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Teachers of Students with Visual Impairments and Their Use of Assistive Technology: Measuring the Proficiency of Teachers and Their Identification with a Community of Practice

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Structured abstract: *Introduction:* This article presents an instrument that measures the assistive technology proficiency of teachers of students with visual impairments and their identification with a community of practice that values assistive technology. Teachers' deficits in assistive technology proficiency negatively impact students who are visually impaired by stunting the development of assistive technology skills, ultimately resulting in poorer postsecondary education and employment outcomes. Identification with a community of practice that values assistive technology may be supportive of the technological proficiency of teachers of students with visual impairments. *Method:* Assistive technology proficiency and community of practice identification dimensions were defined and outlined in rubric-like "construct maps." A survey that was created to place teachers of students with visual impairments within each construct map was completed by 33 Californian teachers. Survey performance was evaluated by estimating Rasch models, which provided information on relative question difficulty and question performance. *Results:* Estimated question difficulties revealed expected patterns. Only two survey questions performed irregularly (infit > 1.33). Internal reliability was good (Cronbach's Alpha $= 0.80$) for assistive technology proficiency, and acceptable (Cronbach's Alpha $= 0.70$) for community of practice identification. *Discussion:* The findings suggest the survey reliably measured the assistive technology proficiency and identification with a community of practice that values technology in this sample of teachers. Utilization of this tool may enable the objective evaluation of assistive technology proficiency of teachers pre- and post-training. *Implications for practitioners:* Creation of a reliable instrument that measures these constructs will support investigations in how one relates to the other, and will consider how professional development may be designed to better support the use of assistive technology by teachers.

Students with visual impairments require specialized services in order to learn skills that sighted peers typically learn incidentally (Hatlen, 1996). These services are termed the expanded core curriculum (ECC), and encompass skills in: functional academics, orientation and mobility, social-emotional development, independent living, recreation and leisure, career education, sensory efficiency, self-determination, and assistive technology (Hatlen, 1996).

The study presented here focuses on assistive technology, which is defined under the Individuals with Disabilities Education Improvement Act as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (IDEIA, 2004). Teachers of students with visual impairments provide vision-related educational services and teach according to the ECC. As a result, these teachers are primarily responsible for assistive technology instruction with students who are visually impaired.

Previous reports suggest approximately 40% of teachers of students with visual impairments with academic students implement assistive technology into instruction (Abner & Lahm, 2002; Edwards & Lewis, 1998; Kapperman, Sticken, & Heinze, 2002). Given that technology skills are related to improved postsecondary education outcomes and paid employment for students with visual impairments (Kelly, 2009, 2011), supporting teachers in addressing this critical area of instruction is necessary to close the achievement gap between students with and without disabilities (Parette & Peterson-Karlan, 2007).

Assistive technology proficiency

Several external factors may influence the assistive technology proficiency of teachers of students with visual impairments, including their level of preservice technology training, continued technology training through professional development, and availability of funding sources for assistive technology (Augusto & Schroeder, 1995; Kapperman et al., 2002). Most recommendations to increase proficiency focus on preservice training by implementing curricula in teacher preparation programs for teachers of students with visual impairments (Kamei-Hannan, Howe, Herrera, & Erin, 2012; Safhi, Zhou, Smith, & Kelley, 2009; Zhou et al., 2012). However, it is likely that other factors contribute to teachers' adoption of technology. For example, a teacher may only use a specific assistive technology device if there is a student who could benefit from it, and if the teacher believes the device is more supportive of the student's learning than other (nontechnology) instructional tools (Hu, Clark, & Ma, 2003;

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Kamei-Hannan et al., 2012). Consequently, the teacher of students with visual impairments gains competency and advocates for using that specific assistive technology.

The following dimensions that define the assistive technology proficiency of a teacher of students with visual impairments were conceptualized from a list of competencies recommended for inclusion in assistive technology training programs (see Methods, also Smith, Kelley, Maushak, Griffin-Shirley, & Lan, 2009; Zhou, Smith, Parker, & Griffin-Shirley, 2011).

