Designing and Implementing
Online Professional Development Workshops

EDC Center for Online Professional Education

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Please note that the Appendices are not included in this file, but are available upon request to jcallahan@edc.org.

1. Introduction

The EDC Center for Online Professional Education (COPE) has been designing and implementing online discussions and workshops for K-12 teachers, administrators, and other educators since 1997. During this time, we have used online discussions to complement and extend in-person institutes and graduate courses, and provided online workshops on a variety of topics, involving hundreds of educators over the course of three years. Our audiences have included teachers at the elementary, middle school, and high school levels; individuals with decision-making responsibilities for curriculum, professional development, policy, budgeting, evaluation, technology implementation, and/or technology infrastructure at the school, district, and state levels; and individuals who are learning to conduct their own online professional development workshops. In all cases, our online workshops were designed with the following goals:

- To help teachers learn to use technology to enhance teaching and learning in their classrooms, and to help administrators provide the technology, materials, professional development, and support that will enable teachers to use technology effectively.

- To create an online community of learners in which participants share information and learn from each other. Educators, whether teachers or administrators, value opportunities to interact with knowledgeable peers who face the same issues and can provide both new ideas and feedback about one's own ideas and practices.

- To closely link each workshop's activities with its participants' ongoing professional practice. For example, workshops for teachers include activities in which participants develop technology-enhanced lesson plans for their own use and to share with others in the workshop. Workshops for administrators include activities that scaffold decision-making and action-planning processes.

- To address specific practical needs articulated by the audience for a workshop topic, while building upon relevant theory and research.

- To provide information and resources that will be of continued value to participants in their professional practices.

Our approach is highly interactive, activity based, and discussion-rich—and therefore models the type of classroom practices we encourage educators to use when integrating technology. Workshop components, such as readings, activities, and discussions, are designed to accomplish the following:

- Engage participants' inquiry into a topic

- Provoke new ideas

- Facilitate exploration and discovery

- Support experimentation with new tools and strategies

- Guide organization of ideas and integration into practice

- Promote sharing, constructive feedback, and reflection.

In the set of online workshops discussed in this report, information was presented to participants via HTML pages that combined text, graphics, and links. In some workshops, brief audio and video presentations were also used. The primary form of interaction was asynchronous threaded discussion, which allows participants to read and post messages at their convenience. When posting a message, a participant can either start a new "thread" (topic) or continue an existing thread by responding to messages within it. The software displays the messages in outline form to show which ones are in response to others.

We have analyzed and evaluated our online discussions and workshops; reviewed much of the available technology and the relevant research literature; explored a number of different approaches; conducted initial, midpoint, and ending surveys of participants; conducted in-person focus groups with district teams that we have trained (via online workshops) to serve as online professional development specialists in their districts; and engaged in extensive discussions to define principles of effective online workshop design and facilitation.

This report summarizes what we have done and learned to date. It is intended to provide useful information for those who are planning to incorporate online learning into professional development programs, and those who will design and implement online professional development activities.   We are continuing to explore this new medium for teaching and learning, as are many others, and both the knowledge of the field and the available technologies will continue to advance rapidly. Therefore, this should be read as a status report of ongoing investigations by one of a number of groups exploring this field, rather than as a final statement on any aspect of online professional development.

This report contains the following major sections:

The Basis of this Report summarizes the goals and audiences of the online workshops and other online activities that inform this report.

General Considerations summarizes principles of effective professional development that we considered in our work, different approaches to online professional development (OPD), the key elements and potential advantages of our "learning community" approach to OPD, and some points to consider when planning the role of online workshops as part of a complete program that includes other types of professional development activities.

The Structure of an EDC-COPE Online Workshop presents an overview of the elements common to all our workshops, and notes about some additional elements used in specific workshops. Example screenshots are included, to convey the general "look and feel" of an OPD workshop.

Research Findings presents a summary of the data collected on four key areas of interest across a set of six workshops.

Strategies for Effective Online Professional Development provides strategies and guidelines, derived from our experience, for effectively designing, facilitating, implementing, and assessing online professional development workshops.

Online Learning Software Environments discusses features needed in systems used to develop and deliver online workshops using a learning community approach.

The *Conclusion* sums up our perspective of the current and future roles of online professional development for educators.

The *Bibliography* provides a selected set of recommended references, with brief annotations.

The *Appendices* provide specific information about EDC-COPE workshops; example activities and discussions; survey and evaluation forms; evaluation results; articles by EDC staff; handouts and slides from presentations by EDC staff; and notes from our reviews of many relevant software tools.

2. The Basis of this Report

The information in this report is based upon work within a number of projects in the EDC Center for Online Professional Education (COPE) and related work in which COPE staff have been involved. These projects are summarized below. The online workshops described under the LNT and NetTech 1998–1999 projects form the major basis for the research reported. More detailed information about these workshops is provided in Appendices A–F, and complete workshop archives can be found at http://www.edc.org/LNT/workshop.htm.

2.1 COPE Projects and Related Work

Leadership and the New Technologies (LNT). This project developed a series of face-to-face and online professional development opportunities as well as supporting resources designed for school and district decision makers. In this context, a joint endeavor of EDC and the Harvard Graduate School of Education Programs in Professional Education with funding from the AT&T Foundation, we conducted intensive week-long summer institutes for teams of school district leaders, with about 100 participants from urban, rural, and suburban districts attending in each of the summers of 1997, 1998, and 1999. The related web site (http://www.edc.org/LNT) provides extensive documentation of each institute, and an online journal and library of annotated resources to serve the same audience. We also explored the use of pre-institute and post-institute online discussions, and conducted online workshops that provided opportunities for institute participants and others to explore specific topics in more depth. The first LNT online workshop is described below. Subsequent workshops were jointly funded by the U.S. Department of Education through the NetTech project, and are described under NetTech 1998–1999.

- *Envisioning the Possibilities: Connecting the Internet with Curriculum Standards and Frameworks.* This workshop, led by Glenn Kleiman (EDC and Harvard) and Rob Ramsdell (FreshPond Education, Inc.), and funded by the AT&T Foundation, ran from March 2 to April 27, 1998. The goal of this workshop was to help school district decision-makers develop a vision of effective uses of the Internet in K-12 education, especially with regard to addressing curriculum standards and frameworks.

NetTech, 1998–1999. As part of our work in the northeastern states, we conducted online workshops for this audience of school and district leaders, with support from the U.S. Department of Education through the NetTech project. The AT&T Foundation provided additional funding to support participants from outside of the northeast region. The following workshops form the major basis for this report.

- *Keeping Kids Safe: Policy Implications of the Internet in Schools.* This workshop, led by Libby Black (Boulder Valley, CO School District), and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from October 26 to December 18, 1998. Participants explored the implications of Internet presence in our schools, including issues of acceptable use by students and staff, filtering of content, the role of an Acceptable Use Policy, and other steps you can take to provide a safe environment for students.

- *Planning a District-Wide Technology Infrastructure.* This workshop, led by Bob Spielvogel and Terry Dash (EDC), and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from October 26, 1998 to January 31, 1999. This workshop introduced basic concepts of computer networks and infrastructure, in order to prepare school district leaders to understand the options and make informed choices about implementing a district-wide technology infrastructure.

- *District Technology Planning for All Students: Helping to Meet the IDEA '97 Mandate.* This workshop, led by Denise Ethier (EDC), Skip Stahl (CAST), and Judy Zorfass (EDC), among others, and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from March 5 to April 16, 1999. Participants examined cases and collaborated in district teams to explore ways that effective technology planning can promote learning and participation by all students—whether they are labeled as having "disabilities" or not.

