Integrating Assistive Technology in the Vocational Evaluation Process for Individuals with Severe Multiple Disabilities—Modifying Assessment Tools and Adapting Work Samples.

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Abstract:

Students with severe disabilities, such as physical and sensory impairments, face significant barriers in accessing school programs, vocational evaluation and employment. Standardized commercially available work samples are designed for use primarily by individuals without physical, sensory and cognitive limitations. Practitioners have been reluctant to modify work samples, because they are apprehensive about compromising standardization. However, modifying work samples to be used in conjunction with assistive technology yields practical and valuable information for career and transition planning.

This paper presents ways in which vocational evaluation and AT professionals can work collaboratively to provide vocational evaluation services to individuals with severe multiple disabilities. Most students with severe physical disabilities referred for vocational evaluation services have already had an assistive technology assessment and are using technology to access the curriculum. Adaptations and modifications of assessments are needed in order to incorporate that technology into the career assessment process and determine possible vocational applications of the assistive technology. Specific accommodations and modifications related to this process are explored, including examples of adapted work samples and assistive technology. In addition, clear reporting of results and recommendations is critical and suggestions for effective reporting of results are offered.

Introduction

Vocational evaluation grew over the last thirty years as a result of legislation authorizing services for research and vocational placement of disabled individuals. The Vocational Rehabilitation Act of 1968, (P.L. 90-391) specifically extended programs in vocational evaluation and the landmark Rehabilitation Act of 1973 (P.L. 93-112) and its amendments emphasized services to the more severely disabled (Sink Jack M. & Field, Timothy F., 1981). Although Vocational/Work Evaluation in some form existed since the first decades of the 1900's, it was, according to Pruitt (1977), a means for industry to exclude individuals through "job tryouts" This system weeded out workers that did not learn the job quickly. The Vocational Rehabilitation system was charged with the task of emphasizing abilities of the more severely disabled individuals. In order to be inclusive, it developed a methodology that emphasized work as the basis of assessment. The 1960's and 70's likewise opened the door to Federal legislation that directly affected children and youth who had traditionally been excluded from services and appropriate education. These laws gave impetus to the Education of all Handicapped Children Act of 1974, which for the first time, mentioned a free and appropriate education for children with disabilities in the least restrictive environment. Ensuing legislation

guaranteed further protections and culminated in the current law, the Individuals with Disabilities Education Act (IDEA, 1997). IDEA mandates that students with disabilities receive school to work transition services, including assistive technology at age 14 or younger, if determined by their IEP. Beginning at age 16, or younger, if appropriate, a statement of transition services needed by the student must be included in the IEP (deFur, 2000). Transition goals may be: post secondary education, vocational training, independent employment, supported employment, continuing and adult education, adult services, independent living and community participation. Transition services are based on students' needs, preferences and interests and include vocational evaluation. Vocational evaluation is particularly important in the development of the Individualized Transition Plan (ITP) which is part of the student's IEP. The emphasis of school based vocational evaluation is to provide information for those goals, rather than actual job placement. The goal of the transition plan is to help the student prepare for the world of work and adult life (WRRC, 2000).

The focus of special education is congruent with that of vocational evaluation, students and their individual needs. Historically, students participated in a vocational evaluation that generally took place in a laboratory environment within the academic setting. As in vocational rehabilitation, vocational evaluation units in schools traditionally relied on standardized work samples (either commercial or home-made) and psychometrics to determine work related strengths and limitations. Behavioral observations during student performance on these instruments as well as test scores were used to determine worker traits and skills. These instruments typically are standardized and have cut off scores. Relying heavily on these methods, it was found, did not serve the needs of the students with disabilities, particularly those more severely affected. Through the past twenty years the field evolved to include other methods that are less exclusionary, such as assessment of students in the community. However, for a group of students where it is not feasible to perform this type of assessment, it has become necessary to think of ways to make the available tools accessible through the use of adapted computer access and assistive technology, often referred to as AT.

When using work samples, it is important that they are accessible to all individuals, but particularly to those with severe and multiple disabilities. Through the use of accommodations, appropriate goals for transition can be developed utilizing the student's strengths. Developments in assistive technology have opened possibilities to assess the strengths of the most severely disabled students. This presentation will address the manner in which some commercial work samples can be modified to uncover strengths and to develop goals.