> Choosing: Willingness and resources to choose assistive technology to overcome an accessibility issue.
>
> Funding: Willingness and resources to find funding for the chosen assistive technology.
>
> Ability: Willingness and ability in learning, using, and troubleshooting assistive technology.
>
> Integration: Willingness to integrate assistive technology into student lessons.

Community of practice

The relationship between a teacher and his or her professional network through which he or she receives continuing professional development can be described as a *community of practice,* as defined by Wegner, McDermott, and Snuder (2002). Identification with such a community refers to the voluntary membership, exchange, and dissemination of knowledge in an informally structured professional organization. A *community of practice* includes the following dimensions (Wegner, McDermott, and Snuder, 2002).

> Domain of interest: Members invest in a shared collection of knowledge, goals, and purpose that inform their actions.
>
> Community: Members interact by sharing anecdotes, posing questions, and responding to others' issues.
>
> Practice: Members share a "toolkit" of tools and resources. The community nurtures this body of knowledge, and leverages it to inform the domain of interest.

Teachers of school-aged students with visual impairments teach in a variety of roles, including itinerant, in a resource room, and at a residential school (Wolffe et al., 2002). Some teachers of students with visual impairments may teach in a combination of any of these capacities, or provide services in homes in addition to school settings. Teachers of students with visual impairmentss provide instruction related to the ECC, secure access to the general curriculum, and collaborate with school staff members (Correa-Torres & Howell, 2004; Spungin & Ferrell, 2007). Itinerant teachers travel between different sites to work one-on-one with students. Resource-room teachers remain at one school and support students throughout the day. Teachers at residential schools are typically members of a staff experienced in working with students with visual impairments. Although itinerant teachers and resource room teachers may or may not attend workshops designated for general education staff members, residential school staff members attend their own professional development activities (Yarger & Luckner, 1999).

The caseloads of teachers of students with visual impairments also fluctuate because students graduate, relocate to different schools, or are reassigned for logistical or administrative reasons. Because the caseloads of these teachers can vary from year to year, it is impossible for them to receive preservice training in all the assistive technologies that might be relevant to future students. Therefore, it is important for them to have both a foundational knowledge of assistive technology and ongoing professional development.

A community of practice is particularly appropriate when used to describe the relationship between teachers of students with visual impairments and their professional communities for several reasons. These teachers work with students who span a range of ages and grades, and address areas of instruction related to the academic and expanded core curricula. They also collaborate with a wider range of educational team members to implement services than do general education classroom teachers, and they often work in isolation from other teachers of students with visual impairments (Correa-Torres & Howell, 2004). When these factors are combined, it is important and difficult for such teachers to find a community that shares relevant support, advice, and resources. This difficulty is most pronounced for itinerant teachers who, due to the amount of travel between sites, are not necessarily members of any single school's community. These teachers may never encounter another teacher of students with visual impairments throughout the course of a typical school day, week, or month (Kapperman et al., 2002; Swenson, 1995). For itinerant teachers of students with visual impairments, a physical connection to a community of practice may be replaced by networking through virtual media such as e-mail, electronic discussion groups, or telephone calls. This virtual community contrasts with that of general education teachers, who physically attend the professional development activities given by their schools. A teacher of students with visual impairments must instead voluntarily seek out colleagues who face similar professional challenges. Once established, the teacher's community of practice shares resources that support one another, and engagement ebbs and flows according to a member's changing needs (Wegner et al., 2002).

The study presented here aims to rethink how the assistive technology proficiency of teachers of students with visual impairments can be measured to gauge training effectiveness, and poses identification with a community of practice as a missing link between professional development and assistive technology adoption.

Methods

The study protocol was approved by University of California at Berkeley's Committee for Protection of Human Subjects.

Measurement constructs

The constructs of proficiency with assistive technology and identification with a community of practice were laid out as rubrics (Tables 1 and 2, respectively). These rubrics, or "construct maps" (Wilson, 2005), informed the development of survey questions. The construct map for teachers of students with visual impairments' identification with a community of practice that values assistive technology was based on the definition of community of practice discussed earlier here (Wegner et al., 2002). We maintained the original dimensions of a community of practice and aligned the construct from low to high community of practice membership.

Table 1
Construct map for the assistive technology proficiency of teachers of students with visual impairments.

