

ASSISTIVE TECHNOLOGY

Predictors of assistive technology use: The importance of personal and psychosocial factors

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Abstract

Objective. To validate an assistive technology (AT) baseline and outcomes measure and to quantify the measure's value in determining the best match of consumer and AT considering consumer ratings of their subjective quality of life, mood, support from others, motivation for AT use, program/therapist reliance, and self-determination/self-esteem.

Design. Prospective multi-cohort study.

Setting. Vocational rehabilitation offices and community.

Participants. Over 150 vocational rehabilitation counselors in 25 U.S. states with one consumer each receiving new AT.

Interventions. Counselor training in the *Matching Person and Technology (MPT) Model* and consumer completion of the MPT measure, *Assistive Technology Device Predisposition Assessment (ATD PA)*.

Main outcome measures. Total and subscale scores on the *ATD PA* as well as counselor-completed questionnaires.

Results. *ATD PA* items differentiated consumer predispositions to AT use as well as AT and user match. There were no significant differences due to gender, physical locality, or age within this sample of working-age adult consumers. Vocational rehabilitation counselors exposed to training in the *MPT Model* achieved enhanced AT service delivery outcomes.

Conclusions. The *ATD PA* is a valid measure of predisposition to use an AT and the subsequent match of AT and user. Rehabilitation practitioners who use the *ATD PA* will achieve evidence-based practice and can expect to see enhanced AT service delivery outcomes.

Keywords: *Assistive technology, quality of life, evidence-based practice, outcomes research, assessment, personality, impact, prediction*

Introduction

Outcomes of assistive technology (AT) use are important indicators of a quality service delivery process [1–5]. From the perspective of consumers and rehabilitation providers, equally or more important is being able to create an optimal match of person and technology at the outset and involve the consumer in AT selection [6–8]. Recent developments in outcomes assessment research confirm the importance of an appropriate

early assessment of consumer needs for AT [9–12].

As the available options and features of assistive technologies (AT) have increased, their use has been more widely considered and recommended [13]. Differences among individual users can be better accommodated due to this expanded choice; however, the process of matching person and technology remains complex because people's expectations of and reactions to technologies are complex [7,8]. Reactions are also highly individualized as people

react to changes in their physical and sensory capabilities according to many factors. These factors include their personality and personal attitudes; background experiences; lifestyle preferences; established interpersonal networks and communication needs; judgment and outlook regarding their perceived capabilities and functioning in a variety of situations; subjective quality of life/well-being; and the adjustment patterns they have established to deal with loss and change [8,12,14–19]. Expectations and reactions also emerge from varying needs, abilities, preferences, and past experiences with and exposures to technologies and social/cultural/environmental support for technology use [7,8,20,21].

One model that has been posited to account for these myriad influences is the Matching Person and Technology (MPT) Model and accompanying assessment instruments, first presented in 1989 [22]. The MPT Model focuses on three primary areas: (a) milieu/ environment factors influencing use; (b) consumer personal and psychosocial characteristics, needs and preferences, and (c) functions and features of the most desirable and appropriate technology. Components of the three primary areas in the MPT Model have been depicted and described in detail elsewhere [8,18]. To operationalize the model and theory, an assessment process consisting of several instruments was developed through participatory action research addressing differences between technology users and non-users. The assessments are clinical measures that identify barriers to technology use for a particular individual. Table I lists all the assessment forms in the MPT portfolio.

The MPT process is both a personal and collaborative (consumer and provider working together) assessment. As shown in Table I, a range of assessments are offered from a quick screen, to

specialized evaluations (which are specific to types of technology and can be completed in approximately 15 minutes each) to a comprehensive assessment (completing Steps One-Three, which can be done in approximately 45 minutes by someone trained and experienced in using the forms). The full MPT process (Steps One-Six) is best divided into two or more meetings with the consumer; this is even more important to consider if more than one assessment form listed in Step Three is selected. These assessment tools can also be used as interview guides. The MPT process is validated for use by persons with disabilities (ages 15 and up) and is applicable across a variety of users and settings. The measures have been determined to have good reliability and validity and they have been used in research studies within the US [22–24], Canada, and Europe [25].

The goals of the present study addressed one specific MPT assessment, the Assistive Technology Device Predisposition Assessment (ATD PA) Person and Device Forms and supporting materials, which consist of computerized scoring and interpretations (developed from consumer and provider input) [8,26] and an interactive CD training program for professionals (also developed from consumer and provider suggestions) [27]. The ATD PA Person Form has 54 items divided into three sections:

- *Section A* (9 items): consumer ratings of functional capabilities (5-point Likert scale),
- *Section B* (12 items): quality of life/ subjective well-being in the context of the World Health Organization's International Classification of Functioning, Disability and Health (ICF) [28] domains of Activity and Participation (5-point Likert scale),
- *Section C* (33 items): consumer personal and psychosocial characteristics (yes/no). This sec-

Table I. The Matching Person & Technology Assessment Process and Instruments.

