of all individuals with disabilities. This social definition can be difficult to overcome. Instead, the definition of "good health" should be associated with the individual's sense of personal well-being, satisfaction in personal relationships, health, education, work, standard of living, community interaction, creative expression, prospects for growth and development and absence of stress (Zacijek-Farber, 1998, p. 203). When disability support service (DSS) staff members are considering AT for students, the focus of treatment/services should be placed on habilitation. Habilitation looks at the abilities and limitations of the person and works to provide the person with

the highest state of well-being by teaching practical and personal care skills to increase independent living. This will, in turn, increase the individual's emotional adjustment and reduce social isolation. AT allows the person to be less dependent upon physical supports from care providers; AT can increase independence and the motivation of the individual. Another important consideration when working with students who are disabled is that individuals with a disability have less motivation and persistence in working towards a goal, mainly because others will usually step in before the person has a chance to problem-solve or struggle. This then contributes to a lower level of independence in individuals with disabilities (Zacijek-Farber, 1998). This concept should be taken into consideration when evaluating an individual for AT because motivation and persistence are essential elements of learning any assistive device.

Legislative Mandates

Federal legislation began addressing the importance of AT with the beginning of the Reagan administration in the mid-1980s. During this period, the U.S. Department of Education, Office of Special Education and Rehabilitative Services began working toward improving the importance of transition services. The reason for this movement was the consensus among legislators and advocates that serious changes needed to be made in public education. Following this period, the federal government personnel have worked for policy changes to provide increased opportunities for disabled individuals in a variety of settings (Johnson, Stodden, Emanuel, Luecking, & Mack, 2002). Policy changes resulted in congress enacting Section 504 of the Rehabilitation Act and the Americans with Disabilities Act (ADA) of 1990, which prohibited discrimination on the basis of disability by most public and private businesses and organizations including

colleges and universities. These entities must provide students with known disabilities reasonable accommodations or adjustments as well as auxiliary aids and services. These services include but are not limited to qualified interpreters, note takers, telephone handset amplifiers, qualified readers, Braille materials, acquisition or modification of equipment or devices including AT, and any other similar services. Within each college or university, it is required that disability support services (DSS) or other similar supportive networks address access and accommodation needs for students with disabilities. It is important to note that a post-secondary school or organization cannot be held liable for failing to make accommodations if the student with a disability does not disclose his/her disability and ask for assistance (Protection & Advocacy Project, 1999). Although federal legislation, such as ADA and the Rehabilitation Act, mandated access for students with disabilities, there continued to be critical areas of college educational access for students with disabilities that lagged behind those for non-disabled students (in particular, web sites and course management software systems). Therefore, in 2001, another federal regulation came into effect that mandated that all electronic and information technology developed by federal agencies and organizations be accessible to those with disabilities. These mandates pertained to software applications or operation systems, web-based information or applications, telecommunication products, video or multimedia products, information appliances such as fax machines and kiosks, and desktop and portable computers (Roach, 2002).

In recent years, there has been a dramatic increase in the number of students with disabilities that require AT services in post-secondary schools. Statistics show that in 1978, 2.6% of students in post-secondary schools reported a disability as compared to

nearly 19% in 1996 (Johnson, et al., 2002). This may be due, in part, to advancements in legislation promoting access and accommodations to this population. Most recently, it was found that 8-12% of the students in the United States post-secondary schools have a disability that requires special attention (Roach, 2002). More specifically, the number of students with learning disabilities entering post-secondary schools has grown faster than any other disability classification since 1985. The figures of students with learning disabilities range from 160,000 to 300,000 students (Raskind & Higgins, 1998). According to Catherine Anderson, Coordinator of Disability Services at North Dakota State University (NDSU), the statistic pertaining to learning disabilities also holds true at NDSU; she stated that 42 individuals served have learning disabilities. The breakdown of other disabilities is as follows: attention deficit disorder (ADD/ADHD), 14; blind and visually impaired, 4; deaf or hard of hearing, 8; mobility impairments, 6; other physical disabilities, 17; depression, 19; anxiety, 5; other psychological disabilities, 3; and other cognitive disabilities, 1 (Anderson, 2003).