Test Accommodations and Issues of Validity

With the passage of the 1997 Individuals with Disabilities Education Act, using testing accommodations has become indispensable. University of Wisconsin Professor Stephen N. Elliott (2001) uses the *access ramp* as a metaphor for testing accommodations.

> "Historically, access ramps were part of a package of testing accommodations for students with significant physical impairments. If students with disabilities can't get to the testing room, they certainly can't demonstrate what they know or can do. Testing accommodations facilitate access to a test for students with a wide range of disabilities,

just like a ramp facilitates access to a building for students with physical disabilities." (p. 25)

Accommodations should enable students with severe disabilities to access and to respond to the test in a manner that insures that their specific skills are assessed in relation to what the test is supposed to measure. The purpose of accommodations is to bring down barriers. They are the "what I can do," rather than "what I cannot do because of my disability."

Regarding validity and accommodations, most emphasis has been placed on psychometric tests. Federal, state, and regional guidelines have been developed to eliminate, or minimize the effect of accommodations on test validity. However, there is no consensus on how accommodations affect test results or in the manner of how these accommodations are to be used.

There is clear consensus regarding the importance of inferences made from assessments and the manner in which these are used. Elliott and Kratochwill (WCER, 2003) have pointed out these key aspects of validity:

- Validity is concerned with the general question, "To what extent will this assessment information or test score help me make an appropriate decision?
- Validity refers to the decisions that are made from assessment information, not the assessment approach or test itself. It is not appropriate to say "This assessment information is valid" unless you also say what decision or groups it is valid for. Assessment information that is valid for one decision or group of students is not necessarily valid for other decisions or groups.
- Validity involves an overall evaluative judgment. It requires an evaluation of the degree to which interpretations and uses of assessment results are justified by supporting evidence and in terms of the consequences of those interpretations and uses" (P. 6)

When using work samples that have been extensively modified, we are not concerned with the norms nor with "time measurements" because, in the first place, the norms are not representative of the students we are assessing; it is not feasible to develop norms for every disability or combination of disabilities. The alternative, not assessing these students at all, is not an option. Secondly, the results that we report are not made in terms of comparisons, but are the unique skills that the students demonstrate when performing these tests through the use of individualized accommodations so that appropriate transition goals can be developed. The inferences made from the results are valid if the evaluator has clearly stated: the goal of the evaluation, what specifically is to be measured, how it is to be measured (what accommodations are to be made) and reports in detail the process and the accommodations used, as well as the manner in which the results will be used. Elliott, J. Thurlow, M. Ysseldyke, J., & Erickson, R. (1997) report that

"Not all parts of a test, even within a single content area, necessarily measure the same skill. Hence, it is important to know the purpose of the test and its parts, what is being measured, and what accommodations would be appropriate" **(p. 7).**

Justifications for using AT and Adapting Work Samples in the Vocational Evaluation Process

The field of vocational evaluation has traditionally combined a variety of methods of assessment in order to provide a comprehensive picture of a person's capabilities. These include commercially developed work samples, psychometric tests, simulated work stations, and situational assessments. Individuals with the most severe physical, sensory, and cognitive disabilities, present a significant challenge to the evaluator, even with access to a wide array of assessments and methods for determining viable vocational alternatives.

According to Douglas Smith (2001), students with disabilities may be penalized by their limitations when taking tests. Inability to perform on a test is not necessarily evidence of failure to perform the measured skill. It may, however, be evidence of failure to measure the skill by the standard instrument. Modifying tasks so that students are capable of performing them insures that we are measuring abilities not disabilities.