Step One: Initial Worksheet for the Matching Person and Technology (MPT) Model is used to determine initial goals and potential interventions supportive of goal achievement.

Step Two: History of Support Use is used to identify supports used in the past, satisfaction with those supports, and those which are desired and needed but not yet available to the consumer.

Step Three: Specific technology matching: The consumer is asked to complete his or her version of the appropriate form depending on the type of technology under consideration:

- General: *Survey of Technology Use (SOTU)*
- Assistive: *Assistive Technology Device Predisposition Assessment (ATD PA)*
- Educational: *Educational Technology Predisposition Assessment (ET PA)*
- Workplace: *Workplace Technology Predisposition Assessment (WT PA)*
- Healthcare: *Healthcare Technology Predisposition Assessment (HCT PA)*

Step Four: The consumer and professional discuss factors that may indicate problems with optimal use of the technology.

Step Five: After problem areas have been noted, the professional and consumer work to identify specific intervention strategies and devise an action plan to address the problems.

Step Six: A follow-up assessment is conducted to determine any adjustments or accommodations needed to the technology and to inquire into goal achievement and whether the consumer has changed priorities.

tion is comprised of eight subscales as follows: Mood, Self-Esteem, Self-determination, Autonomy, Family Support, Friend Support, Therapist and Program Reliance, and Motivation to Use Support

The ATD PA Device Form has 12 items asking respondents to rate their predisposition to using the AT under consideration (or *AT and User Match* at follow-up). Sample items in the Person and Device forms are in the Appendix.

The ATD PA Person and Device Forms (as well as several other MPT assessments) are compatible with the World Health Organizations' ICF and, thus, may be considered measures relevant for use in assessing ICF domains as impacted by technology use [29,30]. Table II lists the principal ICF domains and the MPT measures most appropriate for the assessment of each.

In spite of the increased variety and availability of AT, approximately 30% of obtained ATs are discarded within a year [5,6]. While there are many positive as well as undesirable reasons for this rate of discard, a major reason is poor assessment of consumer needs and preferences [6,26]. Key to an individual obtaining a quality assessment of needs and the most personally appropriate devices is the availability of skilled AT providers who understand the importance of a consumer-driven process and are able to provide appropriate and adequate services. Many professionals working with persons with disabilities are unaware of assistive technologies (AT), do not know how to obtain and fund them, and do not have an effective process for matching person and device even though AT is recognized in a succession of U.S. statutes (including the Americans with Disabilities Act) as they were enacted or reauthorized. Moreover, many professionals want to be, and realize they need to be, more consumer-responsive, but have not received the training they need in how to accomplish this.

Consistent with the findings of earlier research with individuals provided with assistive technology devices who subsequently became either users or

non-users of those devices [8], it was hypothesized that specific personal and psychosocial variables exist which can serve as predictors of a person's predisposition to and subsequent match with a given AT. The hypothesis was that a quantifiable relationship exists between the ATD PA's measure of subjective quality of life and well-being (Section B items) and personal and psychosocial characteristics (Section C items) such that it is possible to predict a consumer's predisposition to use a particular assistive technology as measured by the 12-item ATD PA device form. It is further hypothesized that these same factors are predictive of the degree of match of AT and user.

Method

The development and validation of the ATD PA followed the recommended steps for test/measure construction as follows: (1) concept definition and clarification, (2) draft of items and response scales, (3) pilot testing, and (4) determination of measure quality and usefulness. The underlying MPT model/theory emerged from a grounded theory research study [8]. To operationalize the model and theory, an assessment process consisting of several instruments was developed from the experiences of technology users and non-users through participatory action research. Items emerged from characteristics differentiating the actual experiences of users and non-users.

To further determine the validity and usefulness of the ATD PA as a measure capable of predicting predispositions to the use of a particular AT by an individual, as well as the subsequent match of AT and user, a multi-cohort study of vocational rehabilitation counselors was conducted. At the time of the study, the counselors were employed by State Departments of Rehabilitation and were concurrently earning their Masters of Science degree in Rehabilitation Counseling, as required by the Comprehensive System of Personnel Development (Section 101(a) (7) of the Rehabilitation Act Amendments of 1992).