Identification of Needs

Prior to receiving AT services, which includes assessment, placement, and/or accommodations from DSS, each student in post-secondary education must have a documented disability. Many people are involved in the assessment process either by gathering information from them or being actively involved. Team members may include the user, family, teachers, technology specialists, administrators, DSS staff, funding specialists, significant others, and/or anticipated or current employers (Bryant & Bryant, 1998). The process of evaluating a student for AT needs requires a comprehensive overview of the student's functional abilities in areas such as writing;

communication; reading, studying, and math; recreation and leisure; activities of daily living; mobility; control of the environment; positioning and seating; vision; and hearing. According to Merbler, Hadadian, & Ulman (1999), the selection process should consider human factors such as the ease of use of the AT device, the learning curve needed for a student to become a proficient user, the device's appearance, and any possible danger for the user or bystanders. Other considerations presented include amount of training for the provider, cost, technological features, reliability and durability of the device, whether it can be used across environments and tasks, and promotion of the student's independence while using the AT device (Bryant & Bryant, 1998). Activity based assessments are best conducted in the home or school setting due to a natural environment where students are most comfortable and will perform at their optimal level. It also provides a better variety of situations in which the person must perform. Whereas in a structured setting, situations must be simulated and may not provide opportunities for the student to problem solve accessibility issues and AT device use (Judge, 2002). Following the assessment and trial period, it is important to provide follow-up services to assess and determine if changes are needed for the AT device or reassignment of a device is warranted.

Populations Served

Some of the disability populations requiring AT devices and services may include those with speech and language disorders, hearing impairments, visual impairments, severe physical disabilities, learning disabilities and behavioral problems. Certain AT devices may be more appropriate for individuals based on their disabilities. While one device may be beneficial for a particular person, it may be detrimental for

another. Therefore, it is important that devices be chosen relative to the needs of each student.

Speech and Language

Students with speech and language difficulties may have problems with articulation, voice quality, or fluency patterns, which can impair the listener's ability to understand the speaker. Specialized devices that increase ability to communicate with others in life are augmentative alternative communication (AAC) devices, which support or enhance speaking capabilities of the user. In comparison, AAC devices replace speech as a means of communication. Existing computers can be modified to be used as an AAC device through the addition of special communication hard and software; this option is often less expensive and more flexible than custom built AAC devices. Some factors to consider when selecting an AAC device are: portability, complexity, input method, vocabulary/representation format, and end means of output delivery (Hasselbring & Glaser, 2000).

Hearing Impairments

Students with hearing impairments have a hearing loss that interferes with their ability to process linguistic information through auditory channels with or without amplification. A device used to enhance the person's residual hearing is also called an assistive listening device (ALD). Two telecommunication devices that are available to assist students with severe hearing disabilities are telecommunication device for the deaf (TDD) and captioning. TDD allows a user to use keyboard to type and receive messages over phone lines. Captioning is helpful in the classroom environment since it allows the student to read what is being said during audiovisual programming. Frequency-

modulated (FM) amplification systems create a link between the teacher, who wears a microphone, and the student, who wears a hearing aid. This system reduces background noise, which allows for more clarity in auditory processing. "Audio Loops" is a type of amplification device that directs sound from its source directly to the listener's ear through a specially equipped hearing aid. Sound may be transmitted through a wire connection or radio waves that can be built into the walls or surround certain seats. Also, infrared systems transmit clean, clear sound invisibly to hearing impaired listeners in congested public places. Hearing aids or cochlear implants may also enhance the student's abilities; therefore, referral to an audiologist may be necessary. In addition, sign language interpreting services are helpful to understand lectures, situations or conversations because studies indicate that average reading levels of students who are deaf are considerably lower than their hearing counterparts of similar intellectual abilities (Hasselbring & Glaser, 2000).

Visual Impairments

Students with visual impairments or blindness have limitations in their ability to process visual information. Students who are visually impaired may benefit from large print materials, specialized magnification lenses, or electronic enlargement. Closed captioning television devices (CCTVs) are designed to enlarge any type text or graphic material by using a small mounted video camera with a zoom lens connected to a monitor for displaying images. CCTVs also have many specific features to enhance visual recognition including adjusting contrast, brightness, focus, or background display. Software programs for text-to-speech are often helpful to people with visual impairments because it allows the information on the computer screen to be read aloud.

They also facilitate the re-reading and editing of previously written text. Optical character recognition (OCR) can assist the user by scanning and reading the text aloud, which allows the student access to read all types of printed (not hand-written) materials. These devices range in price from $2000 to $5000. Students with no functional vision can rely on the use of Braille input/output devices, Braille text, descriptive video services, and auditory text on tape. Braille note-takers are small portable devices that can store Braille characters and read text aloud to assist students with blindness or severe visual impairments (Hasselbring & Glaser, 2000).