	Dimensions			
	Choosing	Funding	Ability	Integration
Proficiency level	(Willingness and resources for choosing AT)	(Willingness and resources for funding AT)	(Willingness and ability to use AT)	(Willingness and integration of AT into lessons)
Highest	Chooses AT with help from AT experts as needed	Contact specific funding sources at district, state, and federal levels	Can use AT and troubleshoots with manual and help from AT experts if needed	Uses AT for designated and other tasks
High	Chooses AT with help from colleagues who are not AT experts	Seek district, state, and federal funding sources	Can use AT and troubleshoots with manual and help from non-expert colleagues	Uses AT for designated tasks; is open to using AT for other tasks, but doesn't know which ones
Medium	Chooses AT based on familiar experiences	Ask district, local community, or parents for funding	Can only use AT with directions or after specific training	Uses AT only for designated tasks
Low	Chooses AT based on anecdotal information	Ask and depend on district for funding	Can use AT only with ongoing support from colleagues	Uses AT only for designated tasks when non-AT solution is unavailable
Ambivalent	Does not know how to choose AT	Believes funding is unavailable	Does not know how to use AT	Is unsure how to integrate AT
Aversive	Choosing AT takes too much time and effort	Finding funding would take too much time and effort	Learning to use AT takes too much time and effort	Believes AT distracts from learning goals

AT = assistive technology.

The assistive technology proficiency construct was based on 111 competencies that were developed (Smith et al., 2009) and validated (Zhou et. al., 2011) for teachers of students with visual impairments. These competencies are recommended for assistive technology training programs because they are essential components of the teachers' use of technology with students who have visual impairments. We reconceptualized these competencies into four dimensions of assistive technology proficiency: choosing, funding, ability in using, and integration into teaching. These dimensions were aligned with each other from low (aversive) to high (advocative) assistive technology proficiency within the construct. Across dimensions, levels of the construct shared similarities; for example, the lowest level of each dimension reflected opposition to assistive technology proficiency.

Survey

A survey was created to assess each participating teacher of students with visual impairments' assistive technology proficiency and identification with a community of practice that values assistive technology, and posed questions within four scenarios.

Scenario 1

Imagine the school year just began, and you have a middle school student taking several general education classes. This student needs textbooks for each class. The student has no vision, and is unable

Table 2
Construct for the identification of teachers of students with visual impairments with a community of practice that values assistive technology.

	Dimensions		
	Domain of interest	Community	Practice
Community identification	Shared commitment to using AT when an accessibility issue arises	Interaction with other members of the community	Investment in developing a body of AT knowledge
Strongly identifies with a CoP	Committed to AT use, confident it improves learning and education	Shares and disseminates information about AT with other CoP members	Leverages familiar resources to learn new AT, such as manuals, the Internet, and "techie" colleagues
Seeks a CoP	Committed to AT use, but unsure how it improves learning and education	Seeks and uses information shared by CoP members	Asks for help to learn new AT, but lacks known resources
Ambivalent	Unsure of AT use, and unsure if it improves learning and education	Only exchanges information with CoP members as an obligation	Only learns AT according to a superior's directive
Does not identify	Considers AT use nonessential to learning and education	Observes CoP members' exchanges of information only if convenient	Will not learn AT, but will work around it
Opposed to identifying with a CoP that uses AT	Believes that AT use can impair learning and education	Avoids CoP members	Avoids learning new AT, employs non-AT solutions, or removes reasons to learn AT

AT = assistive technology; CoP = community of practice.

to access print. Unfortunately, it will take six to eight weeks for the braille copies of the books to arrive at the school.

Scenario 2

Imagine you have a third-grade student in a general education class. This class completes projects in a weekly computer lab, and during optional computer time in the classroom. The student has low vision and has extreme difficulty seeing what is on the computer screen using a standard monitor with conventional settings.

Scenario 3

Imagine you have a high school student in a resource room with teachers who use several handouts per day. Some of the handouts are printed from websites, and others are created on computers by the teachers. This student has low vision and cannot see standard print.

Scenario 4

Imagine a new student transferred to a general education middle school in your school district mid-year. The student is totally blind and on grade level. The student's homeroom class goes to the library once a week to learn how to research information on the Internet. All of the computers are Windows computers, with standard-size monitors set to conventional settings.