Fran Smith (1983) has had extensive experience working with students with multiple and severe disabilities and incorporating AT into their vocational assessments. She also believes that the purpose of assessment is to determine the student's skills, not their ability to take a test or perform a work sample:

> "There are many advantages to using assistive technology in the vocational evaluation and assessment process. As a service, the purpose of assessment is to identify the individual's vocational strengths and needs. Often assistive technology can further enhance the assessment process through accommodations, particularly for those with severe disabilities." (p. 153)

Assessment instruments, including commercially developed work samples, were intended for individuals without severe limitations and were designed primarily to be used without additional aides or devices (Langton, 1991). However, work samples do provide an excellent opportunity to determine AT options, modify job tasks, and arguably the most valuable aspect of work sample assessments, observe behaviors. In making observations we determine a student's temperaments, preferences, learning style, work related behaviors as well as specific vocationally relevant skills. One of the greatest advantages of this process is that it affords the opportunity to observe over time how the student responds to the accommodations and the task with regard to persistence, stamina, frustration tolerance, and other significant behaviors. Of importance also is the degree to which the student participates in problem solving when applying the technology used in academic settings to a vocational situation. When adapting work samples and using AT, we reduce or eliminate the obstacles for the student so that we can observe their true potential for performing the task at hand.

Another function of a vocational evaluation is to provide students with the opportunity to explore careers. Work samples and simulated work stations reproduce real work tasks based on the requirements of particular occupations. The process of modifying work samples so that they may be completed via an adapted access, increases the severely disabled student's exposure to

occupational areas and allows him or her to make more informed decisions regarding interests. According to the *Guide to Using Assistive Technology in Assessment & Vocational Evaluation* (Langton, et al, 1997), the emphasis of a good assessment is on:

1) identifying strengths
2) verifying the extent of limitations
3) measuring essential physical and cognitive capabilities and
4) estimating learning and skill acquisition potential (p.2-3).

With applied assistive technology and work sample modification, it is possible to include these four goals in the vocational evaluation of students with severe multiple disabilities.

For individuals with multiple severe disabilities it is difficult, at best, to provide community based instruction and paid or unpaid work internships. The more involved the assistive technology or adapted computer access is, the more challenging it becomes to find employers willing or able to provide work experiences. The vocational evaluation lab is an appropriate venue to explore modifications to job tasks to see what accommodations, task adaptations, and combinations of technology might: 1) permit access by a student to the task in order to yield valuable information regarding his or her potential, and 2) explore alternatives to the traditional methods of task completion. For example, the traditional method for inputting data in a program such as Microsoft Access is through direct keyboarding. For individuals who cannot enter data through the traditional direct select keyboarding method, a database can sometimes be modified to incorporate drop down lists, enlarged fields, and the use of speech recognition software.

Role of the Vocational Evaluator in Assessing AT Needs

A vocational evaluator may find him or herself in one of two situations when asked to provide vocational evaluation services for individuals with severe, multiple disabilities such as spastic cerebral palsy, sensory impairment and cognitive limitations. In situation one, the individual referred is already using assistive technology to access the computer, communicate with others, or access his or her environment. In this case, it is important for the evaluator to understand how that technology can be applied in order to allow the individual to access the assessment. In order to do that, the evaluator must understand how the technology works, or have access to someone who understands how the technology works before and during the evaluation. In situation two, the individual referred for a vocational evaluation has multiple disabilities that prevent him or her from participating in an evaluation using the standard assessments and methods and he or she is not using any assistive technology. In this situation, the evaluator must have knowledge and access to assistive technology resources in order to explore alternatives to the traditional methods of task completion. In either situation, the role of the vocational evaluator is vital in applying assistive technology in the vocational evaluation process.

Vocational evaluators, regardless of setting, are in a unique position to evaluate the AT needs of individuals. Evaluators are trained and certified to recognize worker traits, and match individuals to occupations based on assessment of abilities and job requirements. Langton &

Lown (1995) state that vocational evaluators by nature of their training, are excellent candidates to take the leadership role in ensuring AT is integrated into the rehabilitation process (p. 7). Reed, Fried & Grimm (1993) state that "the application of assistive technology is nothing more than observing a person's functional limitations and utilizing technology to help overcome some or all of those limitations" (p.217).

Evaluators, by trade, are exceptionally good at observing work behaviors and determining how functional limitations can be turned into strengths. Whether vocational evaluators are trained themselves in the use and application of assistive technology or are connected to others that can be called on, an effective vocational evaluation cannot be completed unless assistive technology resources are available.