Table II. Compatibility with the World Health Organizations' International Classification of Functioning, Disability and Health and the ISO9999 Standards.

Body Structure and Functions. Consumer ratings of motor and sensory capabilities and skills (Initial Worksheet, SOTU, ATD PA).
Activity and Participation: Consumer ratings of achievements in general ADL and IADL activities (e.g., reading/writing, household, self-care, recreation, employment, learning) on the ATD PA as well as education, employment and recreation (also ET PA, WT PA).
Environmental Factors: Physical, social, attitudinal. Also items related to the match of environment features to potential technology use by the person in several areas (general AT use: SOTU, ATD PA; educational context: ET PA; worksite context: WT PA; health care/medical technology context: HCT PA). Sample items include: cost of technology/funding mechanisms, support services/training, service delivery systems, AT characteristics, general reactions of others toward technology use, etc.
Personal Factors. Personal resources, psychosocial status (SOTU, ATD PA, ET PA)

Georgia State University, the University of North Texas and San Diego State University formed a Consortium for Distance Education in Rehabilitation (CDER) to provide a Council on Rehabilitation Education (CORE) accredited [31] Masters of Science in Rehabilitation Counseling through distance learning technology. The program is currently offered throughout the U.S. and Canada. Students are primarily professional vocational rehabilitation counselors who need to obtain a Master's degree in rehabilitation counseling and/or pass the certification exam in order to maintain their employment.

One of the required courses in the program is Applications of Rehabilitation Technology, developed by the second author [32,33], which was offered Fall 2002 (91 students) and Spring 2004 (68 students). The 12-week course is interactive, using mediated technology (e.g., discussion boards, weblectures, video and audiostreaming). Described in detail elsewhere [32,33], the purpose of the course is to equip rehabilitation professionals with the knowledge and skills to support a consumer-driven process for assessing AT needs. Course content includes research and resources on acquisition and funding of AT devices and services, and strategies for interdisciplinary and collaborative approaches for effectively integrating assistive technology into the user's life.

The major course project (representing over a third of the students' course grade) requires students to identify an individual who is interested in and may benefit from the use of assistive technology, and to help them make informed decisions on the assistive technology devices that best fits his or her needs. Students were required to view the videotape (2002 cohort) and the interactive CD training program (2004 cohort), "Matching Person and Technology", which describe the Matching Person & Technology process, rationale, and procedures as well as specific assessment forms. The steps and components of the course project as described in the course syllabus include:

1. Identification of an individual with a disability who is interested in and who may benefit from the use of assistive technology.
2. Use of the Matching Person and Technology (MPT) assessments to interview the individual (and significant others as appropriate) to help identify a desired activity and to determine incentives and disincentives for using AT. All MPT forms were made available to the students, but they were required to use the following forms:
 - Initial Worksheet for the Matching Person & Technology (MPT) Model
 - Survey of Technology Use

- Assistive Technology Device Predisposition Assessment Person Form
 - Assistive Technology Device Predisposition Assessment Device Form. The students sent their completed ATD PA Person and Device Forms by fax to the University of Rochester Medical Center where the responses were entered into an Excel program. The Excel program generated scale scores with interpretations that were returned to the students electronically (as E-mail attachments). Students were then asked to integrate the assessment analysis with their own perspectives and conclusions versus simply including the computer-generated written analysis.
3. After students identified the area of AT that might be appropriate, they researched appropriate devices for meeting the needs of the individual and were asked to describe the AT(s) they and the consumer selected along with a rationale.
 4. After investigating possible funding sources and their availability, students were asked to describe how the consumer would obtain the recommended device(s).
 5. Finally, students were asked to evaluate the process from beginning to end and its impact on their role as a professional.

All students completing the distance education courses were requested to complete an anonymous online evaluation of the course. They responded on a scale using: SA = Strongly Agree, A = Agree, NS = Not Sure, D = Disagree, SD = Strongly Disagree. Questions addressed the implementation of the course objectives (i.e., "As a result of this course, I am able to apply the use of assistive technology to enhance vocational opportunities") and the effectiveness of specific assignments and course materials (i.e., "The MPT Model, Survey Analysis and Top Three Recommendations contributed to my understanding and/or skills in Applications of Rehab Technology.") Other sections of the evaluation form related to the quality of communication and support with faculty and staff, accessibility and usability of the website, and general impressions of the course.

Data Analyses

Internal consistency reliability. It is important to know how clear, nonambiguous, reliable and consistent responses are among the items on the ATD PA Person Form. The reliability of each scale was empirically examined through the calculation of Cronbach's Alpha coefficients. The greater the consistency and reliability, the higher coefficient

alpha will be. Generally, scales that obtain Alpha levels of 0.70 or greater are considered to be reliable.