Each scenario provided the framework for seven questions, each targeting one dimension of a construct. Hypothetical questions such as "If the student is not already using technology for reading books, how would you proceed?" and

"How would you feel about using electronic versions of handouts?" were intended to be relevant to participants regardless of their teaching environment and level of experience (Mahmoud et al., 2009; Rosson & Carroll, 2002). This relevance is important because teachers of students with visual impairments have caseloads with different technology and student needs, have varied training and experience with assistive technology, and work in a variety of school settings. We developed the scenarios to include the needs of students with low vision and those who are blind, and offered solutions that used assistive technology, as well as those that did not, using mainstream and specialized technologies. Specific professional contexts and experiences were not overly represented, so that all participants could answer questions based on a range of experiences.

Initial versions of the construct maps and survey were shared and revised with input from two professors in different personnel preparation programs, and from one of the authors from Smith et al. (2009). In addition, three teachers of students with visual impairments outside of California managed the survey. These participants had varying levels of expertise, provided feedback on the scenarios and questions, and explained their thought process in selecting answers. These efforts positively supported the content and response-process validity of the constructs and survey (Wilson, 2005).

The survey was constructed using LimeSurvey, a free and open-source survey tool. It was distributed online through a variety of professional electronic discussion groups, social media, and e-mail to community organizations for dissemination through internal networks. Participants could also call the researchers to complete the survey over the telephone (one participant elected this option). In addition to answering questions on the scenarios, participants were asked for information regarding demographics and comments. The survey took between 30 minutes and 1 hour to complete.

Participants

The 33 participants were Californian teachers of students with visual impairments currently working with at least one school-age (K-12) student accessing some level of an academic curriculum. Twenty participants reported being itinerant teachers, 9 were resource teachers, and 4 were teachers at a school for blind children. Twenty-four participants reported access to general technology support, 18 to special education technology support, and 5 to technology support specific to visual impairment. The participants also reported the number of years they had worked as a teacher of students with visual impairments, the amount of their preservice assistive technology training, the number of other teachers of students with visual impairments in their school district, and the number of students with visual impairments in their current caseload (see Figure 1).

Modeling

We used Rasch models to evaluate the survey: one for questions related to assistive technology proficiency and one for those about community identification. The Rasch model is commonly used to evaluate exam or survey validity (Baghaei & Amrahi, 2011). Instead of the traditional purpose of a model to fit and describe data, the Rasch

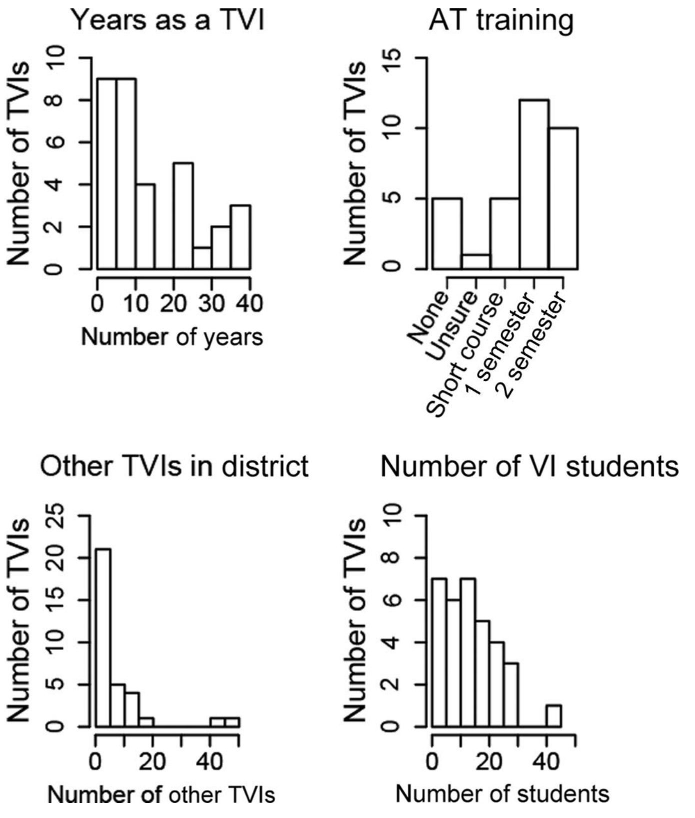

Figure 1. Demographics of 33 respondents who completed the survey.
AT = assistive technology; TVI = teacher of students with visual impairments; VI = visually impaired.