There may be several people from different disciplines who have the knowledge or expertise to determine AT needs and facilitate its use. The administering and delivery of AT services depends on the structure and function of an organization. In Fairfax County Public Schools in Virginia, a staff of trained teachers comprises the county's Integrated Technology Services (ITS). Staff from ITS is assigned to schools throughout the county to support students and teachers in the use of assistive technology. ITS staff members have backgrounds in special education, occupational therapy, physical therapy, audio logy, speech and language pathology, and vocational evaluation. Based on a referral process and subsequent assessment, students are identified as requiring AT in order to access the curriculum. The AT needed may include communication devices to help students who are nonverbal, as well as adapted access to both computers and augmentative communication devices. The initial assessment and on-going delivery of AT services are facilitated and monitored by ITS staff, but the application of the assistive technology is a collaborative effort on the part of the classroom teachers, students, parents, and ITS staff. In the case of the vocational evaluation program, or *career assessment*, an ITS staff person trained in assistive technology is assigned to work with career assessment staff as well as other career and transition programs in the county. This is a great advantage for career assessment staff as they provide vocational evaluations for students with the most severe disabilities. In other school districts or settings such as rehabilitation centers, a rehabilitation engineer, occupational therapist, and other designated professional with training and expertise in the applications of assistive technology might be considered the AT expert.

Regardless of who might be the primary person responsible for ensuring AT services are considered, the process of determining an individual's AT needs is a collaborative one and should include input from the person needing the assistance. In fact, Reed, et al, (1995) note the assessment must "stress self-determination and informed choice" (p.101). Therefore, students must be permitted to express their own preferences for various accommodations, AT devices and methods of instruction.

Increasingly, vocational evaluators in school settings are seeing more students with multiple and severe sensory, cognitive and physical disabilities that can only be evaluated with the use of extensive computer technology and test modifications. The degree of expertise in the use of adaptive devices related to computer access, controls and augmentative communication technology varies among practitioners. Many evaluators have acquired competencies through staff development courses, university courses, and other training, but may find the application of

the technology and the time involved in preparation challenging. The frequency of these types of vocational evaluations will impact the practitioner's expertise with these techniques. Thus, continued effort needs to be invested in maintaining, acquiring and developing skills. In all instances, it is essential prior to the assessment, that the evaluator determine the technology the student has been using and is familiar with.

Integrating AT into the Vocational Evaluation: Practical Experiences:

The Career Assessment Team of Fairfax County Public Schools addressed these issues when working with two students with Cerebral Palsy. Both presented with significant physical limitations and required adapted access to the computer. In addition, they used augmentative communication devices for verbal communication. A school staff member was sent with each student to assist with all personal needs, including feeding.

One student, we'll call him Henry, was diagnosed with Quadriplegia, was legally blind, and experienced some cognitive limitations . Henry used a torso strap for support. He accessed his electronic augmentative communication device and other environmental controls via a head switch. His speech was dysarthic and was severely affected by motor limitations.

The other student, Connie had normal vision, but significant cognitive delays with academic abilities limited to the pre-school level. She also required the use of a torso and pelvic strap to maintain an upright position in her wheelchair and was easily fatigued when this restraint was not fastened. She had no use of her left arm and limited range of motion with her right arm. Additionally, she experienced limited control of the dominant arm and hand, which tended to be rigid and prone to spastic movements. She had low oral-facial muscle tone and was virtually non-verbal. This student could communicate well using an electronic augmentative communication device, hand gestures, vocalizations and facial expressions. Both students used motorized wheel chairs.

Steps in Developing an Appropriate Vocational Evaluation Plan Using AT

Douglas Smith (2001) outlines ten steps in developing appropriate test accommodations. Although he is speaking in terms of standardized psychometric tests, the same principles can be applied when developing the Individual Vocational Evaluation Plan (IVEP) for students with severe and multiple disabilities.

The following addresses the steps (as presented by Smith) involved in developing an appropriate career assessment with accommodations and the use of assistive technology when working with students with such significant needs.

1) Determine the student's receptive skills and ability to understand the test.

Referral information, interviews with classroom teachers, observations of the students in their classrooms and discussions with the students provided the necessary information to determine their receptive skills. Both of these students had little difficulty processing verbal directions and responded well to task demonstration. Henry had a remarkable ability to retain

lengthy strings of verbal information that were concrete, but had difficulties with information that required inferences. It was determined through observations, that additional verbal prompts were often necessary to move both students from one step of a task to the next until they had mastered the activity. Use of written directions was limited due to cognitive/academic limitations in the case of Connie and visual impairments with Henry.