Predictive validity. A score of 60 on the ATD PA Device Form means the individual expects to experience maximum benefit from use of the AT (12 items x maximum score of 5 points = 60). A score of 60 would indicate a highly favorable predisposition to use the particular AT. In reality, however, respondents vary in their predispositions to use a selected AT. A 3-group categorical dependent variable was statistically created (weak, moderate, strong *AT Predisposition*) as determined by the percentile score distribution computed by SPSS 11.0.

Counselors/students were contacted three- to four-months after completing the ATD PA and asked to rate on a 10-point scale how well the selected AT matched with their consumer's needs and preferences. A 4-group categorical dependent variable was statistically created according to percentile score distribution computed by SPSS 11.0. This dependent variable was called *AT and User Match* and the values of the four categories were labeled 0 (not using), 1 (adequate), 2(good) and 3 ("perfect match").

Discriminant analyses were performed to see which of the 45 Section B and Section C items on the ATD PA Person form predicted *AT Predisposition* and *AT and User Match*.

Ethical principles and research with human subjects

Quality of materials. Based on the results of measurement standards applied to date, and through a number of validation studies, the ATD PA has been determined to have reasonable inter-rater reliability and validity [25].

Interpretations of the results of the ATD PA forms were developed from comments provided by consumers and providers and were then reviewed in August-September 2003 by members of the Assistive Technology Special Interest Group, Division 22 (Rehabilitation Psychology), American Psychological Association. The AT SIG consists of licensed counseling and clinical psychologists as well as neuropsychologists, many of whom have been awarded certification in rehabilitation psychology by the American Board of Professional Psychology.

Research with human subjects approval. The general protocol was reviewed and approved by the Committee on Investigations Involving Human Subjects, University of Rochester School of Medicine and Dentistry. Additionally, the Council of State Administrators of Vocational Rehabilitation (CSAVR) approved the participation of the distance education students in the research activities. CSAVR is composed of the chief administrators of the public rehabilitation agencies serving individuals with physical and mental disabilities in the States, District of Columbia, and the territories. These agencies constitute the state partners in the State-Federal program of rehabilitation services provided under the Rehabilitation Act of 1973, as amended. The Council's members supervise the rehabilitation of some 1.2 million persons with disabilities. The Council's Committee on Rehabilitation Research is charged with the consideration of all issues involving research affecting the State-Federal Rehabilitation Program and it reviews requests for State Vocational Rehabilitation Agencies to participate in national surveys.

The course instructor specifically advised students via the syllabus and email messages that their assignment, "is more than a class project to the individual-please don't leave anyone in limbo without a follow-up plan for acquiring their AT!"

Results

The data reported here are from the 2002 and 2004 student cohorts. Data from 2002 (Sample 1) was used to refine the supporting materials used in 2004 (Sample 2). For their course project, students had the option of involving consumers from their case-loads (work-eligible adults), which the majority did, or identifying friends and relatives with AT needs. Table III gives the demographic background of the consumers who participated. The respondents reported functional limitations in mobility, upper and lower extremity control, eyesight, hearing, and speech communication, providing a mix of represented disabilities.

Internal consistency reliability

To determine how clear, nonambiguous, reliable and consistent responses are among the items comprising

Table III. Consumer demographics.

Cohort	N	Age			Gender		
		Mean	S.D.	Range	Male	Female	Not report.
2002	91	37.59	14.40	17-75	41	33	17
2004	68	38.09	15.40	17-77	20	37	11

the scales of the ATD PA Person Form, Cronbach's Alpha scores for each of the subscales were calculated. The results are presented in Table IV. The scores reported are nonstandardized values. Scale scores are standardized in order to have a uniform mean and standard deviation and to be able to make direct comparisons among the scales. This was not an objective of the current study and, thus, non-standardized scores are used. All values of Alpha are above .70 and we can generally conclude that the subscales of the ATD PA Person Form are reliable.

Predictive validity

As expected, respondents varied in their predispositions to use the selected AT according to their ATD PA Device Form total scores (weak, moderate, strong predisposition). This 3-group categorical dependent variable was statistically computed by SPSS 11.0 based on percentile score of the ATD PA Device Form total value. Only cases with complete data were used (a missing value on any variable disqualified the case from inclusion). Table V gives the number of respondents in each group by cohort.