model establishes whether the data fit the proposed model (Baghaei & Amrahi, 2011). For example, in an educational test such as a mathematics exam, a Rasch model calculates the probability of a correct response to a question as a function of the question's difficulty and the participant's knowledge. The easier a question and the more knowledgeable a participant is, the more likely the answer will be correct (Wilson, 2005). In this example, the construct being assessed is mathematical knowledge. This scenario assumes a single construct of "mathematical knowledge," and both the test questions and participants are located somewhere on this construct (from easy to difficult test questions, and from low to high mathematical knowledge). In our survey, we assessed two constructs, assistive technology proficiency and community of practice identification. A difficult question was difficult to answer with a high-construct response. For example, a participant low on the assistive technology proficiency construct would be unlikely to produce a high assistive technology proficiency answer to any survey question.

Calculating the fit of a question to the model (using infit) tests the assumption that the survey measures only one trait. If an infit value is too high, it indicates that the question's responses are irregular and the survey is assessing more than the single intended construct. This would happen if a difficult question was correctly answered by low-level participants and incorrectly answered by high-level participants too often. Ideal infit values are 1, in units of mean squares. The acceptable range is between 0.70 and 1.33 mean squares (Adams & Khoo, 1996). Large infit values represent more randomness than expected, which is more concerning than low infit values that represent less randomness (Adams & Khoo, 1996; Wilson, 2005).

Large gaps between estimated question difficulties indicate that the survey does not adequately cover some range of the construct (Baghaei & Amrahi, 2011). Estimated difficulties are given in scaled values called "logits." To interpret logit values, consider that if a person and a question have the same score (for instance, both are estimated to be 1 logit), there is a 50% chance the person will answer yes to that question. If the person is estimated higher than the question in logits, there is a greater than 50% chance the person will answer yes. Models were evaluated and fit using ConstructMap software with Maximum Likelihood Estimation (Wilson, 2005).

We assessed survey reliability by measuring internal consistency with Cronbach's Alpha. Intuitively, a teacher of students with visual impairments who scored high on one assistive technology proficiency question should have scored high on other assistive technology proficiency questions. This relationship would be demonstrated by a Cronbach's Alpha closer to one. If responses were poorly correlated, Cronbach's Alpha would be closer to zero. Interpretation of Cronbach's Alpha is as follows: Alpha ≥ 0.9 is excellent, $0.8 \leq$ Alpha < 0.9 is good, $0.7 \leq$ Alpha < 0.8 is acceptable, $0.6 \leq$ Alpha < 0.7 is questionable, $0.5 \leq$ Alpha < 0.6 is poor, and Alpha ≤ 0.5 is unacceptable (George & Mallery, 2003).

Results

Distributions of raw scores for each survey question are shown in Figure 2. Most of the participants scored high in assistive technology proficiency and identification with a community of practice that values assistive technology.

Model results

The estimated level of difficulty for the section of the survey with assistive technology proficiency questions are shown in Figure 3. The easier the type of question was, and the lower its estimated difficulty, the more likely respondents were to choose high assistive technology proficiency solutions for that question. The average estimated difficulties for the four dimensions were: choosing, $M = 0.28$ ($SE = 0.21$); funding, $M = 0.19$ ($SE = 0.11$); ability, $M = -0.03$ ($SE = -.06$); and integration, $M = -0.44$ ($SE = 0.22$). The difficulty of reporting high assistive technology proficiency steadily decreased from choosing, funding, and skill, to integration. The only two types of questions with significant differences by *t*-test were choosing and integration ($p < 0.05$). Similarly, the easier a scenario, the more likely respondents were to choose high assistive technology proficiency solutions for that scenario. The average difficulty estimates for the four scenarios were: scenario 1, $M = 0.18$ ($SE = 0.28$); scenario 2, $M = 0.18$ ($SE = 0.03$); scenario 3, $M = -0.22$ ($SE = 0.21$); and scenario 4, $M = -0.14$ ($SE = 0.21$). There were no significant differences between scenarios by *t*-test; no scenario was more or less difficult than another.