Henry required models, screen magnification and color backgrounds. He had considerable difficulty conceptualizing some of the tasks because he could not see the entire configuration simultaneously due to magnification. Because of this factor, hard-copy models were used and presented in his left visual field and slowly moved to the right giving him sufficient time to process the materials. Also, he required prompts to progress through formats requiring progression from one field to another. Because of these issues and the slow time to process new information, the student required considerable orientation and training to learn new tasks using the software.

However, he was able to perform several clerical work samples involving bookkeeping and data entry tasks, once he had learned to use the tools. Given more practice time, he would have been able to perform the tasks independently.

Connie was able to perform rote activities, such as entering three digit account numbers or comparing and editing data, but seemed less able to conceptualize the work and perform it independently. Therefore, use of these tasks appears not to have assessed her work skills beyond using a computer for rote data entry tasks.

2) Determine the student's expressive skills and their ability to respond/perform the test.

Both students used computerized augmentative communication devices. In addition, Henry used a head activated switch to access the computer. Henry had difficulty expressing himself verbally. His speech was dysarthic and uncoordinated articulation made speech difficult to understand initially. Muscle weakness and breath control resulted in extremely slow and laborious voice production which fatigued the student, although he persisted and willingly repeated responses. Occasionally, in the case of Henry, the communication device was used as an interface with the computer, which required it to be set-up for input rather than communication. However, both students were willing and able to communicate verbally when necessary.

Most work samples require performances that are manipulative. "Expressive skills", or the ability to perform tasks, is dependent on the use of the hands. However, with these students, use of the hands was significantly limited or non-existent. Therefore, it was necessary to determine the most efficient mode for each student to use in order to access the work samples.

In the case of Henry, all work samples were completed using the computer through adapted access i.e.., scanning software, switch access, screen magnifiers, high contrast for visual cues, word prediction and text to speech software. Devices had to be programmed for use with the specific software and task being performed. The assessment team worked closely with the AT specialist who provided technical support.

Connie had significant issues regarding range of motion, spastic movements of the dominant hand/arm and limited grasping abilities. It was determined during the referral process, that Connie had never used adapted access to the computer. Her limited exposure to computer use during class had involved minimal word processing tasks and using interactive academic software. This student had been using a standard QWERTY keyboard, in an attempt to use the least restrictive form of access. During the assessment, it was determined that use of a membrane keyboard, key guard, and Windows accessibility features would prove more useful when performing work related tasks.

3) What is the construct/skill being measured?

When modifying work samples to such a significant degree are we truly measuring the skills they were intended to assess? Here we need to go back to the goal of our assessment. Given the accommodations provided, which skills do the students manifest and what are their weaknesses? What were the constraints in cases where the students did not complete the work samples? In what way did the physical/cognitive aspects of the disability affect the student's performance? What relevant behaviors were observed throughout the process?

It was determined that several work samples could be modified to be completed via the computer. These included the VALPAR Daily Log and Disbursement Ledger, the VITAS Verifying Numbers, and Census Interview, and the Attainment Data Entry and Order Processing. Henry attempted to write a letter using word prediction and a text to speech word processing program. Microsoft Office applications were used to modify the work samples.

Traditionally, these clerical work samples assess the student's abilities as compared to norm groups. They also afford an excellent opportunity to observe behaviors in a standard manner. Such aptitudes include, but are not limited to:

- ✓ clerical perception
- ✓ attention to detail
- ✓ ability to follow verbal and/or demonstrated directions
- ✓ ability to use office machines, such as calculators
- ✓ numerical reasoning
- ✓ finger dexterity
- ✓ motor coordination
- ✓ task conceptualization

In the case of Henry, he demonstrated strengths related to several of the above factors. When compensated for vision, he was attentive to detail. Additionally, he demonstrated the ability to follow verbal directions and demonstrations.

However, in the case of Connie, the emphasis of using these work samples was to determine the type of adapted access that would provide the most efficient means for using a computer to perform data entry tasks. Because of the student's limited cognitive abilities, the VALPAR Daily Log was used as a springboard to determine if the student would be able to perform simple data entry tasks using a membrane keyboard. In this case, an overlay that eliminated extraneous keys was designed especially for use with the VALPAR work sample.