When counselors/students were asked 3–4 months post assessment to rate how well the selected AT matched with their consumer's needs and preferences on a 10-point rating scale, the mean rating was 6.2 for the 2002 cohort out of a total

possible score of 10 ("perfect match") and 8.1 for the 2004 cohort. The fact that the scores were on the higher end of the scale is not surprising since these consumers went through a process where their opinions and preferences were solicited and they participated in the decision-making around AT selection. Still, respondents did vary along the continuum and were statistically divided into four categories of *AT and User Match* (not using, adequate, good, perfect) as determined by the percentile score distribution computed by SPSS 11.0. Table VI gives the number of respondents in each group by cohort. The total number of responses for each cohort is less than the total number of students in the course due to the elimination of cases in the analysis as a result of missing values on one or more variables.

Discriminant function analyses were then used to determine which predictor variables discriminate among the three predisposition groups. The predictors were the 45 Section B and Section C items on the ATD PA Person form. The individual items were used, and not scale scores, because many items load on one or more scale and this would yield less accurate results. For each cohort, two "separate groups discriminant functions" were derived (the number of categories in the dependent variable minus 1). The overall Wilks' Lambda was significant at the $p = .03$ level for the 2002 cohort, and at the

Table IV. Cronbach's alpha coefficients for each scale by sample.

Cohort	Scale								
	QOL (12 items)	Family Support (11 items)	Motivation for AT Use (14 items)	Self- Determination (14 items)	Therapist- Program Reliance (12 items)	Mood (15 items)	Friend Support (12 items)	Autonomy (13 items)	Self-Esteem (13 items)
2002	0.89	0.80	0.82	0.82	0.81	0.82	0.80	0.80	0.80
2004	0.88	0.81	0.83	0.84	0.73	0.85	0.81	0.76	0.83

Table V. Number of respondents in each *AT Predisposition* group.

Cohort	Mean	S.D.	Weak	Moderate	Strong	Total
2002	47.1	10.1	15	26	19	60
2004	48.4	9.8	19	17	28	64

Table VI. Number of respondents in each *AT and User Match* group.

Cohort	Mean	S.D.	Not using	Adequate	Good	Perfect	Total
2002	6.2	3.0	2	7	6	15	30
2004	8.1	2.7	3	13	7	13	36

$p = .00$ level for the 2004 cohort, indicating that the 45 predictors (45 Section B and Section C items) in the first discriminant function differentiated the three groups for each cohort. The residual Wilks' Lambda was not significant, indicating that predictors did not significantly differentiate the three groups when partialling out, or removing, the effects of the first discriminant function. The data from the discriminant functions analyses are reported in Table VII. Figures 1 and 2 show the combined groups plots for the 2002 and 2004 cohorts respectively.

Discriminant function analyses were also performed to determine which predictor variables discriminate among the four *AT and User Match* groups at 3–4 months follow up. Once again, the

predictors were the 45 *Section B* and *Section C* items on the ATD PA Person form. For each cohort, three *separate groups discriminant functions* were derived. The overall Wilks' Lambda was significant at the $p = .00$ level for the 2002 cohort, and at the $p = .01$ level for the 2004 cohort. The 45 predictors in the first discriminant function differentiated the three groups for each cohort. The residual Wilks' Lambda was not significant, indicating that predictors did not significantly differentiate the groups when partialling out the effects of the first and then the second discriminant function. The data from the discriminant functions analyses are reported in Table VIII. Figures 3 and 4 show the combined groups plots for the 2002 and 2004 cohorts respectively on *AT and User Match*.

As indicated in Tables VII and VIII and Figures 1–4, the more positively respondents scored their subjective quality of life and their personal and psychosocial characteristics, the more favorably predisposed they were to AT use and the better their match with the AT at 3–4 months follow up. Thus, the hypotheses guiding the analyses have been shown to be correct: specific personal and psychosocial variables exist which serve as predictors of a person's predisposition to using, and subsequent match with, a given AT. Specifically, it can be said that a quantifiable relationship exists between the ATD PA's measure of subjective quality of life and well-being (Section B items) and personal and psychosocial characteristics (Section C items) such that it is possible to predict a consumer's predisposition to use a particular assistive technology as measured by the 12-item ATD PA device form and that these same factors are predictive of the *AT and User Match*.

These findings gain further strength when prediction of group membership was calculated. As shown in Tables VII and VIII, in each case, approximately 100% of the individuals in the sample were correctly classified into the three *AT Predisposition* groups and the four *AT and User Match* groups. The kappa statistic in each case, which takes into account chance agreement and ranges in value from -1 to $+1$ (perfect prediction) with 0 indicating chance-level prediction, was 1.00 and indicates strong accurate prediction [34].