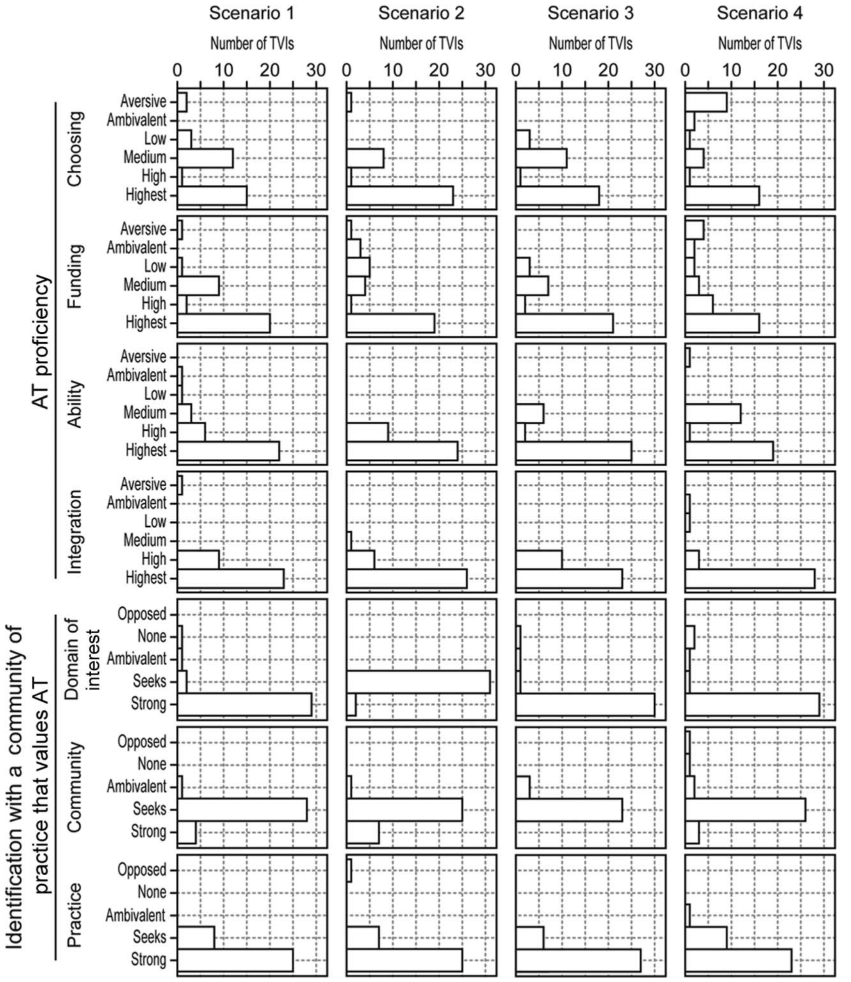

Figure 2. Histograms of completed survey responses (raw scores).
AT = assistive technology; TVIs = teachers of students with visual impairments.

We also evaluated the infit mean squares of the questions. High infit scores indicate that the question had more variation in answers than expected, whereas low infit scores indicate items with less variance than expected. Only two items were outside the range of acceptable values, 0.75 to 1.33 (Adams & Khoo, 1996): scenario 1, choosing (infit = 1.93, t = 3.0); and scenario 4, choosing (infit = 0.58, $t = -2.1$. Overall agreement among the questions about assistive technology proficiency was good, Cronbach's Alpha = 0.80 (George & Mallery, 2003).

