



Evaluating Web-Based Professional Development

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Background

As with other great media technology innovations in the past, World Wide Web technology has created new opportunities for learners. Businesspeople and educators have expended many efforts to test different applications and build demand for their educational offerings. Web learning sites have proliferated. The audiences and instructional methodologies for the different Web learning efforts vary. Some are for children, some are for adults. Some offer academic courses that parallel on-site classroom instruction, while others offer professional development programs that a teacher or other professional might otherwise present in a workshop or training program. Some offer traditional didactic instruction, while others attempt, through varying amounts of assistance, to orchestrate more open-ended, constructivist experiences for the user. Some are rigid in the way they channel the learner through a sequence of interactions. Others let users direct their own learning by choosing where they want to go and what they want to do.

Applications of Web-based technology for professional development include:

- Digital libraries that permit the retrieval of standards, lesson plans, assessments, evaluation resources, full texts of articles, artifacts such as student work, and other resource materials, in any medium.
- Multimedia learning technologies for training purposes that present information, assess learning, provide feedback, and individualize the learning path.
- Tools and environments for synchronous and asynchronous professional communication and collaboration (e.g., e-mail, whiteboards, chats, listservs, video-conferences, file-sharing systems, etc.).



- Professionally useful databases that permit members of professional communities to post, metatag, query, mine, and link records of interest.
- Annotation interfaces layered over digital library resources that make it possible for members of professional communities to exchange context-embedded reflections and feedback about them.

These are not mutually exclusive categories. For example, a database or digital library can be posted on the same site that hosts virtual meetings.

The National Staff Development Council and the National Institute for Community Innovations (2001) have published a resource guide for the implementation of its standards for the professional development of educators in e-learning contexts. The guide presents examples of applications of Web-based professional development and posits quality criteria for meeting the standards. Although noteworthy in positing a blueprint for electronically delivered professional development, the guide does not address methodological issues pertaining to its evaluation.

Framework

This paper discusses the distinctive characteristics of Web-based professional development offerings that should be addressed when formulating designs for evaluating them, above and beyond the usual design issues that pertain to use of comparison groups, sample size, triangulation, etc. To illustrate the characteristics, the article describes the Online Evaluation Resource Library (OERL), a Web-based professional development resource created and maintained by SRI International (SRI) for the National Science Foundation. OERL contains a digital library and set of instructional resources and tools for aiding people who are designing or carrying out educational project evaluations. (The other papers in the session describe strategies that have been used to evaluate OERL.)

Merits and trade-offs inherent to Web-based professional development



Web technology for professional development provides the advantages as well as the disadvantages that characterize all forms of distance learning. The openness, vastness, and ubiquity of the Web and the just-in-time capabilities of content delivery on the Web bring distinct advantages to the learner over other forms of professional development. The disadvantages to the learner are lack of face-to-face contact, and the risks associated with inappropriate interactions among users, unfiltered content, client hardware and software variances (i.e., browser, disk space, RAM, speed of modem, etc.), viruses, and other technical disruptions. Proponents of Web-based professional development should consider adopting strategies that have been used in other venues of Web-based interaction to mitigate the risks. Such strategies could include assigning varying user privileges, certifying content, moderating communication forums, and minimizing multimedia load. The evaluators should determine how well the program addresses the risks and whether the risks that remain are worth tolerating given the program's achievements.

The role of the Web-based offering in context

The evaluator of a Web-based professional development offering needs to be cognizant of the contribution of the offering in relation to the missions and learning goals of what other professional development opportunities, if any, are available and being utilized. There are two broad categories.

1. *It may provide a new way to deliver on the same learning goals that are already pursued in other offerings, such as in face-to-face courses or non-computer-based independent study.* An example would be a Web-based program that uses online asynchronous threaded discussions between learners to meet some of the same goals that are met traditionally in synchronous classroom discussions. Programs which use the Web to pursue the same learning goals as traditional programs may be supplemental, constitute a replacement of a traditional program, or provide a new access opportunity for previously unreached audiences. Those that have replaced traditional offerings are assumed by their advocates to be either



improving the depth or breadth of achievement, or making it more cost-effective. . For supplements and replacements, the evaluator needs to ask how much the Web-based program improves the extent of learner achievement of the traditional learning outcomes. For programs whose primary mission is outreach to previously inaccessible audiences, it might be enough to simply determine that the outcomes are as good, or almost as good, as one can expect from the traditional delivery approach.

