What Makes for Effective In-service Training in Assistive Technology?

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What is it about Assistive Technology that makes it appear to be so difficult to implement? Assistive Technology (AT) is software and hardware that is designed to help students with disabilities to learn. Special educators are requesting and receiving in-service training in the use of AT (Study of Personnel Needs in Special Education [SPeNSE], 2002). However, these professionals (Office of Technology Assessment [OTA], 1995; SPeNSE) report that, after receiving such training, they continue to feel unprepared to apply AT in their instruction. Studies (Bausch & Hasselbring, 2004; Bradshaw, 2002; Derer, Edyburn & Gardner, 1999; Kapperman et al., 2002; Polsgrove, & Rieth, 1996; Schrum, 1999; Wehmeyer, 1999; Zhang, 2000) support the contention that there appears to be meager progress at implementing AT in the classroom.

As mandates springing from the No Child Left Behind Act compel teachers to provide instruction in general curriculum content for all students and to develop alternative assessments for students with moderate, severe, and profound disabilities, the effective use of AT becomes more significant. Research (Edyburn, 2004; Woodward & Rieth, 1997) indicates that AT could play a significant role in this process by providing valuable tools with which to help struggling students. AT tools can assist teachers in the creation of curriculum materials that can be accessed by a range of students. These tools often include the capability to track student performance and to assist in assessing their progress.

If the training that has been provided has not resulted in classroom implementation, then the structure and content of in-service training in AT should be examined and alternative approaches investigated. In-service training in AT typically conforms to what may be labeled an Expert Model (Schrum, 1999). In such training, a subject matter expert is brought in to provide a workshop for teachers on an aspect of AT. The workshop typically lasts for less than a single day, usually just a few hours. Apart from an exit survey, which often captures only the sentiment of the moment, no attempt to assess the quality or the value of the workshop is usually made. Studies (Bradshaw, 2002; Schrum) have shown that rarely do such workshops result in any subsequent follow-up. Wade (1984) suggested that the amount of contact time available in the then-current model might be insufficient for the establishment of the connection between student and instructor. Certainly the time available does not provide support for any independent implementation of the innovation in the actual classroom. Typically, the current model fails to provide for interaction with peers or the instructor while the implementation of the change is in progress (Bradshaw).

Joyce and Showers (1980, 2002) broke down the types of in-service training content into several categories. Joyce and Showers (2002) wrote that these categories are ranked in an ascending hierarchy according to their “level of impact” of the outcomes of the training event: (a) simple awareness of theory or practice, (b) new understandings concerning the content and about one’s self which relate to the subject, (c) skill and proficiency with the materials, and (d) the transfer of new skills and understandings in the

participant's own instructional setting (p. 72). Thus, it is only after this last level has been addressed as part of training that evidence of changes in the classroom can be expected. It is this last level of outcome where there exists the greatest potential to impact student performance (Joyce & Showers).

After an analysis of more than 200 studies of in-service training methods, Joyce and Showers (1980) found that when the subject matter in workshops pertained to minor modifications to teachers' regular classroom routine, a traditional structure for in-service training was adequate. The studies on the effectiveness of these training components revealed that the combination of the theory, demonstration, practice, and feedback components were effective in settings that focused upon awareness, knowledge, and skill development. However, when the goal of the workshop related to the integration and transfer of complex ideas or required significant modifications to teaching method, only the combination of all five components--theory, demonstration, practice, feedback, and coaching--was consistent with the transfer of training to the classroom (Joyce & Showers, 2002).

Dunamis, Inc., a privately held company in the Atlanta, Georgia, area, was founded in 1984 to promote the successful use of AT. In 2001, Dunamis, Inc. initiated a program of training to promote and encourage use of AT in the schools by increasing awareness of the best practices in AT. The company has provided a variety of in-service workshops that concentrated upon integration of AT in the classroom. These in-service workshops were intended to provide professionals working with students with disabilities the training necessary to apply AT in the classroom (Dunamis, Inc., 2003).

Dunamis, Inc. has developed a structure for in-service training that was based upon the trainers' own experience and observation, emphasizing theory, demonstration, practice, and feedback. This structure was similar to that described by Joyce and Showers (2002). Participants in Dunamis, Inc. workshops provided positive feedback on training evaluations, indicating that instruction was helpful and appropriate. However, the staff at Dunamis, Inc. observed that only a few participants were effective at using AT. Many teachers and therapists were having difficulty actually using AT in their school settings.