- *Multi-User Virtual Environments: From Research to Classroom Practice.* This workshop, hosted by Susan Metrick (EDC) and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from March 1 to April 11, 1999 as the first in a series of workshops entitled "Emerging Technologies for Active Learning". Sessions were led by guest facilitators Chris Dede (George Mason University), Alan Epstein (Watertown Public Schools), Judi Fusco (SRI International, TAPPED IN), Amy Bruckman (Georgia Institute of Technology), Lizzie Edwards (Georgia Institute of Technology), Daniel Couturier (U.S. EPA), and a 5th grade student from Watertown, MA. Participants explored text-based and 3D virtual worlds, and discussed ways in which they might be used for classroom practice and professional development, as well as strategies for successful implementation.

- *From Information to Knowledge: Visualizing Real Data in the Classroom*. This workshop, hosted by Kristen Bjork and Terry Dash (EDC) and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from April 5 to May 2, 1999, as the second in a series of workshops entitled "Emerging Technologies for Active Learning". Sessions were led by guest facilitators Kathryn Keranen (Thomas Jefferson High School for Science and Technology), Randall E. Raymond (Detroit Public Schools), Paul Rooney (TERC), and Ray Sambrotto (Lamont-Doherty Earth Observatory, Columbia University). Participants explored remote-sensing and geographic information system (GIS) technologies, discussed current research, and examined issues of classroom implementation.

Technology Innovation Challenge Grant to Concordia Parish, Louisiana. As a subcontractor on this U.S. Department of Education grant, in the first year of the project we developed and ran two workshops on the topic of *Exploring the Possibilities: Using the World Wide Web in Your Classroom.* These concurrent workshops, one for high school teachers and one for middle school teachers, connected faculty from Concordia Parish and Catahoula Parish, LA school districts in an examination of the opportunities, possibilities and key steps to using the World Wide Web effectively in the classroom. Co-facilitated by Kirsten Johnson and Barbara Treacy of EDC and Merrick Lofton and Paula Paul of Concordia and Catahoula Parishes, the workshops ran from January 25 to March 28, 1999. Participants gained direct experience using the web as they explored current models of using the Internet in the curriculum and as they developed their own standards-based, interdisciplinary units. Links to the archives of both workshops are available at http://www.edc.org/LNT/workshop.htm.

During the second year of this five-year project, COPE developed a set of follow-up workshops for each of the initial teacher groups, as well as an introductory workshop for a new group of novice teachers from five neighboring parishes. A major focus of the work during this second year was to build local capacity to include OPD in the overall district professional development program. Therefore, local facilitators collaborated on both the design and the facilitation of the workshops.

NetTech, 1999–2000. During the 1999–2000 school year, with funding from the U.S. Department of Education through the NetTech project, we worked with five urban school districts in the NetTech region (Norwich, CT; Worcester, MA; Schenectady, NY; Prince George's County, MD; and Philadelphia, PA) in a *capacity building* program that built upon our experience with the Louisiana districts. Six teachers from each of the five districts participated together in two consecutive online workshops facilitated by COPE, learning how to serve as district OPD Specialists. Following this experience, they facilitated OPD workshops for teachers in their districts. At the end of the academic year, we conducted in-person focus groups with the OPD Specialists from each of these districts.

The first workshop, *Approaches and Tools for Developing Web-Enhanced Lessons*, ran from November 1 to December 10, 1999. (Screenshots from this workshop are provided in Section 4.) In this workshop, participants explored the possibilities for using the web in the classroom by experimenting with web-based tools such as WebQuest and

TrackStar, which they then used to design collaborative, inquiry-based classroom projects. The second workshop, *Strategies for Facilitating Online Courses*, ran from January 18 to February 22, 2000. This course provided an in-depth look at the curricula for two different OPD workshops that participants could choose to run for local teachers: *Approaches and Tools for Developing Web-Enhanced Lessons* and *Finding the Best Educational Resources on the Web*. Participants discussed techniques for successful online facilitation, and developed strategies for offering one or both of the OPD workshops to teachers in their districts. After taking these two courses, the six participants from each district divided into facilitation teams. During March–June 2000, each team of local facilitators conducted one or two OPD workshops for up to 60 teachers in their district. EDC hosted these workshops on its servers and provided technical support to the districts' liaisons.

Explorations of online discussions to support face-to-face learning opportunities. Glenn Kleiman has included participation in asynchronous, online discussions as a course requirement for students in the Integrating Technology Into K-12 Schools course he has taught at the Harvard Graduate School of Education in each of the past two years. In addition, we have used pre-Institute online discussions to launch the 1998 and 1999 LNT Institutes. Kirsten Johnson, Barbara Treacy, and Glenn Kleiman, all of COPE, are now designing a course on integrating technology into school districts, half of which will be conducted in regular face-to-face classes, and the other half online. This course will be taught in the Harvard Extension School.

3. General Considerations

This section describes some of our guiding principles about professional development in general, different types of online professional development, the approach we have taken, and considerations for integrating online workshops into an overall program of professional development.

3.1 Principles of Effective Professional Development

Effective online professional development (OPD) must adhere to principles that underlie *all* effective professional development, and also take advantage of the particular strengths of the online medium. We must therefore consider the general question: *What are the characteristics of effective professional development for educators, no matter what the medium of delivery?*

Key principles of effective professional development for educators have been articulated in the work of Joyce and Showers, 1995; Loucks-Horsley, Hewson, Love and Stiles, 1998; Renyi, 1996; Sparks and Hirsch, 1997, and other relevant research. These principles include the following:

- Focus on improving classroom practices as a means of increasing student achievement.

- Provide a balance of academic content, the study of curriculum and instructional strategies, and the process of school improvement.

- Engage teachers actively in their own development, rather than "transmitting" knowledge and skills "to" them.

- Relate professional development activities to participants' work, using classroom experiments and action research as integral parts of training workshops.

- Provide sufficient time for inquiry, reflection, and mentoring on an ongoing basis.

- Support the development of collaborative teams and collegial communities of learners, to help educators be more effective in their roles.

- Foster a deepening of subject-matter knowledge, a greater understanding of the learning process, and a greater appreciation of students' needs.

3.2 Different Types of Online Professional Development (OPD)

The phrase "online professional development" is applied to many different types of learning experiences, reflecting many different learning goals and approaches to teaching via the online medium. One useful way to categorize these is based upon the nature of the communications and interactions that take place. Within this framework, some variants of OPD include the following:

- *Broadcast approaches* in which the primary interactions are one-way, from a "presenter" or "teacher" to the members of an "audience" or "class". The web-broadcasting of lectures, which can be done in either real time or asynchronously with full video and audio, is a primary example. In some cases, opportunities for questions are provided following the broadcast, but the primary form of communication is one-way, not interactive.

- *Self-paced, independent study courses,* in which a learner interacts with content provided by the instructor, without any interactions with other students and with little, if any, interaction with the instructor. In many examples of this type of online learning, the instructor provides feedback to students only on papers or projects required to obtain credit. Therefore, the primary form of interaction is between the learner and the materials, with perhaps some one-to-one communications between the instructor and each student.

- *College lecture course models,* that often combine the first two types of interactions: students receive lectures and materials from the instructor. Typically, these add some additional but limited means of communication, such as email with the instructor or online office hours within a synchronous or "chat" environment.

- *Tutorial models* in which there are active and ongoing interactions between each student and the instructor.

- *Learning community models,* in which emphasis is placed on interactions among all the participants and the instructors or "facilitators", which is the term often used within this model. Here, many-to-many interactions play a central role, generally through an asynchronous threaded discussion tool, but in some cases, through an email listserve. Synchronous "chats" may sometimes be used for specific purposes, such as group brainstorming, or to support participants during an exploration activity.

Our approach falls within the learning community model, as we believe that this approach is most appropriate for providing learning opportunities for teachers and administrators in which the goal is both to inform and to help them improve their professional practices. We believe that the general principles of effective professional development, summarized in Section 3.1, require a learning community approach to actively engage participants in their own learning, to enable educators to collaborate and support each other, to connect directly to participants' work, and to provide a supportive context for inquiry, reflection, and mentoring.

