interlink ™
training dissemination services

Interlink: The Development of Web-based Dissemination of Training for Researchers

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Abstract

Over the past several decades, research in the behavioral sciences has blossomed, bringing significant advances in public health issues such as depression, bipolar disorder, drug abuse, and access to health services. Recently, however, the research scientist workforce has declined, with a number of researchers leaving the field early in their careers, before they make the transition to independent scientist. In response to this decline, the National Institute of Mental Health (NIMH) has made it a priority to strengthen behavioral science research through advanced training and career development. Through NIMH funding, this project developed and tested a collection of innovative web-based services designed to support advanced academic training, career advancement, and collaboration among researchers. We present results from this longitudinal study comparing knowledge acquisition and retention, career progress, and website use for two trainee groups – those who attended live training workshops and had access to the training website, and those who only had access to the training website. We then briefly discuss the launching and commercialization of the culmination of this project, *Interlink Training and Dissemination Services.*

Preparing the Next Generation of Researchers

Over the past several decades, research in the behavioral sciences has blossomed, bringing significant advances in public health issues such as depression, bipolar disorder, drug abuse, and access to health services. Recently, however, the research scientist workforce has declined, with a number of researchers leaving the field early in their careers, before they make the transition to independent scientist (Sung et al., 2003; Ahrens, 1992; National Research Council, 2005). In response to this decline, the National Institute of Mental Health (NIMH) has made it a priority to strengthen behavioral science research through advanced training and career development. NIMH provides funding for an abundance of training, educational, and career awards each year. In 2009, NIMH spent approximately $97 million of its extramural research budget on training and career development, including $43 million for institutional and individual research training grants, $56 million in support of early research career development grants, and support for more than 60 conferences and scientific meetings. NIMH, as well as national professional organizations (e.g., Society for Research in Child Development, American Academy of Child and Adolescent Psychiatry), also sponsors dozens of specialized workgroups each year for mental health researchers (National Institute of Mental Health [NIMH], 2009, 2010; NIH Office of Extramural Research, 2009a, 2009b, 2009c).

Importance of ongoing training. The transition from early-career to independent (funded) scientist is a high-risk period for researchers, and they often need additional training in order to successfully navigate this road (Pincus, Dial, & Haviland, 1993; Tuma & Cohen, 1990). Skills such as negotiating a job position, managing staff, running projects, and getting funding are not often taught in graduate school, yet these skills are essential for career advancement (Burroughs Wellcome Fund & Howard Hughes Medical Institute, 2004; Committee on Science, Engineering & Public Policy, 2000; National Postdoctoral Association, 2003). Training in advanced statistics, research design and implementation, measurement development, and other specialized topics are also frequently left out of PhD and MD studies. In order to learn these skills and keep abreast of the newest advances in their fields, researchers often compete for admission to intensive multiday programs that they must take time out from their work to attend. Such programs support the transfer of scientific knowledge from senior investigators to early-career trainees, who not only benefit from the most up-to-date scientific information from leaders in their field but also hear practical advice from those who have successfully navigated research careers.

Interlink Training Dissemination Services

The benefits for early-career scientists of obtaining advanced training and mentoring make the case for increasing the availability of such opportunities through web-based dissemination and networking. Before the development of Interlink Training Dissemination Services, no systematic method of disseminating the resources generated through NIH-funded training programs existed, nor was there a set way for trainees and mentors to network and collaborate. We therefore proposed to develop and test a web-based training and networking tool to disseminate training opportunities for behavioral science researchers and to promote collaboration, networking, and mentoring. Given the high need for effective and usable researcher tools, this product was also developed for broadscale commercialization. In Phase I of this NIMH-funded project, we developed and tested a prototype of a training website, using presentations and other material from the Child Intervention, Prevention, and Services Research Institute. The success of Phase I led to a 3-year Phase II contract in 2007 to create a fully functional web-based training and networking tool to disseminate training opportunities for behavioral science researchers and to promote collaboration.