Physical Disabilities

Students with physical disabilities have barriers due to gross and fine motor mobility impairments. Switches may be beneficial because they allow the user to independently control many aspects of their environment. Placement of switches near accessible body sites that have accurate function is essential for equipment use and to allow for optimal performance in activities. Switches may also be activated through the sip-and-puff method. Switches can be used with many different adaptive devices to enable students with severe physical disabilities to operate a computer independently. These functions may include turning the power on and off, inserting and removing a CD or disk from a drive, copying files, accessing a modem, or using a keyboard. There are also a number of alternative input devices that can be connected to most standard computers to assist or replace the use of a traditional keyboard; inability to use a standard keyboard is often the greatest barrier to computer use for people with physical disabilities. In order to address this issue, adaptive keyboards, infrared sensors, touch screens, and voice recognition systems are effective devices to enable students with

moderate to severe physical disabilities to use computers to participate in many educational activities that would not otherwise be available to them. Adaptive keyboards have many different designs. Replacing standard keys with larger keys that are easier to see and touch, reducing the number of keys on keyboards, placing letter keys in alphabetical order, or providing keys that are brightly colored and easier to read are possible adaptations. These keyboards may be programmed to be more sensitive to touch and are beneficial for individuals with limited range of motion due to difficulty applying pressure to keys. Infrared sensors with pneumatic switches enable the student to interact with the computer through the sip-and-puff method after selecting a target via the infrared sensor. Touch screens are used with students who have more severe physical or developmental disabilities. A touch screen allows the user to touch the computer screen to perform a function. Software allows for the configuration of a variety of screen overlays or the possibility for one to create his/her own overlay to use with on-screen keyboards. Voice recognition systems can allow individuals to bypass the keyboard by providing verbal input into the computer. This is done by programming the computer to one's voice through a series of vocal training procedures. Voice recognition systems can allow students/users to operate a variety of application programs, dictate to a word processor, or enter information into spreadsheets. The devices can range in price from less than $100 to as much as $9000 for the higher-end technology devices. Current research has examined and tested the use of new devices such as robotic arms to aid in retrieving objects, turning pages in books, and possibly some simple computer functions. However, more research is needed before these devices are widely available for consumers (Hasselbring & Glaser, 2000).

Learning Disabilities

Individuals with learning disabilities (LD) can also benefit from AT. However, LD can affect many areas of a person's capability such as written language, reading, organization and memory, auditory processing, and math. Students who have difficulties with written language (which accounts for 80-90% of individuals with LD) may benefit from devices such as word processors, spell checkers, proofreading programs, outlining/brainstorming programs, abbreviation expanders, speech recognition, speech synthesis/screen reading, or word prediction. Word processors are valuable due to the fact that students can generate language and correct errors later. Word processing software costs from $100 to $300. However, the computer required to run the software can range from $1000 to $1500. Spell checkers may be part of many word processing programs or can be purchased as battery-operated standalone devices in desktop or pocket sizes. Price ranges from $30 for basic spell checkers to $500 for higher-level units that include speech synthesizers. Proofreading programs are also included in many word processing programs. They alert users to probable errors in punctuation, grammar, word usage, structure, spelling, style, or capitalization. The downfall is that these programs are not completely accurate. Proofreading programs can be purchased for under $100. Outlining programs included in most standard word processing programs allow the user to put large amounts of information into a document in a relatively unstructured manner to organize at a later date. There are also programs that include graphic capabilities to facilitate brainstorming. These outlining/brainstorming programs are of value because students with LD often have

difficulty organizing papers with regard to topic, categories, and sequence. Add-on outlining programs for word processing software cost between $100 and $400, and graphic organizers are approximately $90 (Raskind & Higgins, 1998).