3.3 Potential Advantages of the Learning Community Approach to OPD

The learning community approach to OPD has a number of important properties that are compatible with principles of effective professional development, and that make it a potentially valuable addition to the set of available professional development methods. These include the following, which are discussed in more detail in Green, 1998; Harasim, Hiltz, Teles, and Turoff, 1995; Kleiman, 1998; Tinker and Haavind, 1997; and Zorfass, Remz & Ethier, 1998.

- *Convenience.* Educators can participate in OPD activities from anyplace that a computer and Internet access are available, so the need for travel is eliminated. When asynchronous exchanges are the primary means of interactions, participants can work on their own schedules, participating anytime day or night.

- *Cost effectiveness.* Since travel and meeting space costs are eliminated, and the need for release time and substitutes is reduced, OPD can be cost effective for participants and school districts. However, we also note that there are many factors to consider, such as the cost of staff time involved in developing and facilitating OPD workshops, the technology infrastructure to run them, technical support, and computer and web-access for participants. So whether OPD is cost effective as compared to face-to-face workshops depends upon many factors, such as what distance participants would travel, what technology is already available and can be employed without extra cost, whether meeting space would be available at no cost, and so on.

- *Ongoing connections to participants' practice.* An online workshop can be scheduled to cover several weeks, which provides the opportunity to make meaningful connections to participants' classroom or administrative practices. An online workshop can mix off-line activities, such as classroom observations or implementing new lesson plans, with online research, reflection, and discussion. Participants can share their thoughts, experiences, and ideas with each other in a timely manner, in response to their ongoing classroom or administrative practices.

- *Interactions with colleagues and mentors not available locally.* OPD enables educators with common interests and needs to share ideas, expertise, and resources at a distance. OPD also makes it possible to involve researchers, students, and others who can provide useful perspectives but would not be available for local meetings.

- *Reflective discussions.* Since participants and instructors can take time to respond to each other's questions and ideas, responses in asynchronous online discussions are often more reflective and more carefully phrased than those in face-to-face classes. The fact that all prior discussions can be reviewed at any time contributes to making online discussions more reflective.

- *Open social dynamic.* Since the "discussion space" is not time limited as it is in face-to-face meetings, each participant can contribute as much as he or she desires without interrupting or limiting the time available to others. Furthermore, the lack of physical presence can lead to more focus on the content of people's contributions, and less on participants' physical appearance, status, race, gender, age, manner of speech, or other personal attributes.

- *Engages educators in using new technologies.* OPD provides opportunities for educators to experience using technology as learners, enabling them to explore ways that they may later use technology with their own students.

- *Multiple modes for learning.* OPD can make use of a variety of current and emerging Internet technologies to promote multiple modes of learning, such as reflective interactions, self-paced explorations, and collaborative work. For example, participants can engage in both synchronous ("same-time") and asynchronous ("anytime") interactions, gather resources of all types available on the web, share audio and video materials, use simulations and other online interactive software, and even see and hear each other using two-way audio and video.

- *Archives of activities and discussions.* Since a record of discussions is automatically accumulated as the course proceeds, and in well-designed courses summaries of each session are made available, participants do not have to rely on memory and notes to recall what others said previously. This can provide opportunities for participants to better build upon prior discussions, and it enables those who did not participate to later benefit from the workshop archive. It also provides a valuable resource for formative research to improve the workshop design.

3.4 Integrating OPD Workshops into an Overall Professional Development Program

We believe that the impact of OPD workshops is maximized when they are thoughtfully integrated into an overall program of professional development to complement and enhance other means of professional development. Therefore, a first step in planning is to decide what roles OPD workshops will play and how they will relate to other professional development activities. In fact, participants in our focus groups have noted that not only is it important to define the role of OPD, but it is also crucial to know *how* to go about defining its role: for example, how to educate the relevant stakeholders about OPD, how to decide what areas to address first with OPD, etc.

Some districts may be tempted to simply offer online versions of their existing professional development activities, with the idea that these will reach teachers who are too busy or who for other reasons do not attend the traditional offerings. However, it is important to consider what types of activities will work well online, and what types should remain face-to-face. While we do not yet have extensive experience with alternative approaches to this decision, some elements to consider are described below. These elements should be considered in conjunction with the potential advantages of OPD described in Section 3.3.

- Technology skill development, particularly at the introductory level, is better accomplished via hands-on in-person workshops, in which immediate assistance is available, rather than via OPD workshops. For example, learning how to use a web browser, search engine, email, Adobe Acrobat Reader, and other plug-ins such as QuickTime or Shockwave, that might be required prerequisites for some OPD workshops, are best learned through local face-to-face workshops or self-paced explorations with help available. The same is true for learning particular software packages.

- Many people are far more comfortable communicating online with people whom they already know through in-person interactions. Therefore, combining an online workshop with an initial, midpoint, and final meeting of the participants can provide a good blend of the advantages of both in-person and online communications. Or if the entire group of participants cannot gather in one place, small "study groups" of those who can meet together can provide a similar blend.

- Some types of activities, such as brainstorming sessions, collaborative concept mapping or lesson design, and other activities that involve the rapid cooperative building of ideas or teamwork are more effective in face-to-face meetings than in online interactions. While the use of sophisticated technologies can make some of this possible online, so far it remains difficult to achieve the same level of productive energy for these types of tasks that can be generated face-to-face. Off-line collaborative team meetings can be combined with online reflective discussions to produce an effective professional development experience.

- OPD should not be considered a "panacea" that can simply replace other forms of professional development for all educators. In addition to considering the types of activities that are best suited for the online medium, it is also important to keep in mind that different individuals will have different levels of comfort in the online environment. While a certain amount of trepidation and inexperience can be overcome, for some educators, text-based, asynchronous online discussions are not a comfortable or effective form of communication, and so other professional development activities need to continue to be available.

- Coaching and mentoring programs, in which the coaches and mentors visit to observe practitioners in action and then discuss their observations, cannot be replaced by online interactions (although some forms of coaching and mentoring can be effective online).

- Inspiring speakers, videos of model classroom practices, graduate school courses, curriculum planning teams, and other forms of professional development can each contribute important elements to an overall program and provide the right opportunities for specific educators.

4. The Structure of an EDC-COPE Online Workshop

In our workshops, we have primarily used the following technologies:

- Web-based asynchronous "threaded" discussions, in which each participant can contribute to current "threads" (i.e., topics) at any time during the period that the thread is active, and from any place in which a computer with web access is available. A thread consists of an initial topic, messages on that topic, replies to messages, replies to replies, and so on to any level of depth. The thread is typically shown as an outline with each level of reply indented and labeled with a subject, author, and date, so that the discussion is presented as a coherent flow of messages, even though those messages were submitted at different times and from different places.

- Web pages to present information, assignments, summaries, and links to other resources on the web. This information can contain text, graphics, photographs, audio files, and video files, all of which can be accessed at the convenience of each participant. These pages contain links to appropriate parts of the discussion as needed so one can easily move from an assignment to the relevant discussion.

We have experimented with synchronous chats and events, as well as with email and listserves, but find that the schedules and communication styles of our audience make asynchronous, threaded discussions far more valuable. (Although combinations of email with threaded discussions may also be valuable for some participants.) As compared to synchronous communications, asynchronous threaded discussions have the advantage of providing participants with time to carefully consider other messages and compose thoughtful responses; as compared to email and listserves, asynchronous threaded

discussions have the advantage of organizing messages into coherent, related strands and enabling participants to easily find and review prior messages.

We designed our workshops with the expectation (verified by our surveys) that many participants would be using phone lines and modems to access the web, so that the amount of data transmitted must be limited. So, for example, we used some short video clips when they were valuable, but we also provided lower-bandwidth alternatives, such as still images with text descriptions, to ensure equitable access to the content. We have not yet explored extensive use of video, two-way audio or video, or other techniques that will be feasible when we can assume that all participants have broadband connections to the Internet.