Upon reflection, the Dunamis, Inc. instructors concluded that the introduction of AT constituted a fundamental change in instructional approach for many special educators. An effort was made to offer coaching as part of the in-service training provided by Dunamis, Inc. However, busy teacher schedules and limitations placed by district and local school administrations made coaching difficult to implement. The Dunamis, Inc. team sought an alternative way to include follow-along coaching and support as part of in-service .

In the Spring 2005, the concept of a virtual or electronic community of practice (eCoP) was discussed. The team decided that an eCoP could be a way to provide a measure of coaching and support for educators as they attempted to use AT in their educational settings. In addition, the eCoP held out the possibility of providing support in a way that was less obtrusive than face-to-face coaching.

Beginning with the courses offered during the Summer 2005, Dunamis, Inc. has provided an eCoP as an additional online component to its workshops as a vehicle for providing support and coaching following in-service training. This eCoP was facilitated by the LMS (BlackBoard, Inc. (2003). The LMS was moderated by the Dunamis, Inc. course instructors, providing technical assistance and fostering peer support and group problem solving as the participants go back to the schools and classrooms and attempt to apply what they have learned in workshops and training opportunities. This eCoP provided threaded discussions, live chats, a virtual-classroom setting, an activity exchange, links to additional resources, and a space for reviews of new research.

Research Questions

In the Spring of 2006 a research project was undertaken to examine in-service training in AT. The research questions were:

1. What are the factors in in-service training that encourage classroom use of AT?

2. Does participation in an eCoP, following a face-to-face in-service training event, enhance educators' use of AT with students with disabilities?

3. What obstacles or barriers impact the use of AT in the classroom?

Methodology

This research employed a modified Delphi approach (Eggers & Jones, 1998) to gather and clarify the perceptions of special educators concerning Dunamis, Inc. in-service training in AT. The Delphi approach was appropriate for this project because of the diversity of factors that have been identified that may impact the use of technology in the classroom. The Delphi method provided a means to collect and quantify consensus and disagreement about the impact of the factors upon AT use, while minimizing researcher bias (Helmer, 1983).

In the first round, a pre-Delphi probe asked the local pool of participants to identify the factors in Dunamis, Inc. training that have positively impacted AT use in their professional setting. Participants were also asked to list barriers to AT use they encountered. The responses were collected electronically via a web-based response site. The listed factors were analyzed by a "monitor team". Redundant factors were discarded. A compiled list of all unique factors was produced.

In the second round, two smaller panels of experts in AT, a Local Panel and a National Panel, rated the factors that had been identified in Round 1 to determine which factors were believed to contribute most to AT use. A Likert scale was employed, including the following responses: 1 = *strongly disagree,* 2 = *disagree,* 3 = *unsure,* 4 = *agree,* and 5 = *strongly agree*. Participants were also presented a list of barriers to AT use that had been compiled during Round 1. The same Likert rating scale was used for the list of barriers. The responses were collected via a Web-based response site. Responses were analyzed

for degree of group consensus using computations of median and interquartile range (IQR). Results from Local Panelists and National Panelists were tabulated and listed separately. Panelists were invited to view the results for their panel online.

In the third round, the list of factors and barriers, with group statistics from Round 2, were presented to each participant along with their own rating for each item on the previous round. Panelists were invited to adjust any of their previous ratings using the same Likert scale. Space was provided for clarifying comments. Panelists were asked to justify changes and explain choices that were a significant departure from their group's mean. Responses from the third round were collected and the mean, median, and first and third quartiles calculated to accommodate any changes that were made. Again, each group's statistics were calculated and recorded separately.

After careful analysis of the results of Round 3, a fourth round was deemed unnecessary. Sufficient consensus had been reached, and there was little variation between the second and the third round responses. An IQR of 1.75 was deemed to indicate sufficient consensus.