With the special overlay, Connie merely had to choose code numbers and monetary amounts on her keyboard that matched what was presented on her hard copy.

Despite the discrepancy between Connie's skills and her ability to complete the tests, valuable information was gained in using these activities. She had a difficult time using keyboards due to limited range of motion, no use of the left hand and limited control of the right hand. Without the use of AT, we would have dismissed using data entry tasks with this student. However, by using various adapted access devices we learned that:

- ✓ using Windows accessibility options minimized her typing errors
- ✓ setting the arrow keys as the mouse functions was too confusing to the student who had difficulties understanding orientation, however, in terms of manipulation, the arrow keys were more easily operated than a mouse
- ✓ use of the standard mouse was easier than the trackball mouse
- ✓ using a smaller keyboard with a key-guard prevented the student from touching unwanted keys and eliminated range of motion issues
- ✓ specially designed membrane keyboard overlays allowed the student to enter strings of information, thereby eliminating keystrokes and the opportunity for error.

We also learned that the student could:

- ✓ identify and match numeric and alphabetic data
- ✓ open database records by entering account numbers
- ✓ determine if a bill was paid or a balance due existed
- ✓ independently find and correct her errors
- ✓ type accurately when appropriate accessibility features were used
- ✓ enjoy repetitive work
- ✓ quickly learn the use of newly introduced AT devices
- ✓ express her preference for various accommodations versus others

4) What is the purpose of the assessment?

The goal of Career Assessment in the public schools is to determine appropriate career and transition related goals that address the student's interests, temperaments, learning style and abilities. Additional goals in the case of the severally physically and sensory disabled student include identifying how the AT the student is using can be applied toward vocational goals, such as job accommodations. Moreover, it is important to identify how assistive technology can be used to obtain vocational related goals, such as accessing the computer for performing data entry tasks, using a communication device for specific job related vocabulary and other appropriate objectives.

5) What tests can be used to address the assessment goals?

Work samples are a natural source of assessment data. They are easily modified and adapted to address individual learning styles and other needs. Because they simulate real work, the student's performance on work samples can be observed and measured in terms of job requirements. According to NICHY (1990), the focus of Career Assessment has shifted from

diagnosing student's limitations to identifying barriers to work and identifying appropriate accommodations to implement on the job. Work samples provide a snapshot view of the types of barriers our students face when performing specific types of job tasks. In addition, they can be considered a springboard for developing appropriate accommodations to similar barriers on the job site.

For example, the VALPAR Daily Log work sample was programmed in an Excel spreadsheet for Henry, because his physical and visual impairments precluded him from doing this paper and pencil task in the traditional manner. By using Excel, the assessment team was simulating a typical data entry task.

6) What receptive/expressive skills does the test require?

As noted previously, most work samples are manipulative in nature. Whether they simply require the use of a pencil for recording answers or tools for assembling parts, the bulk of the work samples used in Career Assessment rely on use of the hands. Therefore, modifications to the work station and task are necessary when working with the severely involved student. Jigs, stabilizers, adjustable tables, adapted keyboards and other AT devices will be necessary to use with standardized work samples. In terms of receptive skills, one should address individual learning styles when working with any student. In the case of Henry, we also had to be concerned about visual input. Therefore, hard copy materials were enlarged, contrasting background/foreground was used, fonts on the computer screen were enlarged and scanning software was used to accommodate spreadsheets.

In the VALPAR Bookkeeping Daily Log, students record medical charges in the charge column of the Daily Log work sheet and determine the balance for each patient. They are provided with a fee schedule. Each item in the fee schedule has a code number. These code numbers are recorded next to the patient's name on a work sheet. For instance, an office call is coded 01. The fee for an office call is $10.00. It was determined that Henry would need the following modifications implemented with the Excel Spreadsheet, all of which could be replicated on a job site.

- ✓ an Excel worksheet with black background to simulate the Daily Log hard copy
- ✓ an enlarged on-screen font of 100 point Ariel
- ✓ use of a head activated switch to navigate through the Excel worksheet
- ✓ different colored columns to ease in tracking across fields
- ✓ auditory scanning feedback to inform the student what field she was working in
- ✓ automatic entry of amounts and calculations of totals based on student input of codes

The first row of the list in the Excel worksheet contained the following labels for each column: NAME, CODE, CODE, TOTAL, CHARGES, AMOUNT PAID and BALANCE. The worksheet was programmed to enter specific values corresponding to the codes that were entered. Code columns were automatically totaled upon entering the codes and amount paid. The switch provided auditory feedback as it scanned twice through the set up.