4.1 Examples of General Structural Elements

The following screenshots provide a view of what a COPE OPD workshop actually looks like. The screenshots show what participants and facilitators see when they open the workshop web site in a standard web browser, such as Netscape Navigator or Microsoft Internet Explorer. The example workshop shown below is *Approaches and Tools for Developing Web-Enhanced Lessons*, which ran from November 1 to December 10, 1999 as part of a capacity-building program for 5 urban districts, funded by the U.S. Department of Education through the NetTech 1999–2000 project (see Section 2.1).

Figure 1: Workshop Home Page
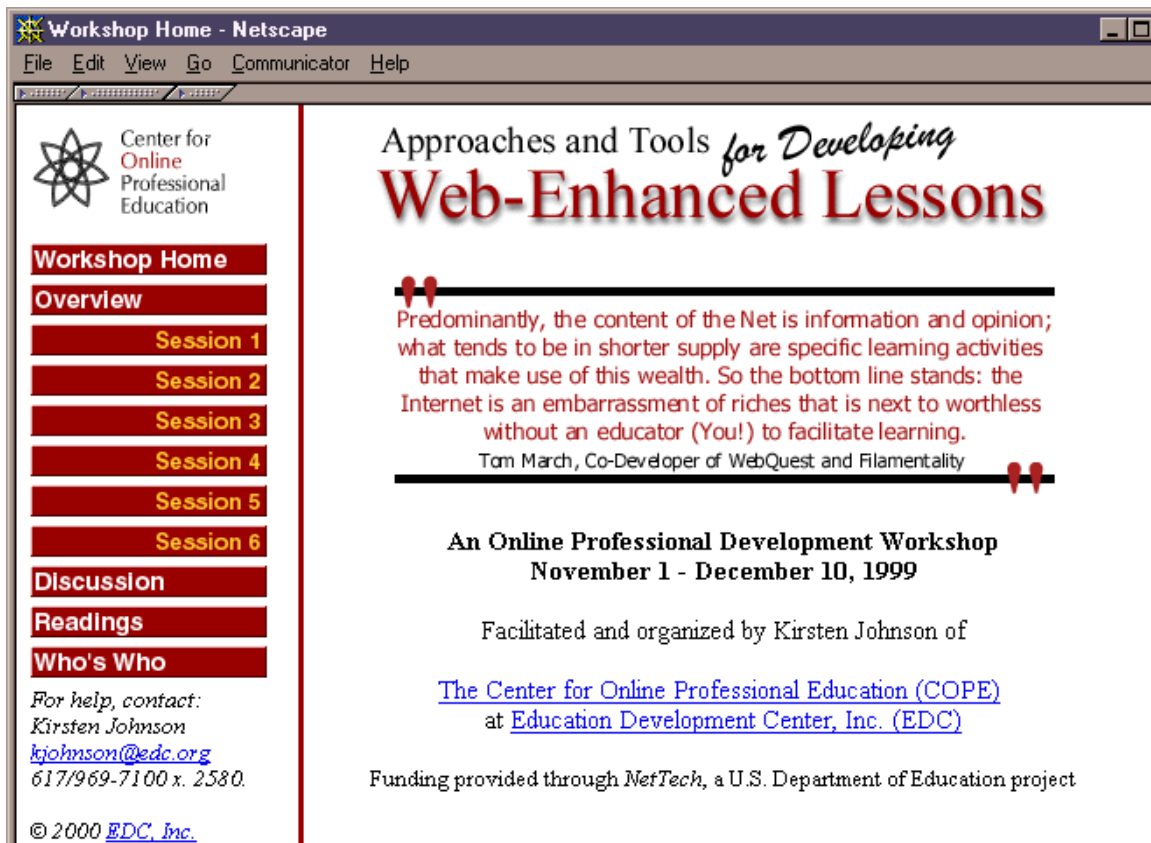
From the home page, participants have access to all of the major structural elements of the workshop, which appear as the links on the navigation bar on the left side of the screen. As the screenshot illustrates, these basic elements are: Overview, Sessions (one link for each session of the workshop), Discussion, Readings, and Who's Who. The navigation bar also includes an email address and phone number that participants can use to contact the facilitator if they need help. This navigation bar appears on every page, so that participants can easily navigate throughout the workshop, no matter what page they are on. The one exception to this format is the discussion section, which had to be formatted slightly differently due to the discussion software used (in this case, O'Reilly's WebBoard software). This is shown in Figure 4.

Figure 2: Workshop Overview

The *Overview* page provides a description of the workshop, as well as specific goals, end-products that the participants will create, workshop format (types of activities covered),

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and prerequisites, which include both required technical knowledge and the expected time commitment. This particular workshop followed a very straightforward schedule, so a calendar was not included. Other workshops have included a calendar in the Overview section, which shows dates for each session, as well as due dates for particular assignments. In one workshop, small group synchronous meeting times were also scheduled and shown on the calendar.

Figure 3: Example Workshop Session

Each *Session* page provides the goals, readings, activities, and discussion questions for each week. From each session, participants can link to the appropriate articles, resources, and discussions. If a session includes more than one assignment, generally due dates will be indicated for each assignment.

Figure 4: Example Discussion
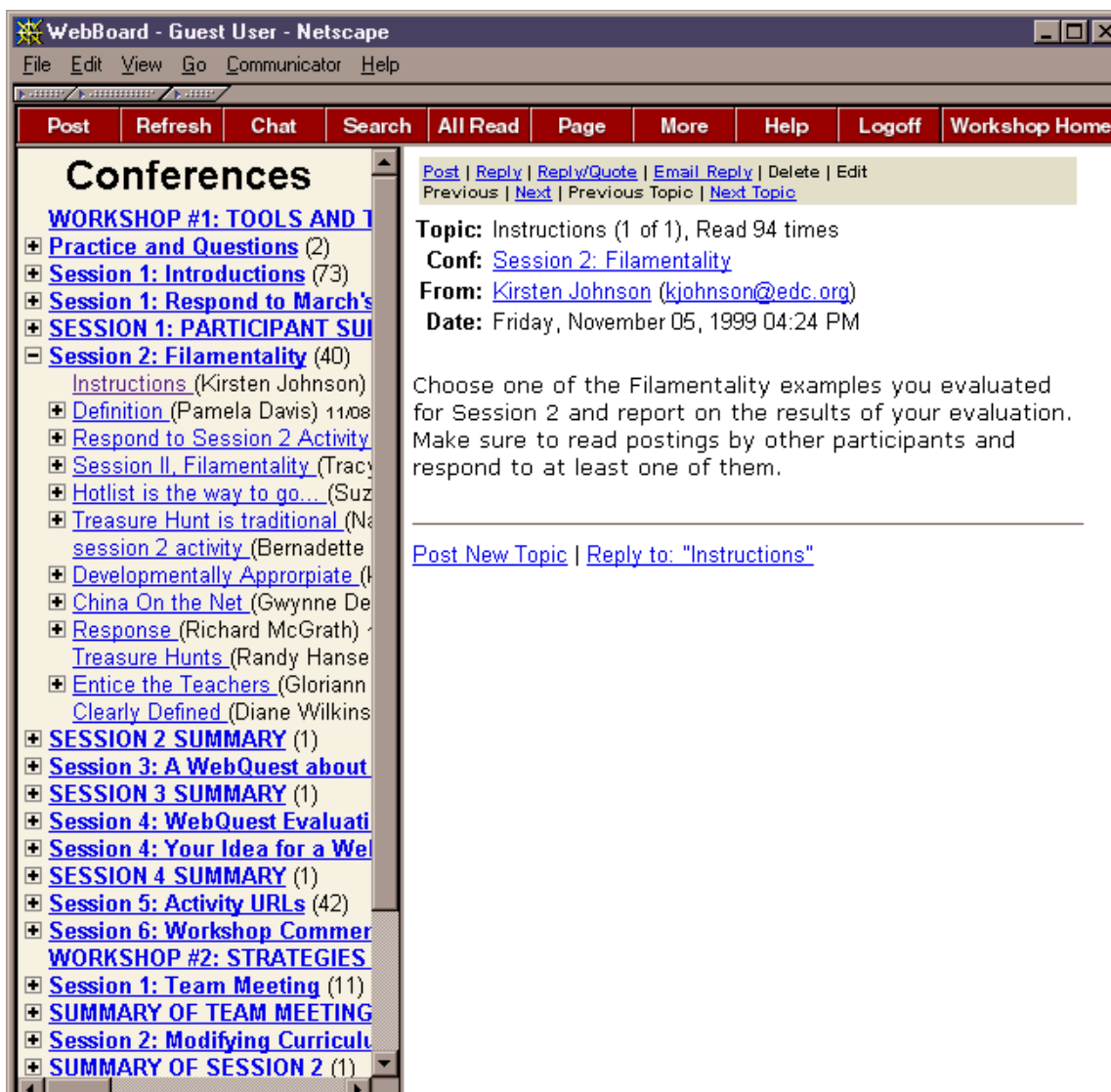
This workshop used O'Reilly's WebBoard software for the discussion pages. This software provides a full-featured asynchronous discussion tool that works reliably, is reasonably efficient to manage (e.g., set up new discussions, register users), and provides a user interface that our participants were able to master quickly. There are many different programs that provide the needed capabilities, each with its own strengths and weaknesses. See Section 7 and Appendix I for more information about software tools.