An interesting finding is the comparatively weak correlation between *AT Predisposition* and the sub-

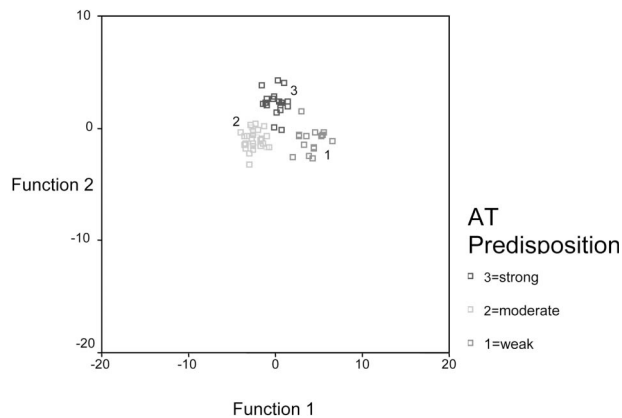


Figure 1. Separation of the 2002 Predispositions Groups on the two discriminant functions.

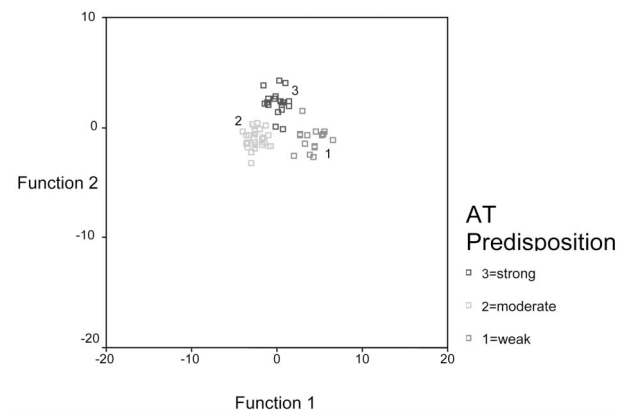


Figure 2. Separation of the 2004 Predispositions Groups on the two discriminant functions.

Table VII. Results of the discriminant analysis of the ATD PA's QOL and personal/psychosocial items predicting *AT Predisposition*.

Cohort	Eigenvalue	% variance	Canonical Correlation	Wilks' Lambda	df	Sig.	Kappa	% correctly classified
2002	7.14	74.0	.937	.035	90	.03	1.00	100
2004	4.86	56.7	.911	.036	90	.00	1.00	100

Table VIII. Results of the discriminant analysis of the ATD PA's QOL and personal/psychosocial items predicting *AT and User Match*.

Cohort	Eigenvalue	% variance	Canonical Correlation	Wilks' Lambda	df	Sig.	Kappa	% correctly classified
2002	148.37	89.1	.997	.000	78	.00	1.00	100
2004	35.56	73.3	.986	.001	96	.01	1.00	100

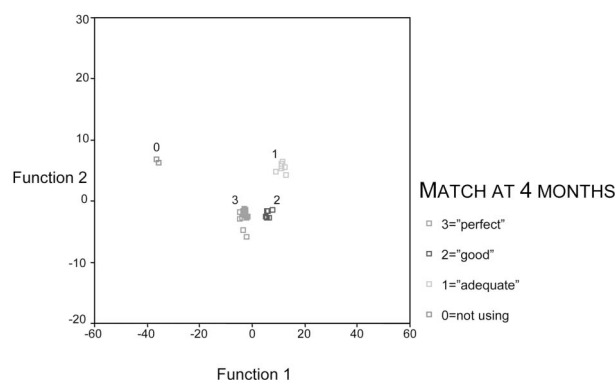


Figure 3. Separation of the 2002 Match Groups on the two discriminant functions.

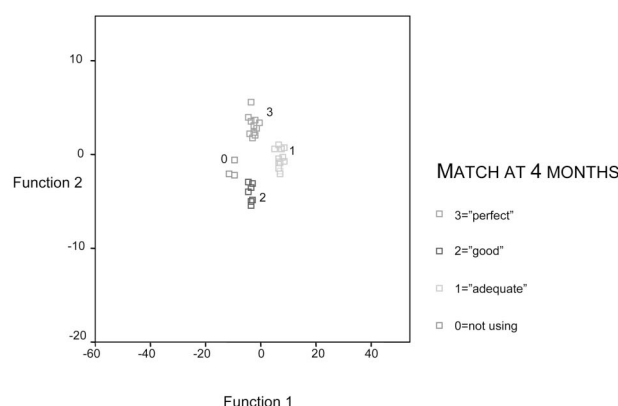


Figure 4. Separation of the 2004 Match Groups on the two discriminant functions.