Results

The panelists expressed consensus and rated highly a set of 9 factors:

Rank Factors in In-service Training That Encourage Classroom Use of AT

1. Hands-on practice using the AT products
2. Practical Implementation strategies, ideas and applications
3. Expertise, knowledge of workshop leader
4. Interactive presentation: encouragement to ask questions
5. Quality documentation/ handouts that support the instruction
6. Examples from personal experiences & real-life to specific applications
7. Effective communication – presented in "layman's terms"
8. Effective demonstrations
9. Information/support available following workshop: through electronic community of practice (eCoP)

The panelists reached consensus on four barriers:

Rank Barriers That Impact AT Use

1. Not enough training
2. Getting fellow professionals to use AT with students consistently
3. Not enough time
4. Teachers and parents lack of AT knowledge and unwillingness to try it

Discussion

The nine factors from in-service training that positively impact AT and have been agreed upon by the two panels conform closely to the ideal structure for in-service training described by Joyce and Showers (2002).

The participants in Round 1 identified many of the same barriers to AT use that have been mentioned in the literature. The panels narrowed the significant barriers down to four: (a) not enough training, (b) getting fellow professionals to use AT with students consistently, (c) teachers and parents lack of AT knowledge and unwillingness to try it, and (4) not enough time.

These rankings also indicated that panelists as a whole did not regard the rest of the identified barriers to be significant. However, it is worth noting that a few individual panelists did rank these other barriers highly. Their accompanying comments confirm that some of these barriers were important in their local settings. While it may be observed that some barriers appear to be more common than others, it appears likely that the barriers that were identified in Round 1 still persist as impediments to AT use in some local settings.

Limitations

The applicability of the findings from this research must be tempered by two considerations. This first is the selection process by which participants entered the study. The second is the design of the research which was focused around training provided by Dunamis, Inc. The means by which participants in this study were selected dictated that care must be taken in the application of any conclusions. The participants in Round 1 and on the Local Panel were all participants in Dunamis, Inc. training events. While all participants in Dunamis, Inc. training after 2001 were invited to take part in this research, the actual participants were self-selected. The design of the research also argues that caution be used when applying findings from the study. This study solicited factors that contributed to AT use as they were presented in training provided by Dunamis, Inc.

Conclusions

Implications of findings in local setting

Participants in Round 1 identified factors from Dunamis, Inc. training that were contributing to AT use. These factors were verified by the Local Panel and confirmed by the National Panel during Rounds 2 and 3. This would indicate that Dunamis, Inc. training incorporates several factors that have been identified as having a positive impact upon AT use.

Consistent with the research literature, the educators in this study reported that more training was needed to support successful implementation of AT. Both panels saw the lack of AT training as a primary barrier. Both panels evidenced strong consensus on this item.

It appears clear from this research that there continues to be a need for in-service training in AT similar to that provided by Dunamis, Inc. Panelists in this research indicated that they believed that Dunamis, Inc. training contributed to use of AT. The

Local and National Panels confirmed that the structure of Dunamis, Inc. is consistent with the ideal structure for in-service training described in the literature (Joyce & Showers, 2002).

The innovation of employing an eCoP as a follow- up to Dunamis, Inc. in-service training appeared to have been regarded as having a positive impact upon AT use. The panelists achieved significant consensus relating to the eCoP. These responses argued for the continuation of the use of the eCoP in conjunction with Dunamis, Inc. in-service training.

Panelists' comments reinforce the need to explore further the potential that the eCoP represented. Specifically, it may be useful to examine how the community can be encouraged to become more interactive. It seemed clear that the eCoP would be viewed as successful to the degree individual participants could be encouraged to value and become involved in the community

Recommendations for further research

Several points from this research deserve further study and examination. While this study provided visibility to the impact of components of Dunamis, Inc. training upon AT use, it did not systematically investigate beyond that environment. Further investigation is warranted concerning: (a) The possibility of additional factors that might contribute to AT use, (b) the optimum structure of the eCoP, and (c) the significance of the barriers of lack of time and difficulty getting fellow professionals to use AT.

While this research appears to indicate that the eCoP was a factor that contributed to AT use, the study did not delve into the structure or operation of an eCoP. The question of what constitutes an effective eCoP was not addressed in this study and could have had bearing upon how the panelists in this study rated this factor.

The part of this study that dealt with barriers confirmed the continuing perception that more training is needed in order for successful implementation of AT to be achieved. One barrier, "difficulty in getting fellow professionals to use AT consistently with students," was rarely mentioned in the literature. Because of its significance in this study, this barrier deserves further investigation.

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