Additionally, abbreviation expanders are used in conjunction with word processing programs. The student is able to create his/her own abbreviations for commonly used words, phrases, or standard pieces of test. Add-on programs are available for about $100. Speech recognition systems consist of speech recognition software, a sound-board, headphones, and a microphone that can be used with personal computers. The computer is operated by speaking directly to it, and higher-end systems can convert 40 to 70 words per minute. These programs range for $100 to $1000. Speech synthesis and screen readers allow the user to have text read back to him/her; enabling the user to identify errors in grammar, spelling, and punctuation as well as problems with coherence and semantics. Speech synthesizers vary between $100 and $1000. Screen-reading programs run between $200 and $500. Word prediction software minimizes the number of keystrokes the user is required to produce, acts as a compensatory spelling aid, and prompts for appropriate words according to grammatical rules. These are available as add-on programs or are available in software packages and cost around $300 (Raskind & Higgins, 1998).

Individuals with LD who have difficulty reading may benefit from text-to-speech programs (previously described), OCR systems (described under visual impairments), and variable speech-control (VSC) tape recorders. The tape recorders may be used for listening to books or lectures on audiotape. VSC tape recorders allow the individual to play back information at a slower or faster rate without the loss of intelligibility.

Prerecorded text can be slowed down by 25% and range in price from $100 to $200 (Raskind & Higgins, 1998).

Organization and memory problems are also common among individuals with LD. Personal data managers and free-form databases may be of use to compensate for these difficulties. Personal data managers assist in remembering, organizing, and managing personal information by scheduling appointments, prioritizing activities, remembering important dates/deadlines, or recording/retrieving names, addresses, and phone numbers. These are available as software programs for handheld units and range in price from $20 to $250. Free-form databases electronically store notes in a computer rather than on paper, which is easily misplaced; and cost approximately $100 (Raskind & Higgins, 1998).

Listening aids such as personal FM listening systems and tape recorders (previously described) may also enhance a person's abilities. Personal FM listening systems help students focus on a speaker and minimize distractions. The speaker wears the transmitter unit and the student wears the receiver unit. Most run on AA batteries and cost between $300 and $600 (Raskind & Higgins, 1998).

Math capabilities can be enhanced through the use of talking calculators. This provides the student with auditory feedback for checking accuracy of visual-motor operations. Basic talking calculators cost between $20 and $75; however, postsecondary students may require scientific calculators, which cost up to $650 (Raskind & Higgins, 1998).

Conclusion

Because of the wide variety of AT available to individuals depending upon their

disability, it is important for disability support specialists who design accommodations for these students to learn about assistive technology or hire personnel who are trained in assistive technology. Because of federal legislation to increase access for students with disabilities, accommodating these individuals is becoming more important than ever (Roach, 2002). In addition to increasing education for DSS staff on assistive technology, it is equally important to train general education teachers who will be working directly with students with disabilities. Therefore, there are many suggested areas of competency for DSS staff and teachers whom will be working with students with disabilities and AT including: computer literacy skills, general knowledge of AT, laws, learner needs, devices and services, curricular integration, environment, resources, partnerships, and evaluation (Bryant, Erin, Lock, Allan & Resta, 1998).

Bryant, et al. (1998), provide many suggestions on how to incorporate AT into existing courses for pre-service general and special education providers. New courses could also be developed. In either case, courses should provide an inclusive overview of AT and teach ways AT can be used in classroom, vocational, and post-secondary settings. Courses may also include an internship in AT. Another suggestion presented was to have various professionals or an assessment team invited to class to discuss data collections, clinical observation techniques, and instruments/assessments administered to develop a profile of a student who is a potential candidate for AT.

There are, however, challenges to integrating AT into pre-service programs. The first is lack of faculty training and technical support within colleges. Another is that there are usually few incentives for faculty. Course release time to contribute time to the development of lab facilities and new curriculum may to be available or is limited.

Finally, obtaining funding can be challenging, especially with increased demand of AT and diminishing financial resources in educational settings (Bryant, et al.,1998).

Solutions to these roadblocks include providing staff development via workshops and networking with teachers who have experience using AT, experts from state and local agencies, and vendors of AT. Encouraging faculty to use AT by providing incentives and release time to re-design or develop new courses using AT is another solution. External sources of funding are available through grant programs, state education or rehabilitation agencies, private funding sources, and foundations or other funding agencies (Bryant, et al., 1998). Roach (2002) encouraged that disability support staff become an advocate to promote awareness of the federal legislation and the need for accessibility within the classroom and around campuses.