Due to the way that WebBoard works, we could not include the main navigation bar from the other workshop pages on the discussion pages. However, a "Workshop Home" button at the top right of the page allowed participants to link back to the workshop home page from any page within the discussion. The left frame in the discussion pages shows

the outline of discussion topics and messages. The top-level items show the main topics organized by the facilitator; there are usually one or two discussion topics per session. Clicking on that topic expands the outline to show the messages that were posted in that discussion. In the example in this screenshot, the Session 2 discussion on Filamentality is open, showing the messages under it. Each message may contain several replies (as indicated by the "plus" symbols); clicking on a message expands the outline even further to show the replies. The numbers next to each topic, such as the "40" next to "Session 2: Filamentality" show how many messages have been posted in that discussion. Each message has a subject title, the name of the author, and the date the message was posted. Since all of the discussion topics for the whole workshop are shown in this frame, participants can easily jump to the current discussion, or review a previous one. Some workshops also had discussions that continued for the entire length of the workshop (see Section 4.2 below). Each discussion also includes a summary that is posted by the facilitator at the end of each week. The text of these summaries may link to participants' messages as appropriate.

The right-hand frame shows the text of the opened message. In the screenshot above, the instructions for the Session 2 discussion are shown. Users have the option to view one message at a time, or to view a message with all of its replies at once, so they can simply scroll through the text or print it for off-line reading. The author of each message is shown as an active link, so that you can click to see the author's bio page and photo.

Figure 5: Workshop Readings

The *Readings* page contains links to all the readings and resources for the workshop, so that participants can easily refer to them at any time during or after the workshop. (Specific readings are also accessible from the Session pages for which they are assigned.) Some workshops that have many readings and resources may divide them up into those that are required, and those that are optional recommendations for participants who wish to gather more information on a topic. When a participant selects one of the web-based resources, it opens in a new window, so that when the participant is done using the resource, he or she can simply close the window to return to where they were in the workshop.

Figure 6: Who's Who

The *Who's Who* page lists the facilitator(s) and participants (in this example the participants are organized by their district teams), and provides links to each individual's picture and brief biography (a sample bio page is shown in Figure 7 below). This section of the workshop web site is very helpful for creating a learning community, in which participants who may have never met can still gain a sense of comfort and familiarity with each other. It also provides a convenient "rolodex" so that participants can look up

each other's email addresses and other contact information for additional collaborations during or after the workshop.

Figure 7: Sample Who's Who Bio Page

4.2 Special Features

In addition to the basic workshop elements shown in the preceding screenshots, some of the workshops had special features that enhanced the structure for the specific topic being addressed.

The *Planning a District-Wide Technology Infrastructure* workshop (see Appendix A for description) incorporated an *Ask the Expert* feature. Three networking professionals were "on hand" to answer questions from participants on infrastructure issues, such as "What is the latest and greatest hardware?"; "How can Ethernet speed be optimized?"; "How can school districts manage suppliers?" and so on. The experts would review the questions, compile their responses and post these to the discussion and on a web page that could be accessed from the main navigation bar.

In *Technology Planning for All Students* (see Appendix A for description), an additional element of the workshop involved participants working in teams to create action plans that could be implemented in their districts. Each team had its own "workspace" in the workshop that was closed to the other teams. There was also a "fishbowl" conference where guest experts explored the issues while the participants were the audience. During the last week of the workshop, participants could comment on what the experts had posted.

In the *Multi-User Virtual Environments: From Research to Classroom Practice* workshop, several synchronous sessions were included in which groups of participants, guided by one or more facilitators, visited selected virtual environments (e.g., TAPPED IN (http://www.tappedin.org), MOOSE Crossing (http://www.cc.gatech.edu/elc/moose-crossing/), and Active Worlds (http://www.activeworlds.com/)), and explored interacting in real time with each other and with other individuals they "met" in these environments.

5. Research Findings

Our research focused on the following major questions.

1. What are the similarities and differences between face-to-face and online collaboration? Which strategies for instructional design and delivery can be transferred from in-person workshops to the new medium, and which need to be modified for reap the benefits of online professional development?

2. What facilitation strategies encourage engaged and reflective interactions? How do we encourage participants to voice their thoughts? How do we ensure that participants interact with each other, rather than interacting primarily with the facilitator?

3. How can online learning connect to off-line activities such as local study groups, action planning teams, and classroom experiments born from ideas developed in online collaborations?

4. What instructional design strategies best exploit the strengths and avoid the weaknesses of this new technology? What combination of factual information, provocative discussion questions, investigative activities, and other techniques promote meaningful learning?

Information in regard to these questions was collected from participants in four ways:

- Web-based surveys distributed to participants before and after the running of each workshop (see Appendices D and E for sample surveys). In some workshops we also used a midpoint questionnaire and conducted phone interviews of a sample of participants.

- Online discussions, during the last session of each workshop, in which participants were asked to reflect upon their online learning experiences.

- Quantitative data of participant log-ins, number of messages, and time spent online.

- Analyses of discussions and products produced by participants.

The results from data that were gathered in the six online workshops run within the NetTech and LNT projects (see Section 2.1) are summarized below. The results are a compilation of the responses participants provided on the post-workshop surveys.[2] Results are organized by the research areas designated by the questions above. The response rate for the surveys ranged from 50% to 75%. More detailed data from two sample workshops are provided in Appendix F. Our interpretations of the data into guidelines for effective workshop design and facilitation are provided in Section 6 below.

Key to workshop abbreviations

Abbreviation	Workshop Title
Envisioning	Envisioning the Possibilities: Connecting the Internet with Curriculum Standards and Frameworks
AUP	Keeping Kids Safe: Policy Implications of the Internet in Schools
Infrastructure	Planning a District-Wide Technology Infrastructure
IDEA	District Technology Planning for All Students: Helping to Meet the IDEA '97 Mandate

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[2] Not all questions were asked on all workshop surveys. In those cases where the question was not on the survey, the workshop is not listed on the corresponding table.

MUVE	Multi-User Virtual Environments: From Research to Classroom Practice
Visualizing Data	From Information to Knowledge: Visualizing Real Data in the Classroom

5.1 The Online Medium's Effect on Participation

5.1.1 Participation patterns

Table 5.1.1a: Average number of hours per week spent participating in the workshop
(Table shows median responses.)

Envisioning	3
AUP	2
Infrastructure	2.25
IDEA	2.25
MUVE	3.5
Visualizing Data	3

Table 5.1.1b: Percent of discussion messages read
(Table shows median responses.)