sequent *AT and User Match*. For the 2002 cohort, the Spearman's rho correlation was .16 and insignificant. For the 2004 cohort, the correlation was .362, which is significant at the .05 level. The weak relationships may be due to the fact that while the 45 items as a group predicted both predisposition and match, the individual items having the most bearing on predisposition or match did differ. For example, the item "freedom to go where desired" was strongly associated with a predisposition to AT use in the 2002 cohort, but moderately in the 2004 cohort and also moderately for each cohort's subsequent *AT and User Match*. The ATD PA was designed as an idiographic measure, and it needs to be used and interpreted in this manner. That is, a particular individual's pattern

of scores is what is used to guide choices around the selection of AT and other supports, and the determination of the subsequent *AT and User Match*, and not how that individual compares to others.

Evaluation results

Data from the students regarding their views of the course were obtained from their online evaluations. The following list provides the average rating (from 1–5, 5 being *strongly agree*) of evaluation questions that directly addressed the use of the MPT Model as part of the Tech Team process as completed by students from Sample 1 and Sample 2:

- I am able to develop competencies in conducting person centered assessments in order to identify potential assistive technology applications. (4.57)
- The MPT Model, Survey Analysis and Top Three Recommendations contributed to my understanding and/or skills in Applications of Rehabilitation Technology. (4.26)
- The Tech Team Project [using the MPT Process and Forms] and Report contributed to my understanding and/or skills in Applications of Rehabilitation Technology. (4.64)
- I gained useful skills and/or knowledge in this course. (4.70)
- This course was relevant to my professional needs. (4.67)

Students had the option of anonymously adding their own thoughts by writing in text boxes that were submitted electronically with their responses to the evaluation form. Completed forms were received by the instructor and course facilitators via email with "anonymous student" listed as each sender. Specific comments included:

- Allowed us to talk about areas that [the consumer] may have thought were too personal but since they came from a form, she was more at ease and answered the questions more readily.
- This case was initially all about hearing. It has turned into speech, mobility, technology, and independence. I think my consumer's thought process has been affected in the same manner.

- Helps avoid the “one size fits all” mentality
- Useful as case documentation
- Reduces worry that I omitted something, forces one to be thorough
- Helps organize thoughts and focus on entire picture.

The comments provided by the counselors/students give additional evidence for the usefulness of the ATD PA forms as both an initial assessment and an outcomes measure.

Discussion

The findings from this research demonstrate that the hypotheses guiding the analyses were correct. The variables that consumers have identified in earlier research [8] as having the most influence on their views and use of AT have been shown statistically to indeed be key influences; specifically, there are personal and psychosocial characteristics that predict the predisposition to use a given assistive technology and its subsequent match with the user's needs and preferences. Further, results from the use of the ATD PA forms of the Matching Person and Technology Model (which identify key personal and psychosocial characteristics and measure subjective quality of life and well-being from the consumer's perspective) can predict the individual's predisposition to use a particular AT in time to make adjustments that will enhance and optimize use.

Although the ATD PA items are predictive of both *AT Predisposition* and *AT and User Match*, *AT Predisposition* does not strongly correlate with *AT and User Match*. One explanation might stem from the individual's initial expectations not fully matching the later realities of using the technology (in either a positive or negative direction). It is also possible that during a period of use of four months, consumers reported more sophisticated perspectives of what constitutes a good match with their needs and priorities. Other factors that may play a role in cases where a less than perfect match was achieved include the lack of follow-through by family members, complexities of accessing funding, a decline in an individual's health, or the failure to provide adequate or appropriate training in the use of the AT. Finally, it cannot be ignored that the ratings of *AT and User Match* were ultimately reported by the students/counselors, and therefore a bias may have entered into the ratings.

The results from this research on the use of the ATD PA have demonstrated good to excellent psychometric properties and indicate that the assessment instrument is a valid measure of the following: subjective quality of life; seven areas of

temperament and personal characteristics related to AT use; predictors of predisposition to the use of a given AT and subsequent *AT and User Match*. Using this tool collaboratively can guide professionals and AT users in selecting appropriate assistive technology and in subsequently measuring the outcomes of use of the selected assistive technology.

Implications for practice

The need for achieving and documenting assistive technology outcomes cannot be overstated. There are limited fiscal and personnel resources for meeting the growing number of consumers with widely varying needs; therefore, the better the match of AT and user, the more effective is the use of these limited resources. Rehabilitation professionals, by virtue of their positions, often provide an essential link between the consumer and the assessment and acquisition of assistive technology. The MPT model has been demonstrated to be a user-friendly strategy for rehabilitation professionals and AT users to collaboratively explore AT options and to achieve positive outcomes. Rehabilitation professionals can be more consumer-responsive by using this model and accompanying measures and as a result, will be employing an evidence-based practice to help consumers achieve positive AT outcomes. The instruction provided to the two cohorts of rehabilitation professionals in the context of a graduate course clearly enabled them to play a more active and effective role in the assessment process.