Access and exposure to AT becomes more important in post-secondary education systems than in previous settings due to the emphasis on school to workplace transition and the competitive job market. A Business Week Online article entitled "For the Disabled, It's always a Depression; Always the group with the highest unemployment rate, they're all too often the last to get hired and the first to be let go" (2001) Payne (2003), and Cohen (2002), all address some of the issues that individuals with disabilities face when they are seeking and attempting to maintain gainful employment. First, the unemployment rate for individuals with disabilities is by far the highest among all demographic groups in the country, according to the latest census data. In fact, of the 54 million Americans with disabilities, only two-thirds of the individuals who are capable of working are employed (Cohen, 2002). In addition, certain segments of the disabled population have even higher unemployment rates. For

example, the unemployment rate for blind individuals is 70% (Payne, 2003). In the Business Week Online article (2001), it is written that a recession and a weak job market makes finding and maintaining a job especially difficult for individuals with disabilities, even though there are federal and state laws that are to work in their favor to prevent discrimination. The article goes on to describe that most employers have a misconception that accommodating for an individual with a disability is going to cost the company too much money. In reality, most adaptations are not costly and the company is more likely to loose more money by leaving a job opening vacant then they are to loose money to make reasonable accommodations.

All the articles provided the consensus that the most difficult barrier for individuals with disabilities when trying to gain employment is attitudinal barriers. The misconception that people with disabilities can't be productive members of the workforce is still commonplace in today's society. Therefore, the managers need to be flexible and proactive in accommodating individuals with disabilities because this will model a positive attitude towards the employee with a disability and will most likely be carried out by other employees (Cohen, 2002).

Another issue that plagues individuals with disabilities is the unequal pay rate they receive for completing the same job. According to the 2001 Business Week online article, full-time disabled workers took home an average of $33,186 in 1999, while their non-disabled counterparts received $40,889. For this reason as well as the attitudinal barriers, many individuals with disabilities simply decide to remain unemployed and collect social security disability insurance.

Because of these issues, it is important to begin AT training for students while in

the post-secondary education setting. If the individual can prove they are competent in school, they may be taken more seriously when applying for positions in the workforce. Additionally, with increased experience with AT in post-secondary education settings, the individual will be able to tell prospective employers the devices he or she will need to be successful. This will require less time problem-solving possible accommodations for the company if the person is hired.

CHAPTER THREE

ACTIVITIES

Extensive research was done through a literature review to determine the current trends regarding AT in postsecondary education settings. The information gathered also assisted in forming a foundation for the development of the AT protocols at NDSU. An organizational software program (Inspiration ®) was used to develop the protocols in a flowchart format. This design was chosen due to its ease of use by all personnel regardless of the amount of training they possess in the area of AT.

The following data log was compiled to describe the steps taken in completion of the scholarly project. The format was chosen due to its descriptive nature and because it lays out a progressive timeline.

Data Log

September 26th, 2002

Jeremiah met with the OT faculty advisor Gail Bass to discuss details about the scholarly project and to obtain contact information for North Dakota State University Disability Support Services Coordinator Catherine Anderson. In the meeting Gail and Jeremiah discussed the general problem/need that NDSU DSS was needing to address. Due to the current mandates regarding the provision of reasonable accommodation for students with disabilities, NDSU DSS requested assistance from the University of North Dakota's Occupational Therapy Program in developing a process that could be used by their department to meet the mandates. Gail then provided Jeremiah with contact information for Catherine Anderson (Cathy), NDSU DSS Coordinator. Gail also provided Jeremiah with contact information for the two other group partners (Kjersten &

Stephanie) for the scholarly project to keep in contact about the project. Lastly, Gail provided Jeremiah with some resources that related to the scholarly project. Ideas were then discussed for questions to ask Cathy in the first meeting to gain a clearer perspective of what exactly is needed by NDSU DSS.

October 11, 2002

Jeremiah met NDSU DSS Coordinator Cathy Anderson for the first time. Cathy introduced Jeremiah to all of the DSS staff that he would be possibly working with for the project. Jeremiah then explained his understanding of what DSS staff wanted to accomplish with the scholarly project and asked for feedback regarding the accuracy of his understanding. Cathy explained to Jeremiah that they wanted to develop a way to assess students assistive technology needs to facilitate maximum educational potential and to comply with federal mandates. She then stated that, "The overall goal of DSS personnel is to facilitate increased use of the assistive technology lab and services on campus." Cathy provided Jeremiah with a tour of the AT lab and the available AT devices. Cathy and Jeremiah talked with ITSS staff working in the AT lab regarding computer programs/devices and hours of AT lab. Jeremiah requested a list of the current AT devices and programs available at NDSU's AT lab.