Interlink now offers:
- Professional videotaping of training events and conferences
- Skilled editing of text- and video-based material for effective web dissemination
- Customized website design
- Website hosting

Interlink's customized websites offer these features and functions:
- Public and private (login) areas
- Several formats for content presentation.
    » Video/slides/transcript for presentations
    » Quick Tips (video clips with transcript) for interviews
    » Q&As
    » E-training courses (video presentation, transcript, interactive features, quizzes, final test)
    » E-training curriculum (a multi-session set of courses using a variety of formats)
- User control over delivery.
    » Ability to choose various combinations of video, audio, graphics, text
    » Ability to download audio, slides, and transcript
- Networking and collaboration.
    » File sharing through Collaborative Workspace
    » Discussion boards
    » Wiki
    » Ask-the-expert help desk
    » Newsletters
- Online applications, progress reports, surveys

Research Evaluation of Interlink

This project began in 2004 with a 1-year contract from the NIMH to develop a prototype of a suite of tools and services that would support dissemination of advanced research training via the web. In 2007, NIMH awarded 3-C ISD a 3-year Phase II contract to fully develop and test these services. This second stage of the project involved three steps:

- In-person workgroups with researchers to get qualitative and quantitative feedback on the prototype
- Development of customized websites for four NIH-funded training institutes
- Field testing of the customized websites

In-person workgroups. Three 2-hour workgroups were conducted to assess the prototype with researchers representing diverse interests (e.g., autism, epidemiology, public policy, psychiatry). The workgroups involved a walk-through of the prototype at individual laptop stations. Participants viewed and provided feedback on all aspects of the site, including navigation, user interface, networking and administrative features, and training formats. Data from these in-person groups were analyzed and used to develop the actual websites.

Development of customized websites. Four NIH-funded training conferences were selected to take part in the project; for each conference, we videotaped presentations, conducted interviews with faculty and presenters, and designed and launched a fully functional website:

Career Development Institute for Psychiatry (www.cdipsych.org)

The CDI for Psychiatry promotes academic leadership and fosters mentoring between early-career researchers and senior scientists. It is directed by Dr. David Kupfer, (former) chair of psychiatry at Western Psychiatric Institute and Clinic of the University of Pittsburgh, and Dr. Alan Schatzberg, (former) chair of psychiatry at Stanford University.

National Hispanic Science Network of Drug Abuse (www.NHSN.4researchers.org)

NHSN hosts an annual conference for multidisciplinary researchers, the focus of which is mentoring and training activities to promote career development. It is directed by Dr. Jose Szapocznik of the University of Miami.

Career Development Institute for Bipolar Disorder (www.cdibipolar.org)

The CDI for Bipolar Disorder trains researchers in career advancement and current methods in bipolar research, and supports peer networking and mentoring. The institute is directed by Dr. David Kupfer at the University of Pittsburgh.

Center for Latino Family Research (www.CLFR.4researchers.org)

CLFR hosts a training conference to bring together scholars in Latino mental health, behavioral sciences, and intervention research. This conference is directed by Dr. Luis Zayas of the Brown School of Social Work at Washington University in St. Louis.

Field testing. After attending and videotaping the four training conferences and developing their customized websites, we conducted a field test in order to compare two modes of delivery (combined in-person and web training versus web-only training) in terms of value, satisfaction, fatigue, knowledge/skill acquisition and retention, and career progress.

Participants

Two sets of trainees were recruited for the field test: (1) trainees who attended the conferences and (2) trainees in similar areas of research (e.g., bipolar disorder, drug abuse) who did not attend the conferences. These two sets of participants were selected in order to compare the following two training delivery modes:

- **Combination condition (COM)**—These participants attended one of the live, in-person training events AND were provided with access to their training site's website of e-training materials and collaboration tools; website access was provided to these participants at 3 months following the live training event.

- **Web-only condition (WO)**—These participants did not attend any of the four live training events but received access to all web-based training materials for the particular institute that matched their area of research (i.e., psychiatry, bipolar disorder, Latino family research, or drug abuse).

A total of 128 trainees participated in the field test. Sixty-three percent were female. Approximately 77% of the sample was early-career level. With regard to racial distribution, 82.8% were Caucasian, 10.9% Asian, 3.9% African American/Black, 1.6% Native American, and 0.8% Middle Eastern. Of the 128 participants, 36% were of Hispanic/Latino ethnicity.