2. *It provides unprecedented opportunities for learning that have not been available to the learner before because the technology to make it available did not exist.* An example would be powerful computer hardware and software that provide Web-based access to enormous data sets and computational power to nonscientists that were previously available only to scientists on special computers at national research centers. The availability of the technology to science teachers and students provides them with unprecedented opportunities to learn and practice computational science.

For such programs, the program developer should articulate what added value the technology is likely to create, and that should be reflected in the programs' learning goals. The challenge for the evaluator is to work with the program developer to determine what new outcomes can be anticipated and how best to measure them. The challenge of finding sufficient evidence to assert program impact can be especially problematic. Assertions of impact require a control group, but by definition, a control group that provides opportunity to achieve the same learning goals but in different ways may be impossible to find. In the context of the example cited in the preceding paragraph, can a control group be found that provides alternative opportunities for students and teachers to learn computational science at the same depth, without the use of the new technology?



Data collection challenges

The evaluation of Web-based programs presents distinctive challenges for data collection, such as:

- What types of formative evidence can be collected to refine a Web site during development?
- What data should be gathered when “observing” the online learning experience?
- What data constitute reliable evidence of the quantity and quality of Web site use?
- What types of outcome data can be gathered to gauge program success?
- How can outcomes be measured against quantity and quality of use in order to determine impact?

When evaluating Web sites that permit unrestricted access, the evaluator is presented with an additional set of challenges that pertain to identifying the attributes of the user population, drawing from it a representative sample, and collecting data from the sample.

Generally speaking, the more diffuse the target audience is and the more open-ended and self-directed the learning process is, the more challenging it is to monitor the quantity and quality of the user’s experience with the site. One way to handle these challenges is to track down and solicit a sample of users, monitor their use of the site over a specific period, then have them complete specific outcome measures. Another way is to compel users to register, then track their use of the site and their interaction with the site through the collection of logged data about their use. Registration permits the associating of specific interactions with the site and specific users. However, to many Web users, registration is considered burdensome and constitutes a participation disincentive.

The Online Evaluation Resource Library

Overview



The Online Evaluation Resource Library (OERL) is a Web-based digital library and resource bank. Its primary purpose is to improve the evaluation of projects funded by the Directorate for Education and Human Resources (EHR) of the National Science Foundation. It does this by providing prospective project developers and evaluators with supporting material that they can use to design, conduct, document, and review project evaluations.

OERL contains exemplary artifacts (i.e., plans, instruments, and reports) from evaluations of EHR-funded projects, plus criteria about good evaluation practices, professional development modules, and links to evaluation standards. Scenarios illustrate how the evaluation resources can be used or adapted. To stimulate ongoing dialogue in the evaluation community, threaded discussions, interactive case studies, a project directory, and links to project abstracts are also provided.

OERL exemplifies Web-based technology for professional development that is:

- Open to all users
- Nonprohibitive in its hardware and software requirements
- Navigable and searchable
- Extensible to other programs in evaluation
- Update-able at any time
- Facilitative of online communication and collaboration.

Currently, the OERL collection contains 108 evaluation plan documents (9 complete plans, 99 excerpts), 179 instruments, and 226 report documents (9 complete reports, 217 report excerpts).

Strategies for confronting the trade-offs in a Web-based professional development solution



In Web-based professional development, there are trade-offs between subjecting artifacts contributed by communities of practitioners to a quality review process versus automatically posting everything that is contributed. OERL has a quality review process, which is carried out by SRI staff. Examples of criteria include whether the artifacts represent best practice and the extent to which they present an approach or focus that is not already extensively represented in the artifact collection. Artifacts that do not pass the review do not get posted. Conversely, OERL takes a hands-off approach to the content of its threaded discussions and user responses to case study questions posed in its professional development modules. However, to avoid receiving or transmitting computer viruses, OERL only allows threaded discussion users to type answers into text boxes hosted on the site and does not allow them to submit files or applications. Since OERL is publicly-accessible and does not require registration, its need for such precautions is more acute than for restricted-access sites.

Professional development role in context

In the language of the framework, OERL provides a new means of delivery on the same learning goals that are offered in other professional development opportunities or graduate school courses.