Jeremiah discussed with Cathy a preconceived plan for the scholarly project. It was explained that a review of literature would first be conducted, followed by development of the protocols. Cathy requested that the OT students compile all research information into an individual organized resource binder.

October 18th, 2002

Jeremiah met with Catherine for the second meeting. The purpose of the meeting was to discuss an idea and design for protocols. Cathy introduced Jeremiah to another DSS staff member Susan. Cathy and Susan discussed some of the current mandates and legislation that would need to be considered when completing the project. Susan mentioned an AT presentation that was scheduled in Fargo, and stated that she would attend and gather information to share with Jeremiah. Catherine explained to Jeremiah that she would like to see a protocol developed to assist DSS staff in determining student's assistive technology needs and the amount of training needed to use the AT device. Jeremiah shared his idea for the protocol with Susan and Catherine, and explained that the protocols would need to be developed in a flowchart fashion due to the unmet need for an occupational therapist to provide consultative services. The protocol design also allows for easier follow-through and use by DSS staff.

October 25th, 2002

Jeremiah met with Cathy at NDSU to discuss plans for the project and to provide OT students with lab accessibility. Cathy and Jeremiah visited ITSS to discuss the plans for the scholarly project and the possible need for ITSS personnel to assist OT students with access to the lab and resources. Jeremiah was provided an AT lab access card-key for OT student access to the lab.

November 5th, 2002

Jeremiah developed the topic proposal for the scholarly project based on the information obtained by DSS staff. The topic proposal was reviewed by UND OT faculty advisor Gail Bass and was modified for the final draft. The topic proposal was

sent via e-mail to the other OT students Stephanie and Kjersten, for review and approval for submittal. The topic proposal then was to be reviewed by DSS staff before submitting to the UND Graduate school.

November 8th, 2002

Cathy and Jeremiah met again at NDSU to review the topic proposal for the scholarly project and to discuss progress on research. The topic proposal was reviewed and approved by Cathy and DSS staff. Jeremiah reviewed current research findings with Cathy and asked about locating specific resources in order to obtain information appropriate for the project. Cathy expressed interest and excitement about some of the resources/information that was located. Cathy called NDSU library and researched the Internet with Jeremiah to find resources that would contribute to the project and assist with protocol development. Cathy developed a list of Internet resources to assist OT students with research.

November 11th, 2002

Jeremiah notified the OT faculty advisor (Gail) that DSS staff and OT group partners approved the topic proposal and was ready for submittal to the Graduate school. The faculty advisor then submitted the topic proposal to the graduate school.

November 15th, 2002

Jeremiah met with Cathy to educate and recommend an AT computer program and discuss progress. Jeremiah explained the importance of Inspiration®, an AT computer program. He explained the disability populations and student areas of difficulty that the program would be appropriate. He also demonstrated the tutorial and applications of Inspiration®. Jeremiah illustrated how information could be transferred

to and from a flowchart to an outline. Cathy expressed interest in the program and identified the value of the program. Jeremiah discussed with Cathy that the review of literature and protocols would be completed at the beginning of next semester, when all OT students would be available to meet. Information was given to Cathy about other two OT group partners and that she would be contacted next semester to schedule meetings to complete project.

March 7th, 2003

Stephanie and Kjersten had their first visit with Catherine Anderson, coordinator for NDSU's DSS staff. She familiarized them with other DSS staff, ITSS personnel, and services provided by DSS. They also received an overview of AT hardware and software currently available in the AT lab. They discussed and clarified specific areas of the project and determined timelines. Stephanie and Kjersten acquired pertinent statistics on populations served by DSS and determined populations to be focused on during project development. Catherine and a co-worker expressed a desire for Jeremiah, Stephanie and Kjersten to present outcomes to DSS staff and possibly aid in the awareness of DSS services and available AT for students with needs on the NDSU campus.

After consulting with Jeremiah, the team of three OT students decided to focus the development of protocols on the learning disabled population as that is the largest population served as well as the visually impaired population as that is the population with the highest need for AT services at NDSU.

March 9th and 10th, 2003

All three OT students met at the UND School of Medicine and Health Sciences Library to compile information from research into the review of literature. Informational research was also retrieved from the Internet to be included in the resource binder.