Envisioning	75%
AUP	50%
Infrastructure	75%
IDEA	100%
MUVE	50%
Visualizing Data	100%

5.1.2 Ease of use of the elements of the online discussion environment

Table 5.1.2a: Finding the appropriate session assignments
(1=very difficult; 3=neutral; 5=very easy; table shows median responses.)

AUP	4
Infrastructure	4.5
IDEA	4.5
MUVE	5
Visualizing Data	4

Table 5.1.2b: Finding the right place to post messages
(1=very difficult; 3=neutral; 5=very easy; table shows median responses.)

AUP	4
Infrastructure	4
IDEA	5
MUVE	4
Visualizing Data	4

Table 5.1.2c: Following the flow of conversation while reading other people's messages
(1=very difficult; 3=neutral; 5=very easy; table shows median responses.)

AUP	4
IDEA	4.5
Infrastructure	4.5
MUVE	4
Visualizing Data	4.5

5.1.3 Challenges and advantages of the online environment

Table 5.1.3a: Allows more time to be reflective
(1=strongly disagree; 3=neutral; 5=strongly agree; table shows median responses.)

AUP	4
Infrastructure	5
IDEA	5
MUVE	5
Visualizing Data	4

Table 5.1.3b: Missed the spontaneity of in-person interactions
(1=strongly disagree; 3=neutral; 5=strongly agree; table shows median responses.)

AUP	3
Infrastructure	2.5
IDEA	3
MUVE	3
Visualizing Data	4

Table 5.1.3c: Too easy to procrastinate
(1=strongly disagree; 3=neutral; 5=strongly agree; table shows median responses.)

AUP	4
Infrastructure	2.5
IDEA	2.5
MUVE	3
Visualizing Data	3

5.1.4 Time management strategies

When asked what time management strategies they would recommend to a new participant in an online workshop, participants overwhelmingly commented that new participants should schedule time for an online course the way they would for any other commitment. The following strategies for time management are representative of the replies received:

- Review weekly assignment early in the week to know how much time to allocate.

- Print out required readings so they can be read and responses drafted off-line.

- Try to do a little work online every day.

- Schedule specific times during the week to go online.

- Participate with a colleague for motivation and collaboration.

- Decide ahead of time whether you can devote the required time.

- Take advantage of the practice session so that you are very comfortable with the online environment before the workshop gets into full swing.

5.1.5 Advantages to participating in an online workshop

Participants were asked to comment on the advantages of learning online. Their replies fell into the following categories:

- More time to be reflective

- Could work according to own schedule

- Web resources could be bookmarked for future reference and easy access

- Opportunity to learn with experts who would not otherwise be accessible

- Opportunity to engage in dialogue with educators from diverse regions and types of schools and districts

- Saves travel time and costs

5.1.6 Disadvantages to participating in an online workshop

When asked to list the disadvantages of taking a workshop online, participants' responses were very similar across all workshops. Replies to this question often listed the lack of liveliness in the discussion and an expectation that conversations online would have more depth. A second disadvantage cited was the pace and that operating in an environment

that was primarily reading and writing took longer. Most other comments mentioned technical difficulties and the learning curve needed to master the technology.

5.2 Workshop Elements and Facilitation Strategies Designed to Promote Interaction

5.2.1 Usefulness of elements designed to help participants get to know one another

Table 5.2.1a: Who's Who
(Each workshop participant had a page with his/her photo and short biography.)
(1=not at all useful; 3=neutral; 5=very useful; table shows median responses.)

AUP	3
Infrastructure	4.5
MUVE	5
Visualizing Data	4.5

Table 5.2.1b: Link from message to poster's biography
(Each message posted to the discussion linked the poster's name to his/her respective Who's Who page.)
(1=not at all useful; 3=neutral; 5=very useful; table shows median responses.)

AUP	4
Infrastructure	4.5
MUVE	4.5
Visualizing Data	4

5.2.2 Facilitation Strategies

Table 5.2.2a: Effectiveness of email reminders to help participants stay on track
(Emails were used to update participants on the coming week's assignments, to provide technical support, and as prompts to join the discussion.)
(1=not at all useful; 3=neutral; 5=very useful; table shows median responses.)

AUP	5
Infrastructure	5
IDEA	5
MUVE	4

Table 5.2.2b: Rating of facilitators' responsiveness

AUP	Majority: appropriate level of feedback
Infrastructure	Majority: appropriate level of feedback
IDEA	All: appropriate level of feedback
MUVE	Majority: appropriate level of feedback
Visualizing Data	Half: appropriate level of feedback Half: wanted more feedback

5.2.3 Participants' comments on their own levels of interaction

When asked whether there were periods of time during which they would read messages but not contribute to the discussion by posting, most respondents indicated that at times they felt that they had nothing new to add to the discussion. For example, one participant commented that if he got to the discussion early he had something to post, but otherwise he felt that there was too much to read and too much already covered to add anything. Another participant wrote that reading in general took more time than expected so it was difficult to find time to write messages.

Despite the fact that for some participants there may be times at which they don't appear to be "interacting", i.e., they are not posting messages to the discussions, our research has shown that by itself, the number of messages posted is not an accurate measure of participation, learning or benefit. Many participants reported engagement and learning

from the workshop at times when we could not see this if we were only measuring their (lack of) message postings. This engagement is evident in the final products that participants produce for the workshops, as well as in participants' comments on the final feedback surveys about the overall benefit of the workshop to them.

When participants were asked whether there were periods of time when they were neither posting nor reading, a minority of participants responded in the affirmative; of these participants, most of them explained that their temporary lack of participation occurred when off-line commitments took precedence. Further, one respondent commented that it was difficult to get back into the workshop once he "had been away" for a period of time.

5.3 Incorporating Small-Group and Team Activities

All the workshops included online group discussions around a topic or issue, or the sharing of information around practice. Often online collaborations would informally develop when participants were asked to research resources and to share what they learned. In addition, several of the workshops incorporated specific small-group or team activities, and explored ways to accomplish these activities off-line and/or in the online environment.

During the MUVE workshop (see Appendix A for further description), participants engaged in online activities where they were taught how to use a tool almost entirely online (some phone support was provided). Participants were divided into small groups, and each group would "meet" online in a particular MUVE at a particular time, along with one or more facilitators. Learning a tool together provided a shared learning experience in the group similar to that experienced if they were attending a face-to-face workshop together. Participants felt strongly that the group support was essential for learning the tool, and they preferred this method rather than relying exclusively on self-paced individual exploration. They found that they were more confident returning to the MUVE for further individual experimentation after their initial group explorations. Conversely, initial individual explorations made the group time more productive. One challenge was scheduling times during which participants in different time zones could meet. This can be a problem even in the same time zone, due to participants' busy schedules.

The IDEA workshop (see Appendix A for further description) incorporated a collaborative action-planning activity that was conducted both online and off-line. Participants for this workshop had registered in district teams, and during the workshop each team worked on an action plan that could be implemented in their respective districts. Each team was designated a private online discussion area and assigned a facilitator to help with the planning process. Teams were also encouraged to arrange off-line meeting times. Of the ten teams that participated in the workshop, three completed action plans and shared them with the rest of the group; three teams produced drafts of action plans; and two teams indicated that they wanted to continue the action planning process on their own. Two teams responded that they did not engage in the action planning process primarily due to the off-line logistics required.

5.4 Instructional Design Strategies

When asked which assignments and readings participants found the most useful during the workshops, the majority indicated that their choice for "best" assignment was linked to how applicable the activity was to their own practice. Readings that were highlighted also tended to be those that were related to participants' own issues in their school or district. Participants said the following elements of workshops were most valuable to them:

- Information on how to design their own learning activities

- Readings that provided practical examples of what was being done by others

- Assignments that asked participants to evaluate examples of web sites or actual projects designed by others in the field

- Looking at models of practice

- Hearing stories from other teachers or administrators who had first-hand experience

- Any assignment or reading that helped focus on problem-solving

- Activities that were most applicable to professional development needs

6. Strategies for Effective Online Professional Development

In order to produce and deliver successful online professional development, special consideration must be paid to the ways in which the online medium differs from traditional face-to-face instruction. The spectrum of issues that apply to online professional development aligns with those that apply to face-to-face professional development as well. However, the new medium requires that we shift our emphases in certain ways.