The estimated level of difficulty for the questions in the community of practice identification section of the survey are shown in Figure 4. The average estimated difficulties for the three dimensions of community of practice identification were: domain of interest, $M = 0.45$ ($SE = 1.33$); community, $M = 0.32$ ($SE = 0.12$); and practice, $M = -0.77$ ($SE = 0.19$). Among the community of practice questions in all

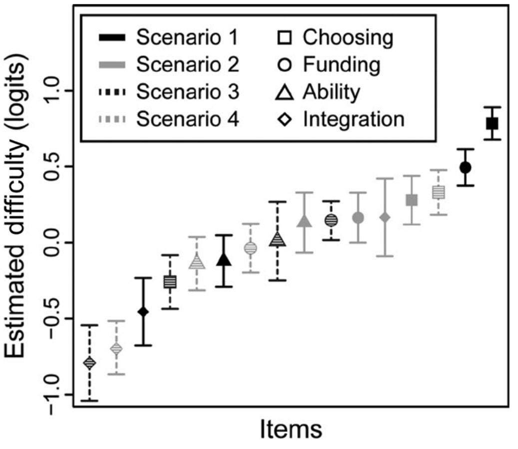

Figure 3. Estimates of assistive technology item difficulty. Error bars indicate standard errors.

scenarios, practice was easier to score highly on than other questions (significant difference by *t*-test only for community and practice, $p < 0.01$). The average estimates for the four scenarios were: scenario 1, $M = -0.48$ ($SE = 0.32$); scenario 2, $M = -0.36$ ($SE = 0.43$); scenario 3, $M = 1.11$ ($SE = 1.46$); and scenario 4, $M = -0.28$ ($SE = 0.34$). There were no significant differences between scenarios by *t*-test. However, one community of practice identification question was significantly more difficult than the rest. Despite the fact that, across all four scenarios, practice had the lowest estimated difficulty, the estimated difficulty for the practice question in scenario 3 was significantly higher than for the next most difficult question ($p < 0.001$). The practice questions in scenarios 1, 2, and 4 were so easy that despite the high difficulty of the practice questions in scenario 3, practice questions were the easiest on which to score highly (this is evident in Figure 4).

Three questions had infit mean squares outside the acceptable range of 0.75 to 1.33 (Adams & Khoo, 1996). High infit scores indicate items with more variation in answers than expected, whereas low infit scores indicate items with less variance than expected. The infit scores were as follows: scenario 1, practice (infit = 1.58, $t = 1.9$); scenario 2, community (infit = 0.59, $t = -1.7$; and scenario 3, community (infit = 0.67, $t = -1.2$). Overall agreement among the questions about community of practice identification was acceptable, Cronbach's Alpha = 0.70 (George and Mallery, 2003).

Discussion

The study presented here developed construct maps for assistive technology proficiency among teachers of students with visual impairments and their identification with a community of practice that values assistive technology. It also describes the creation and evaluation of a survey instrument for measuring these constructs. This work supports the

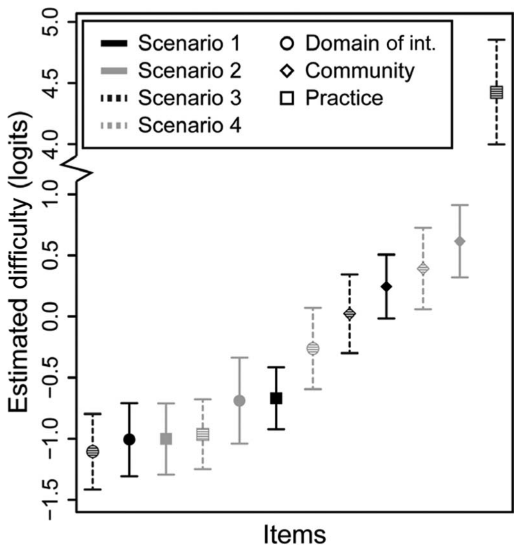

Figure 4. Estimates of community of practice item difficulty. Error bars indicate standard errors.

assessment of the assistive technology proficiency and community of practice identification of teachers, and it may inform professional development activities depending on the relationship between these two constructs. Based on estimated question difficulties, infit scores, and internal consistency, the survey questions reliably measured both constructs in our sample of Californian teachers of students with visual impairments.