Measures

At designated time points over the course of the study, trainee participants completed questionnaires assessing a variety of variables:
- Knowledge and Skill: their understanding of material from three presentations given at their conference
- Career Progress: career advancement, funding, satisfaction with position, and other factors
- Website Evaluation: usability and value of the website

Key Research Findings

1. <u>Knowledge and Skill</u>. Participants were tested on their understanding of content from three presentations given at their conference. We were interested in comparing knowledge acquisition and retention across time and across the two delivery modes (COM and WO).

   We found the following significant changes in Knowledge and Skill scores for both groups:
   - Improved between pre-test and post-test
   - Declined between post-test and 3-month follow up
   - Improved between 3-month and 6-month follow up
   - Remained stable between 6- and 9-months post
   - Improved between pre-test and 9-month follow up

   The only significant difference *between* the two groups occurred between post-test and 3 months, where the decline was worse for the COM trainees than it was for the WO trainees (63% vs. 72%, respectively). This is likely due to access to the website: without access to the training materials between the conference and 3 months after the conference, COM trainees showed a considerable drop in retention, basically back to their pre-test scores. Interestingly, however, the difference between groups disappeared by 6 months, supporting the idea that website access to training material improved understanding. Figure 1 displays this pattern of scores across time.

**Figure 1**. Knowledge Percent Correct by Delivery Mode
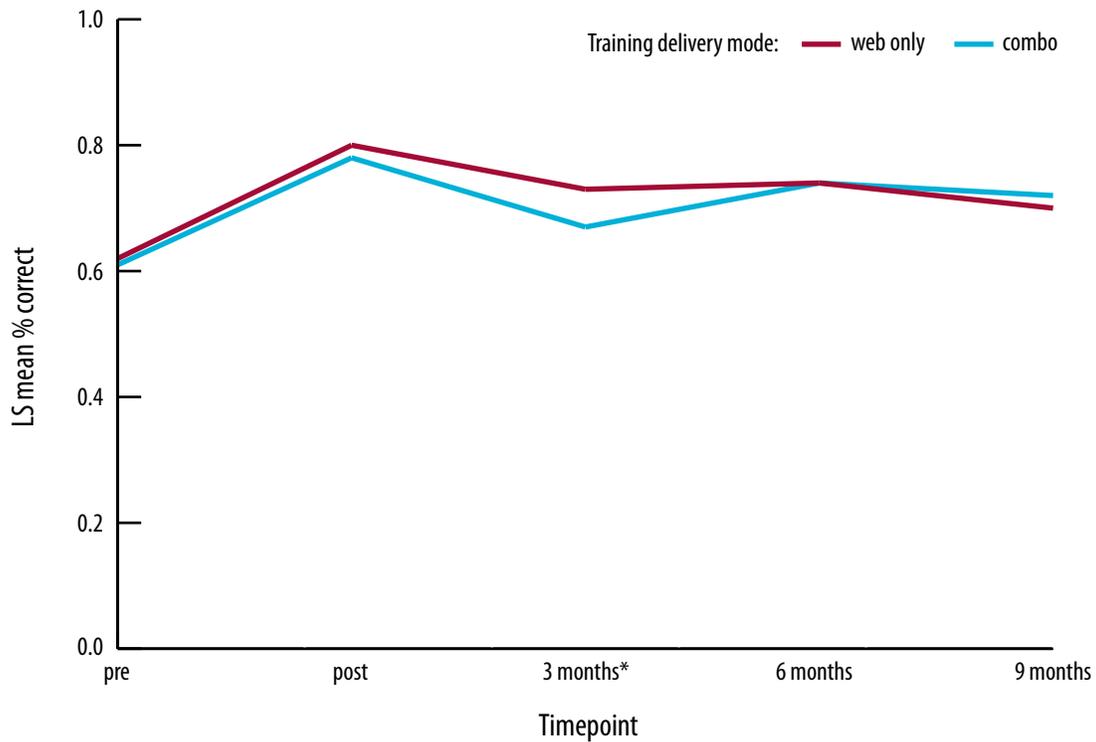
* There is a significant between-subjects difference for delivery mode at the .05 p-level