6.1 Guidelines for Effective OPD Workshop Design

The process of designing an effective OPD workshop is similar in many ways to designing effective in-person workshops, with the addition of some special considerations for maximizing the effectiveness, and minimizing the pitfalls, of the online environment and the asynchronous, text-based primary form of communication. In this set of guidelines, we discuss both the key considerations that are related to in-person workshops and those that are unique to our learning community approach to online workshops. We present these guidelines as a series of design recommendations. Many of the recommendations relate to the limitations of the online communication channels, and suggest steps that should be taken to make the learning experience effective within these constraints.

See Appendix H for COPE materials from a conference workshop we presented at NECC '99 that describe the OPD development process in more detail.

6.1.1 Audience and Participation Considerations

Know your audience.

This principle is, of course, true of all teaching—the better one knows the interests, knowledge levels, learning styles, time availability, and other characteristics of the learners, the more effective one can be as a teacher. For OPD, it is also important to know what access to technology your participants will have, and how comfortable they are with it. Online workshops also raise some additional considerations in that the opportunities to get to know the participants, and the types and timing of feedback are achieved in different ways than in face-to-face workshops.

The implications of this principle vary in different situations. For example, if an online workshop is run as a follow-up to an in-person event, or if in-person meetings are integrated with online learning during the course of the workshop, the facilitators will be able to obtain direct information about the audience. However, if the workshop brings together people from many places without any in-person meetings, care should be taken to obtain information via pre-workshop surveys and initial online discussions, and feedback should be solicited, typically by email and perhaps by scheduled phone conversations, during the workshop. This principle is closely related to the following ones.

Define clear and specific goals that address a focused target audience.

We have found that when the primary form of communication is limited to text-based asynchronous discussions, there is a great need to clearly define the goals of the workshop and to make sure that the goals directly address the needs of the participants. This works in two directions: defining goals that address the needs of likely participants, and communicating those goals very clearly to enable potential participants to determine whether the workshop will meet their needs. In recent workshops, we have provided potential participants with detailed descriptions of the workshop goals and requirements, and used pre-registration surveys to check that the potential participants' interests matched the goals.

While this principle is important for any type of workshop, we have found that this guideline requires particular care in online workshops for several reasons: (1) There is limited feedback—you can't see when participants look puzzled or uninterested—so it is difficult to make quick adjustments, e.g., to clarify, explain further, provide examples, or make connections more explicitly, in response to the participants' needs; (2) The pacing of an online workshop content and discussion also reduces the opportunities for ongoing revisions; (3) Participants with different goals and interests can push the discussion in different directions; and (4) It is more challenging to keep participants engaged when there is no personal contact, and especially challenging to re-engage participants if their interest has waned during a session or two.

Define expectations for participation, and use formal or informal contracts to make sure that all participants understand and agree to meet them.

While online workshops provide flexibility in time and place for participation, active, ongoing participation is essential in order for a learning community approach to OPD to be successful. For each session, which typically lasts for one week, each participant needs to: (a) complete the assignment, which might involve readings, reviewing web sites, designing a lesson, or other activities; (b) contribute their thoughts in response to one or more discussion questions; and (c) read and respond to the messages posted by others. Therefore, participants need to agree to access the workshop web site at least three times per session, and to respond to other participants' postings.

6.1.2 Progression of Activities: Pacing and Scaffolding Considerations

Present information and assignments in small, clear chunks that progress incrementally during a given time period.

Online learning is characterized by the fact that each participant works at his or her own pace. This means that online discussions evolve over time, asynchronously, with participants and facilitators responding to each other at different times, and not always immediately. Therefore, it is crucial to frame sessions so that they can survive and even benefit from a lag in response time, and so that they accommodate participants working at their own paces, and being at different parts of assignments during the same time period.

However, if everyone works at their own pace without any scaffolding, then soon the online course will resemble a self-paced tutorial for each individual, and it will be very difficult to achieve meaningful discussions. One strategy for coping with the pacing challenge is to frame assignments in small, clear chunks, and to provide incremental due dates every couple of days, or at most every week. This way, participants can work at their own paces within a structured time frame, and discussions can be organized so that they build on participants' readings and activities.

Use the pace of an OPD workshop to your advantage.

The fact that an online workshop extends over multiple weeks—about six-to-eight in a typical COPE workshop—provides the opportunity to make meaningful connections to participants' classroom or administrative practices. Sometimes these connections are fortuitous. For example, in one COPE workshop, participants were reading about and discussing strategies for enforcing Internet acceptable use policies at the same time as one participant was dealing with a disciplinary issue in her school; not only did this connection help the one administrator, but as her experience unfolded over the weeks, it enriched the workshop discussions for the rest of the participants as well. Workshop designers should take advantage of the OPD pacing to mix off-line and online activities. For example, in longer workshops, teachers can learn about an online tool during the workshop by testing it out and discussing implementation strategies with other participants, and they can subsequently integrate this tool into a lesson they do with their

students; after each teacher's classroom experience, they can report back to each other in the workshop to discuss additional strategies and refinements.

The format of an online workshop is conducive to many forms of information sharing and pooling of resources. For example, participants can each research a different web site or teaching tool, and then report back to the group. Participants can also post drafts of new lesson plans for feedback from the group or from a specific peer-review partner.

The pace of an OPD workshop also has implications for the nature of the discussions. Participants can take the time to read others' comments and carefully consider their own responses before posting a message. This pacing enables more contributions from more participants than in many in-person settings. For example, when mixing in-person classes with online discussions, we have found that many individuals contribute far more online than during a class meeting. There are many reasons for this, including: some students for whom English is not their native language feel more comfortable writing than speaking English; some students prefer to have time to reflect carefully before adding their ideas to a discussion, and find they cannot do so while listening to others in class; some find it difficult to get into the conversation in class and are hesitant to take up class time with their comments; and many continue to have ideas after a class, and like having a means to express them to the group.

The pace of an OPD workshop is therefore appropriate for multiple contributions from multiple participants, and provides time to link to off-line activities, to reflect upon the activities and others' comments, and to have everyone get time and space to contribute what they have to say. However, the pace is not conducive to intense brainstorming sessions or other interactions that require quick interchanges that build immediately upon each other.

Provide closure to sessions before moving on.

It is valuable to provide "we are all together" moments to segue from one assignment to the next. These help keep the workshop participants together, knowing what they have completed and what they are about to do. For example, facilitators can summarize the previous discussion and provide a transition to the next assignment and discussion topic. (More suggestions regarding session summaries and related facilitation strategies are provided in Section 6.2, under the heading "Guide participants through the curriculum".)

Various types of activities can be used to provide "we are all together" moments. For example, surveys can be used to compile participants' thinking on a topic and display the group's results. In addition, participants can engage in collaborative, consensus-building activities, or scheduled synchronous chat sessions.

6.1.3 Presentation Considerations

Write for the web.

Good web-based writing has some different characteristics than writing for print media. For example, it is best to limit the amount of information presented at one time, but to provide a clear overview with links to more details and examples that a reader can follow when they so choose. Visual organizers, which can include links for more information, are very valuable on the web.

Since many people prefer to read lengthy documents in hard copy rather than on-screen, any long articles or other readings should be formatted to accommodate easy printing.

Provide access to rich but carefully selected sets of relevant resources.

Educators report that they are overwhelmed by the amount of information available on the web; they have difficulty knowing where to find appropriate, up-to-date, accurate information relevant to their professional needs. OPD resources and tasks can help address the "information overload". For example, workshops should present a set of carefully selected relevant resources. It is also helpful to have each workshop participant review a few of these resources and post their comments; the compiled set of everyone's reviews provides a useful way for participants to determine which resources are most likely to meet their needs, while minimizing each person's time spent looking at sites.