OERL was designed primarily to help evaluators and principal investigators of projects who recognize that they have a professional development need. OERL's special value to this audience comes by virtue of the fact that, at this point in their careers, traditional approaches are either no longer available to them or are impractical to pursue. These are people who already possess some basic understanding of evaluation and perhaps some proficiency in certain of its aspects, yet need help in other aspects. For example, perhaps they have:

- Evaluated programs in one subject area but are faced with evaluating in a different subject area and would like to read examples of how other people have evaluated those other areas.



- Observed classes to collect data but have never developed questionnaires to collect data.
- Taken a university course in the theories behind different evaluation methodologies or one or two evaluators' particular preferences, but have not been exposed to practical strategies for carrying out an evaluation.

The Web has made this disparate audience reachable for just-in-time professional development. To have engaged in a previous comparable experience, they would have had to follow more burdensome paths, such as finding face-to-face conferences or workshops to attend or seeking out evaluation books or subscriptions to evaluation journals. Perhaps they would have been fortunate enough to have had access to academic libraries with appropriate evaluation resources. If not, they would have had to buy the books and journals themselves. In either case, disparate books and journals can provide a wealth of information, but would lack the integration that OERL provides.

OERL is also an appropriate resource for graduate students or other evaluation novices taking evaluation courses or workshops. For this audience, OERL provides a complementary approach and set of resources that are likely unavailable in these other venues. Many training courses in evaluation are grounded in academic pedagogy, using lectures from experts, scholarly articles, and textbooks. In contrast, OERL's approach to professional development is grounded in the principles of electronic performance support systems (EPSS) that arose from the organizational development community in the 1990s (Brown, 1996; Gery, 1991). EPSS's are electronic learning environments that provide resources for employees as they need them in order to build their skills and do their jobs better. OERL provides many EPSS features through its:

- Collections of plans, instruments, and reports from real projects
- Indexed annotations explaining the significance of the examples
- guidelines for proceeding systematically and deliberately through the stages of an evaluation
- Guidelines for constructing evaluation documents, such as survey questionnaires.



OERL's individualization proceeds from its architecture, which permits a user to access any component of the site at any time. As an EPSS-oriented professional development offering about project evaluation, OERL provides a distinctive approach that is different from, though not a replacement for, a traditional academic course or workshop in evaluation.

Strategies for collecting data about site usage and appeal

OERL's effectiveness has been evaluated through examining complementary sets of data from different data sources and data-gathering procedures.

Observing the online learning experience. To gauge whether learning is occurring, principal investigators and evaluators with different specializations were observed interacting with the site. Observations of university students majoring in education were also carried out to determine the usefulness of OERL with this additional critical audience. Users were observed navigating around the site and, in the process, saying what is on their minds. The observers identified from these comments moments when learning is occurring. The observations also served as a basis for testing the site's user interface, since users also raised issues pertaining to site navigation.

Gathering data about the quantity and quality of Web site use. The task of obtaining evidence on a large scale of the quantity and quality of use of a Web site is always challenging when the use is open to the public, at sites like OERL that do not require user registration. Statistics about OERL are automatically gathered and aggregated hourly, daily, weekly, and monthly. These include:

- How many requests were made for the site?
- Which pages on the site were requested?
- How many users from different domains visited the site?
- Which Web site links did users follow from OERL?



Although somewhat revealing of quantity of use, these statistics say nothing about quality of use. This is why the user tests are so important. OERL, like all Web learning sites, could be designed to be more revealing of the quality of the user learning experience on the site if it had a more rigid design that channeled users through sequences of screens and interactions based on their learning progress. However, this method would compromise the self-directed nature of the site and threaten use by the target professional development audiences.

Gathering outcome data. Self-report data about outcomes were gathered from surveys taken by self-selected samples of users of the site. (For more information on this, see the paper on Technological Design Considerations for Surveys of Online Learners). To better measure the impact of OERL on evaluation learning, it would be ideal to move beyond self-report to administering learning assessments about evaluation and move beyond self-selection to administering the assessments to a representative, randomly selected set of users, along with specification of a control group.

Conclusion

The Web holds tremendous potential for professional development. However, it also presents distinctive challenges with regard to specifying project goals and evaluation designs that are responsive to those goals, methodologically appropriate, and feasible. By using the goals and characteristics of OERL as an example, this paper has presented a framework for identifying the distinctive characteristics of Web-based professional development offerings. It is through the identification of the characteristics outlined in the framework that an appropriate evaluation design can be fashioned.

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