2. <u>Career Progress</u>. Career progress (looking at change from pre-training to 9 months) focused on two areas: (1) professional activities and (2) confidence in career-related areas. We found significant progress in the following areas:
   - Increase in professional activities
     - » Mentors
     - » Honors received
     - » Affiliation in professional societies
   - Increase in level of confidence
     - » Achieve career goals
     - » Manage research projects effectively
     - » Manage time efficiently
     - » Manage staff effectively
     - » Write grants

3. <u>Website Evaluation</u>. Faculty, administrative staff, and trainees at each training site were asked to complete a brief evaluation of their experience with 3-C ISD staff and their training site's website at the end of the project.

- **Interlink features and content**. Trainees were asked to rate the importance of various features on their websites. **Presentations** were considered by both groups to be the most valuable. They also rated **Quick Tips** very highly. Trainees made use of each of the **networking features** (file sharing, wiki, and discussion boards). The only significant difference between the two groups was the rating of the Discussion Board, which WO trainees found more important. Since the WO trainees did not have the opportunity to meet face-to-face, they may have valued the Discussion Board as a way to connect with other trainees.

- **Interlink services and tools**. Another key aspect of evaluation of Interlink is the service itself. Therefore, we also asked the training directors and their staff to assess the **overall experience of Interlink services**, from videotaping through website creation and support. Figure 2 illustrates these ratings on a 1–5 scale from 1 (not at all) to 5 (extremely).

Figure 2. Participants' Experiences of Interlink Services
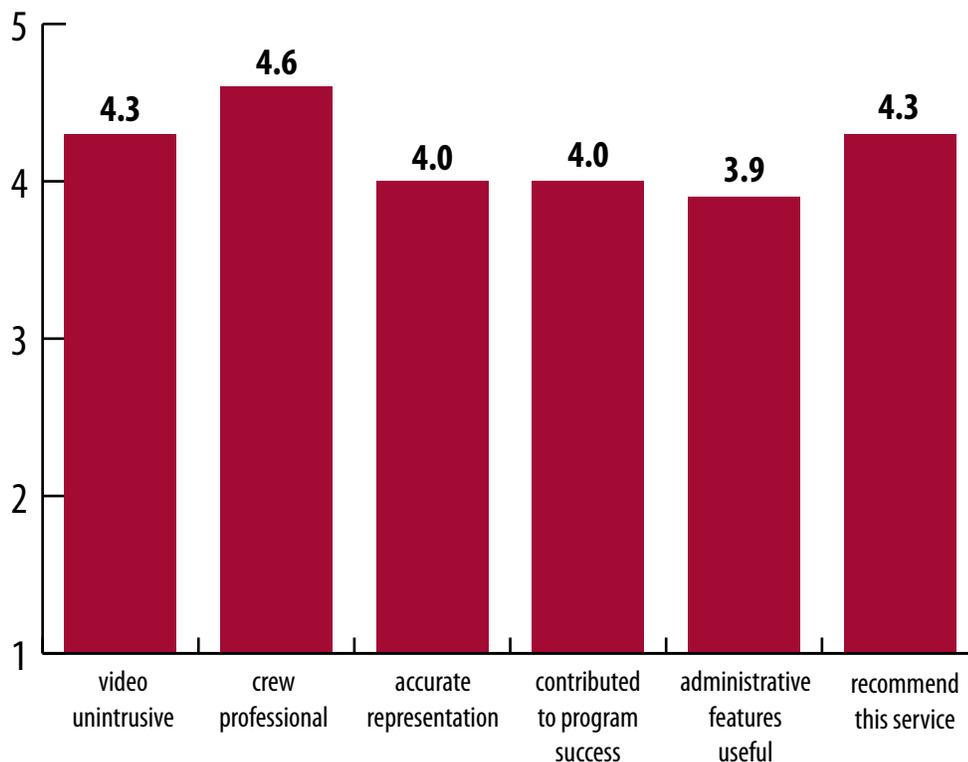
Testimonials from Trainees