The student was given instructions about the nature of the work sample and the requirements of the task. The fee schedule was reproduced on a cardboard sheet 22 inches tall by 28 inches wide. For contrast, information was printed on yellow background with 1 ¼ inch tall black Ariel Font. For example:

01	Office Call	45.00
05	Chest X-Ray	130.00

The student was presented with a model each time he needed to determine what to charge each individual patient. Use of the chart and the Excel spreadsheet were rehearsed. Before entering each record, the student was shown an enlarged model of the record. For instance, the student was presented with the following record that contained two codes in order to determine the balance:

Name	Code	Paid
CHARLES BELL	OFFICE CALL LAB	$35.00

In order to determine the balance due, the student had to refer to the Fee Schedule, which shows that an Office Call is code 01 and Lab is code 03. As the student entered the codes, the program determined the appropriate charges and automatically entered the correct amount in the Balance Column. The student then needed to refer to the Paid amount and enter this amount in the cell under Paid Column. The program then automatically used the formula to deduct the paid amount from the balance and entered the correct amount in that cell. Following training and rehearsal, the student was able to see (with effort) the white box surrounding the active cells and learned to discern which record she was working in with reference to color and outlining box. As she proceeded through the task, the student memorized many of the codes and amounts paid and relied less on the hard copy model.

7) Are the student's skills sufficient for completing the test/s?

As noted previously, Connie's cognitive abilities limited her performance. She could complete the tasks as modified, but was not able to demonstrate the constructs the tests were designed to assess. In addition, both students experienced limitations in physical stamina. They had to exert a good deal of physical effort to complete the tasks as well as to communicate. In the case of Henry, he demonstrated appropriate stamina to complete the tasks presented, despite being easily fatigued. He was able to follow and retain verbal directions. In addition, he demonstrated strengths in clerical perception and detail. He easily conceptualized the tasks to be performed. He used models and followed demonstrations and easily learned how to use new software to perform tasks. Both students were able to use Microsoft Office applications with appropriate accommodations. Moreover, they were able to advocate for themselves and make suggestions for accommodations. Lastly, both students were able to access the computer with adaptive devices.

8) What accommodations are needed?

In the case of severally physically and sensory involved students it is important to do a lot of ground work prior to the assessment. To determine appropriate accommodations for the assessments described in this paper, the vocational evaluators made classroom observations and conferred with the classroom teachers, occupational therapists, vision specialists, AT professionals and teachers. In addition, they consulted the students to learn what adaptations they preferred and felt most comfortable with. Typically, students with severe multiple disabilities may need the following AT:

- ✓ alternative keyboards
- ✓ track ball mouse or other pointing device
- ✓ switches
- ✓ on-screen keyboards
- ✓ touch windows
- ✓ scanning software
- ✓ Windows accessibility features
- ✓ voice recognition software
- ✓ talking word processors
- ✓ word prediction programs
- ✓ membrane keyboards and originally designed overlays for use with specific work samples
- ✓ adjustable height work stations
- ✓ special work trays for the wheelchair
- ✓ peripherals and cables needed to access the computer using special keyboards/pointers, etc.
- ✓ Dysum

9) Will the accommodations compromise test validity?

All tests were administered in a non-standard manner, and were untimed. This is the only manner that the tests could be administered in view of the students' significant disabilities. In some cases, the students did not complete work samples due to stamina issues and the extra time required for training and orientation to the software and AT being used. Therefore, scores could not be obtained for these partially completed tasks. Significant accommodations would have compromised the validity of the results had the goal been to use the results of performances for comparison purposes. In this case, the goal of the assessment was to ascertain what skills the students had and how these were demonstrated through the use of technology. In addition, information was gained concerning how the work environment could be replicated in job training and placement settings, given the same or similar accommodations and technology. One can assume with a degree of confidence that, in the future, advances in technology will afford individuals with disabilities considerably more opportunities to demonstrate their skills. In these cases, the work samples were the vehicle to express these skills.