Implications for further research

Further collaboration at multiple sites in a variety of contexts would add evidence to this growing body of research. Validating these surveys and measures with additional samples of individuals with mobility, sensory, cognitive, and communication disabilities is recommended. Conducting additional research with individuals who are not actively seeking employment, including children and older adults, would provide valuable information for other professionals who assess, advocate, and/or recommend assistive technology for these populations.

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Appendix: Sample Items (less than half of the items) of the ATD PA Initial/Baseline *Person* and *Device* Forms (Follow-Up Forms Also Exist)

Name _____ Date of Birth _____
 Primary Goals (6 months): _____ Today's Date _____
 Primary Goals (1 year+): _____ Form completed by _____

A. How would you rate your abilities today in the following 9 areas using your current AT or other support?

- For items 1-9, circle the best response (1 for *poor* through 5 for *excellent*).
- Under **Name of Support** write the name of the support you use where relevant (example: 'eyeglasses' for # 1, *eyesight*).
- Write a plus [+] in the spaces where you expect to need more support over the next year (example: 'eyeglasses' gets [+] if you'll expect to need stronger lenses during the next year). Write a [-] in the spaces where you expect to need less support, and a [0] where you expect your support should stay the same over the next year.

	Poor		Average		Excellent		Name of Support	Need increase [+] or decrease [-]
1. Eyesight	1	2	3	4	5		_____	_____
2. Hearing	1	2	3	4	5		_____	_____
7. Grasping and use of fingers	1	2	3	4	5		_____	_____
9. Mobility	1	2	3	4	5		_____	_____

B. How satisfied are you currently in the following areas?

- For items 10 – 21, circle the best response (1 for *Not Satisfied* through 5 for *Very Satisfied*).
- Under **Importance** write #1, #2 or #3 for your three most important areas (#1=most important). Leave the other lines blank.
- Under **Primary Obstacle** write an [E] or [PR] to indicate if the primary obstacle you face is due to external, environmental and social barriers [E] or to limitations you experience due to inadequate AT and other personal resources [PR].

	Not Satisfied		Satisfied		Very Satisfied		Importance	Primary Obstacle [E],[PR]
10. Social relationships	1	2	3	4	5		_____	_____
15. Recreational involvement	1	2	3	4	5		_____	_____
16. Freedom to go wherever desired	1	2	3	4	5		_____	_____
17. Educational attainment	1	2	3	4	5		_____	_____
20. Autonomy and independence	1	2	3	4	5		_____	_____
21. Fitting in and belonging	1	2	3	4	5		_____	_____

C. Please circle all the statements below that describe you.

- | | | |
|---|---------------------------------|--|
| 22. I have the support I want from family | 33. I am a calm person | 44. I find technology interesting |
| 23. I have the support I want from friends | 34. I am patient & easy-going | 45. I am cooperative |
| 25. I feel the general public accepts me | 36. I am often angry | 47. I feel isolated & alone |
| 30. I am often frustrated or overwhelmed | 41. I like having a challenge | 52. I often feel insecure |
| 31. I am curious & excited about new things | 42. I am satisfied with my life | 53. I feel as if I have little privacy |

For Comparing Devices to Meet Desired Outcomes

DIRECTIONS: Read each of the twelve items below (A-L) and circle the letter of the *three* that are most important to you.

- A. The assistance and accommodations exist for successful use of this device.
 B. This device will physically fit in all desired environments (car, living room, etc.).
 D. I will benefit from using this device.
 G. This device will improve my quality of life.
 H. I have the capabilities and stamina to use this device without discomfort, stress and fatigue.
 L. I will feel comfortable (and not self conscious) using this device around the community.

Write the name of each device being considered in the boxes below under **Device**. Rate each device for the twelve items (A-L) according to the following scale and then write your ratings in the appropriate boxes:

- 5 = All the time
 4 = Often
 3 = Half the time, neutral
 2 = Sometimes
 1 = Not at all
 0 = Not applicable

DEVICE	A	B	C	D	E	F	G	H	I	J	K	L	Total (Add A-L)

Review each **total score** above. In general, the device with the highest total score is the one most preferred (maximum number of points=60). However, when total scores are close, more weight should be given to the three items circled as being *most important*.

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