Construct for assistive technology proficiency

Questions used to assess assistive technology proficiency among teachers of students with visual impairments generally decreased in difficulty as participants progressed through each scenario: choosing questions were most difficult, then funding, then ability, and their integration (significance between choosing and integration). This pattern could be explained by how the survey questions were structured. Assistive technology proficiency questions were always asked in the following order, with later questions hinging on the resolution of previous challenges: teachers of students with visual impairments were first asked to consider how they would choose a device, then how they would fund the device, and finally how they would learn how to use and integrate the device into practice. It is likely that subsequent questions were easier (to score high on the assistive technology proficiency construct) because previous challenges of using assistive technology were already resolved.

We performed a similar investigation of the level of difficulty of the items in each of the four scenarios. There were no significant differences between scenarios for the assistive technology proficiency questions. This result was surprising, because we expected certain technologies would be more difficult for teachers of students with visual impairments. Finding no significant differences between assistive technology proficiency questions across scenarios suggests that each scenario comparably assessed the assistive technology proficiency of participants. The estimated difficulties of assistive technology proficiency questions covered the range of our participants well, with no large gaps in item difficulty.

Another component in evaluating the survey's performance was to calculate the infit mean scores of the items. High infit scores indicate that the survey assesses more than the single intended construct. Only two assistive technology proficiency items were outside the range of acceptable infit values: scenario 1, choosing (infit too high); and scenario 4, choosing (infit too low). High infit values are of more concern (see Methods). It is notable that scenario 1, choosing, was the first question posed to the participants, and it is possible that the irregularity of this item stemmed from the uncertainty of participants in answering the first survey item. Finally, calculation of Cronbach's Alpha revealed that the survey questions within the assistive technology proficiency construct agreed well with each other for the participants of the current study.

Construct for identification with a community of practice

The survey also performed well for the construct related to identification with a community of practice that values assistive technology. One question was significantly higher in estimated difficulty than all other items: the practice item in scenario 3. This question asked participants to consider how they would proceed if they had a new student who used an iPad to view most classroom handouts, and were unfamiliar with using the device. The difficulty of participants in achieving high scores on this item may reflect the relative newness of the iPad as a technology used by teachers, and suggests that the teachers in our sample did not feel they had an established network of resources and tools to inform their use of the iPad with students. In addition to this extremely difficult question, the community of practice identification questions covered the range of participants well, with no large gaps in difficulty of items.

We also evaluated the survey's performance on the community of practice identification construct through calculating the infit mean scores of the questions. Three questions had infit mean squares outside the acceptable range: scenario 1, domain of interest (infit too high); scenario 2, community (infit too low); and scenario 3, community (infit too low). The questions with high infit for both assistive technology proficiency and community of practice constructs were the first questions asked for each construct in the survey. As mentioned previously, these high scores may be due to the uncertainty of participants in answering initial survey questions. Changing the order of scenarios in a future replication could confirm whether this is a reasonable explanation.

Finally, calculation of Cronbach's Alpha suggests the survey questions within the community of practice construct had an acceptable amount of agreement for the current study's participants.

Limitations

A limitation of this study is the recruitment of participants by way of technology-dependent channels. These methods may have limited participants to those who already had high assistive technology proficiency and community of practice identification. We will replicate this study to include a larger range of teachers of students with visual impairments and disseminate the instrument through online and paper formats. We will also re-evaluate the validity and reliability of this survey as a measurement instrument with a larger sample size that includes teachers of students with visual impairments from the United States and Canada.

Implications for practice

We conclude that our survey adequately and reliably captures the constructs we created for assistive technology proficiency and community of practice identification for this sample of teachers of students with visual impairments. Typically, self-reported satisfaction surveys measure the efficacy of teacher trainings (Lawless & Pellegrino, 2007). The survey instrument presented here has the potential to better assess the efficacy of an intervention such as pre- or postservice assistive technology training, and could be applied to evaluation of training curricula in professional development. The application of community of practice to teachers of students with visual impairments will also support investigations of the relationship between assistive technology proficiency and community of practice identification.

The underuse of assistive technology by teachers of students with visual impairments is often attributed to lack of knowledge and funding. Since the infusion of money and assistive technology training in teacher preparation programs, the use of assistive technology by teachers of students with visual impairments remains unchanged (Kapperman, 2002; Kelly, 2009, 2011). The absence of positive outcomes as reflected by the practice of such teachers necessitates ongoing investigation to develop other supports such as those offered by identification with a community of practice.

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