In terms of Career Assessment, behavioral observations are more crucial than normative data. Behavioral observations could be relied upon for making predictions concerning future success on similar activities, given adequate time and training opportunity. The referring programs will use the information gained from observations to develop appropriate transition related goals. Test scores are not as useful to the special educator who will develop IEP and

transition goals. However, the observation that a student performs data entry tasks with better accuracy when using a key-guard or with the use of a switch as a computer access is invaluable to the classroom teacher and future employer.

1***0) Carefully document all accommodations used and provide appropriate caveats concerning test result interpretation in light of the changes made.***

The career assessment report should include detailed descriptions of the accommodations provided, including use of AT. Whenever possible, photographs should be included that show work station adaptations as well as the AT used. Readers should be advised that the norms do not apply and that the purpose of assessment was to determine career related interests, temperaments, strengths and needs, learning styles, work related behaviors and to determine appropriate accommodations. Recommendations should be made for a continuum of AT assessment services as the student's needs may change dependent on the job requirements. Information resources regarding AT should be outlined in the recommendations section. Referring programs and parents should be informed of the available information on the internet, including the Job Accommodation Network and Abledata.

Issues Specific to Working with Students Who Have Severe and Multiple Disabilities:

Many issues need to be considered when developing an appropriate Career Assessment for students with severe and multiple disabilities. Consider the following questions when developing an assessment plan:

- ✓ What AT devices does the student currently use and what else might be necessary for completing assessment tasks?
- ✓ Is there access to appropriate AT devices during the assessment?
- ✓ Are the evaluators trained in AT? If not, is there an AT specialist available to work with?
- ✓ How much time is needed to adapt the work samples? Can this be done prior to the assessment?
- ✓ Will new activities and methods, such as special membrane keyboard overlays, communication device pages, color-coded fields on spread sheets or models to compensate for visual deficiencies need to be developed? If so, how much time is there to invest in development?
- ✓ Is the assessment center physically laid out to accommodate the special needs of this population? What needs to be modified prior to the student's attendance?
- ✓ How does the student communicate?
- ✓ What is the effect of the disability on stamina?
- ✓ Will the student require assistance with personal needs? Will they be accompanied by an assistant to help with toileting and feeding?
- ✓ What does the student use for mobility? How does the student operate their motorized wheelchair?
- ✓ Can the student transfer from their wheelchair independently?
- ✓ Does the student require use of special pointing devices?
- ✓ What are the students other physical abilities and/or limitations that will affect their performance during the assessment?

- ✓ Are medications administered during the scheduled time at the assessment lab? What are the dosages and administration instructions? Who is the responsible party for administering medications in the school?
- ✓ What are the student's cognitive abilities? How will their cognitive skills impact their performance and ability to conceptualize the work samples?

Conclusions

The goals of the vocational assessment and the role of the evaluator have changed quite dramatically over the past several years. Access to assistive technology by persons with disabilities has been mandated in various legislative acts. Vocational assessment has shifted its focus from identifying weaknesses that exclude employment options for disabled person's to identifying barriers to work and emphasizing strengths. This view demands that evaluators identify appropriate accommodations that make work tasks accessible to these individuals. Work samples can be used as a catalyst in determining specific barriers to task performance as well as appropriate job accommodations.

The goal of the school-based vocational assessment is to identify transition goals, such as job training options and appropriate job accommodations. Students with severe multiple disabilities are being referred for vocational assessment more often than in the past. These students provide a challenge to the vocational evaluator who must adapt work samples and create appropriate activities to address the multiple needs of this population. Assistive technology provides an avenue for determining these students' aptitudes by providing access to tasks that they may not have had before.

Adapted access to the computer may include use of alternative keyboards, switches, voice activated software and a variety of other tools. Evaluators may want to adapt commercial work samples for use on the computer so that those with severe physical impairments can access these tasks. Work samples may need to be modified to such an extent that the normative data can not be used. However, behavioral observations, the cornerstone of the vocational assessment, will provide useful information in determining appropriate transition goals. Preplanning is essential when modifying work samples and using assistive technology. Vocational evaluators should consult with teachers, counselors, specialists, therapists, parents and the student prior to developing the Individual Vocational Evaluation Plan.

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