March 28th, 2003

Stephanie and Kjersten met once again with Catherine Anderson to discuss progress of the project. They asked for input regarding content of the protocols that are to be developed. Catherine suggested a number of sections that would be beneficial to the DSS staff working with students who have disabilities. The first suggested section identifies environmental accessibility to the AT lab and other computer clusters on the campus. Second, she suggested that sections for student AT goals, identification of student limitations or needs, and possible AT devices be included in the protocol. Finally, she thought that a section should be included that encourages communication between the DSS staff and other on-campus programs and personnel regarding the student's needs.

A deadline of April 11th, 2003 was set for the completion of a rough draft of these protocols. This will allow Catherine to consult with colleagues on the format and comprehensiveness of the protocols and provide feedback to the OT students. This will allow sufficient time for revisions to be made. In addition, a final meeting was proposed following the completion of the project to present information and the results of the scholarly project to NDSU DSS staff members.

April 3rd, 2003

On this date, Stephanie and Kjersten completed protocols for determining AT device use for learning disabled population and for the visually impaired population. The flowcharts were constructed using Inspiration, which is a software program that enables graphic representation of concepts. In addition, a general assessment form was completed to aid DSS staff in compiling background information, accessibility, and AT device needs. These documents were then faxed to Catherine Anderson for review and feedback on Friday, April 4th.

April 9th, 2003

The three OT students met to discuss plans for completion of the project, finalize the review of literature, and develop the AT protocol guidelines and the wish list. It was agreed upon by the students to meet on April 12th, 2003 to complete a rough draft of the project and to compile the resource binders.

April 12th, 2003

On this day, the OT students met to complete the rough draft of the scholarly project document. Resource binders were compiled and organized into sections. Plans were made regarding the poster presentation and the presentation for the NDSU DSS staff.

CHAPTER FOUR

PRODUCTS

Various types of products were developed through the completion of the scholarly project. A resource binder with journal articles, information on devices, assessment, accessibility, funding, and training was compiled for future use. Two copies of the binders were developed, one for NDSU DSS staff and one for UND OT Program faculty advisor. Two AT assessment protocols were created, one for those with learning disabilities and one for visually impaired, which includes flowcharts for low vision and no vision. A guideline was also made to assist DSS staff with developing additional protocols for other disability populations. A wish list was devised to aid DSS staff in selecting additional devices and programs meet various student needs.

Guidelines for Protocol Development

1. Identify population

2. Identify problem areas for specified population

3. Research AT options for specific problem areas

4. Use Inspiration® software to compose flowchart that includes problem areas and possible AT devices that may maximize educational potential

AT Wish List

Software Programs

Kurzweil Voice

Voice Type

CoWriter

Write out Loud

Inspiration

Franklin Speaking Language Master

Franklin Spelling Master

Xerox's BookWise

DecTalk

SoundProof

ZoomText

Equipment

Customized Keyboards

Right Bat Keyboard

Hand-held Spell Checker

Pencil Grips

Variable speech-control tape recorder

Personal data managers (voice organizer, Voice It)

Pocket PC

PDA

Personal FM listening system

Graph paper

Large-keyed calculator

Basic or scientific talking calculator (RadioShack talking calculator model EC-208)

Link

Tactile markers

Braille Key Labels

Magnifiers

Colored overlays

Refreshable Braille Output

Laptop with voice output

Books or notes on audiotape

CHAPTER 5

SUMMARY

Upon completion of this project, the OT students have recommended that DSS personnel from NDSU research additional AT devices in order to develop additional protocols using Inspiration® and the guidelines provided. It is also recommended that faculty increase training and understanding of AT for use within post-secondary education. DSS staff advocacy is an important aspect of increasing awareness of AT needs for student with disabilities to general education instructors, ITSS staff, and all others involved with the student's educational performance. In order to increase AT lab use, a few recommendations are proposed. First, easier access into the AT lab area by changing the card-key access method to a handicapped accessible automatic door would be beneficial for student of all disabilities. Second, placing specialized AT computers and devices into the general computer lab area would promote mainstreaming and decrease segregation of students with disabilities. Third, placing specialized computers and AT devices in various areas around campus will be more convenient and may increase use of the equipment. An AT device and programs wish list was compiled for NDSU DSS staff as recommendations that would maximize student's potential in this post-secondary educational setting.

During the completion of this project, it was requested by DSS staff that future OT students provide training to general faculty, DSS staff, and ITSS staff on the use of AT devices. It was also requested that future efforts be made to market the AT lab to increase student use.

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