Qualitative data collected from the trainees illustrate the websites' usability and value:

> *"The presentations were very helpful, especially because I could watch them at convenient times and read the transcript while listening to the audio. For me, this method of training is more effective than sitting in a lecture when I am tired."*

> *"The website was extremely well done and intuitive."*

> *"[Quick Tips] were helpful for getting pieces of information I otherwise would not access, and I have seen [the presentations] multiple times now and I still get lots from them."*

> *"This [website] is a great way to keep articles, presentations, contacts, etc. up to date so that our faculty and participants can log on at any time to find the information they are looking for."*

Commercialization of Interlink Training Dissemination Services

After the development of the four customized websites and following data collection and analysis in late 2009, deliberate steps were taken to prepare for Phase III commercialization of this 4-year research project. The result was Interlink Training Dissemination Services (www.interlinkyourtraining.com), which supports behavioral science researchers in disseminating their training and conferences, and enhances collaboration and networking among researchers.

Competitive advantage. The tools and services offered by Interlink are distinctive and innovative in this field. There is no other research-based product that is tailored to meet the needs and priorities of researchers in the behavioral sciences who wish to disseminate conferences or training.

Staff expertise and professional-grade equipment. The four training sites taking part in this project were quite diverse in terms of academic fields represented and website requirements, as well as users' technological savvy. In order for us to develop effective, useful websites, it was necessary to have both highly skilled and flexible staff, and high-grade video equipment and technology. Staff proficiency and skill also increased over the duration of this project. Expertise in the four 3-C ISD teams includes the following skills:

- Video production team
  - » interview and lighting design
  - » substantial experience with high-definition video equipment
  - » Final Cut Server
  - » AfterEffects, color correction

- Content editing team
  - » advanced degrees (PhD in developmental psychology, doctoral candidate in English, master's candidate in distance education)
  - » well versed in the research process
  - » expertise in technical editing, copyediting, and editing for the web
  - » skilled interviewing

- Graphic design team
  - » brand identity and logo development
  - » design for advertising and marketing materials
  - » Adobe InDesign CS3, Illustrator CS3, Photoshop CS3
  - » layout and graphic design

- Web development (IT)
  - » Content Management Systems experience
  - » workflow automation for video and content development and deployment
  - » focus on usability and iterative design cycles
  - » Javascript/Ajax, PHP, MySQL, Flash/ActionScript, Java/C++

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Building partnerships. Research that stays in the lab or is only published in journals will not reach the people who can most benefit from its findings. Therefore, commercialization of products developed through government funding is the final phase of a research study. Over the course of this project, we developed and continue to maintain strong relationships with the directors of the four institutes that were part of the study. In addition, we have begun building partnerships with other directors and researchers who are now using our services. Our partners as of October 2010 include the RAND Corporation, University of Illinois at Chicago, University of Pittsburgh School of Medicine, Cornell Institute of Geriatric Psychiatry, Washington University in St. Louis School of Social Work, Rutgers University, and Stanford University.

Testimonials

"Though we have used other options to disseminate various training programs in the past, none have come close to providing the professional, engaging, and interactive features that Interlink offers."

David Kupfer, MD
Director, Career Development Institute for Psychiatry
University of Pittsburgh School of Medicine

"Collecting information online is faster and easier with Interlink. Administrative tools like the online application and the survey system save valuable time and energy."

Kimberly Bauer
Coordinator, Career Development Institutes
University of Pittsburgh School of Medicine

"Interlink's staff is informed and responsive. Launching a website involves a thousand moving parts and learning about a lot of unfamiliar technology. The staff is always willing to explain and/or demonstrate a new concept or technology and help us think about how it could be useful."

Marc Atkins, PhD
Director, LINKS Center
University of Illinois at Chicago

"An R13 requires getting colleagues together to come up with new ways of thinking about ideas. Interlink helps us speak not only to each other but also to a broad network of peers."

Luis Zayas, PhD
Director, Center for Latino Family Research
George Warren Brown School of Social Work

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