Ensure that activities are feasible given your audience's technical configurations, and provide technical support.

Don't assume that what works on your computer and with your Internet connection will work for everyone else. Conduct pre-workshop surveys to assess the type (PC versus Macintosh) and sophistication of the computers that your participants will be using, as well as the speeds of their Internet connections. Make sure that all your activities and all components of the workshop web site are feasible given these parameters. If you plan to include high-bandwidth components, such as audio or video clips, make sure that you also provide lower-bandwidth alternatives, such as text and simple images. Try to test everything from the types of computers that your participants will be using, and above all, provide quality technical support to your participants throughout the workshop. Technical support should include opportunities for face-to-face help as needed.

Abide by universal design principles.

The workshop web site needs to follow principles of universal design so that it can be accessed by users with special needs, such as those who are using special input devices due to physical handicaps and those who are using screen readers due to visual impairments. See http://www.cast.org for specifics.

6.1.4 Designing Activities and Discussion Questions

Connect directly to participants' day-to-day professional practices, and tap into the expertise and experience of the participants.

Teachers and administrators have many day-to-day professional demands, and have extensive expertise in meeting these demands. Asking for examples from participants' own work and providing opportunities for participants to bring their own experiences into the discussions lead to good engagement and sharing of ideas. Teachers and administrators find tremendous value in learning about their colleagues' strategies for approaching issues and challenges that they all face. Good online workshops provide many opportunities for participants to share their own expertise and experiences during online discussions and workshop activities.

Engage participants in authentic, technology-based learning at their own level.

A key advantage of OPD is that it enables educators to experience using the technology as learners, giving them first-hand experiences that can inform their decisions about using technology with students. It is therefore valuable to provide experiences in which participants function as learners themselves, not simply as reviewers of learning materials for their students.

Link between key concepts and examples of activities.

Effective workshops enable participants to learn key concepts that they can apply to new materials. This requires that participants have opportunities to explore specific examples along with readings and discussions that help them connect the specific examples to understand key concepts that can be applied broadly. For example, in our workshop on connecting the Internet with curriculum standards, we used the Library of Congress American Memory materials as an example. However, we focused the discussion on the potential advantages and challenges of using web-based primary historical resources with students, with American Memory as one example, rather than focusing on just the potential uses of this one set of materials.

Seed discussions with provocative and engaging materials and questions.

Active engagement in discussions by many participants is critical for a successful workshop. Choosing materials, activities, and provocative questions to stimulate discussions is a critical part of workshop design. Finding areas in which there will be different views, controversy, relevant experiences, and current needs among the participants leads to good online interactions.

Consider how techniques that are effective in face-to-face workshops can translate to the online environment.

Teaching cases, role-playing, "fishbowl" discussions, small-group activities, debates, compare-and-contrast activities, and other techniques used in face-to-face workshops can

be used in the online environment, but require careful consideration about the flow of information, the nature of the interactions, and the other requirements of the activity in order to design appropriate online versions.

Define an end-product toward which participants build throughout the workshop.

A defined end-product can take many forms, as long as it is useful and authentic for the participant. Having a defined end-product—e.g., a technology-enhanced lesson, analyses of web sites, a plan for selecting specific technology to use with students—organizes the work throughout the sessions. It also provides products for participants to share and discuss at the end of the workshop, and to apply to their own professional practice. When needed, these end-products can also serve as a means for participant evaluation.

6.2 Guidelines for Effective OPD Workshop Facilitation

Online course facilitators, like classroom teachers, play a variety of roles. In the online medium, it is possible to divide the roles among several people. Whether or not there will be one or more people responsible for the online course, it is helpful to consider the various roles and strategies that go into successful online facilitation. The following recommendations are addressed to current or future OPD facilitators.

Make everyone feel welcome and heard, and create a comfortable environment.

- Publicly respond to each person's messages in the beginning of the course (i.e., by replying to their introductions in the web-based threaded discussion, rather than by sending private email). After everyone is comfortable, responses can become more global—i.e., rather than responding to each message individually, you can post replies that respond to issues raised in a cluster of messages.

- Respond to initial introductions in a way that uses them as a springboard for discussion, connecting participants' experiences to the workshop content, and raising questions for consideration.

- Encourage participants to peruse each other's biographies and photos in the Who's Who section of the workshop web site.

- Show your personality, so people feel like they know you. Use emoticons (gestures represented via text), and an informal and friendly tone.

Provide behind-the-scenes support via email.

- Email is a good way to respond to individual problems, or to prod people into participating without embarrassing them. If participants start saying interesting content-related comments via email, encourage them to post these thoughts to the discussion as well.

Foster communication between and among the participants.

- Phrase responses to encourage further responses from participants, and draw connections between participants' comments.

- Avoid "over-facilitating", i.e., don't answer every question and settle every point so there is nothing for anyone else to say. If you respond to one question, push the discussion forward by raising another.

Model accepted interactions for participants.

- Pay attention to the tone of messages that you post, as a way of setting the workshop tone globally. Try to be both professional and informal, setting a tone of mutual respect and comfort, while avoiding any sense of intimidation.

- Being inclusive and making connections between participants' comments will model this type of discussion for the participants as well.

Keep the workshop alive; prevent stagnancy.

- Post "acknowledgment" messages to participants' comments, even if you don't have anything elaborate to contribute on that point. A simple "interesting idea," "good example," "I agree," or similar message provides the online equivalent of eye contact and a nod of the head—it lets the communicator know someone is paying attention.

- Be aware of time—participants don't tend to check the discussions as frequently as facilitators do. Don't let the lulls last too long though. If you keep the discussion alive, this is an incentive for participants to check more frequently.

- The facilitator, or at least one member of a team of facilitators, must read and contribute to the discussion at least every other day (minimum).

- Keep the majority of all communication in the public forum. Do not dilute the discussions with too much one-on-one email with participants.

Keep the discussions on track; rein in long digressions; push people forward on the topic.

- Guide the group's comments back towards a central focal point.

- Be creative with limited tools for getting people's attention. Use subtle/humorous messages to rein in digressions, or perhaps a humorous graphic/photo. Send personal email if necessary.

Guide participants through the curriculum.

- Compile and post discussion summaries at the end of each session. Summaries may extract key ideas, organize examples provided by participants, gather ideas into tables, concept maps, or flow diagrams, or use other means to convey and display the work of the group. Summaries serve many purposes. They can provide closure for one session and a bridge to the next session. They are a way to explicitly synthesize what is being learned. Summaries can be a place to recognize the key contributions of various participants. They are also a way to help participants who may have missed a session "catch up". Lastly, they can communicate to people outside the workshop.

- Send out an email message to all participants at the end of each session to provide closure to that session, announce that the session summary is available, introduce the next assignment, and remind participants of upcoming due dates for the next session's activities.

Make sure the audience and the curriculum are in sync.

- Observe participants' behavior and responses to assignments, and adjust facilitation strategies and/or curriculum content and presentation as necessary.

- Encourage participants to explicitly reflect on the course experience and provide feedback (either in the online discussions or via email to the facilitator).

- Use midway questionnaires (either via email or a web-based form) to gather information about participants' attitudes towards the workshop pace, content, activities, discussions, and readings, and to solicit any other questions, concerns, or requests that they may have.

6.3 Implementation Strategies

In addition to the specific design and facilitation guidelines outlined above, there are also implementation issues that must be considered in order to ensure effective online workshops. In our experience so far, the following factors were essential to the success of districts' online professional development experiences.

Advertise OPD workshops well ahead of time.

It is important to make teachers aware of the online professional development activities that will be available to them. Districts have done this by advertising their OPD offerings in their printed professional development catalogs, and/or on their district web sites. Many districts mail professional development catalogs to teachers during the summer before the upcoming academic year. This allows teachers to plan ahead, scheduling time to participate, assuring that they have appropriate hardware and Internet access available, and allowing them time to acquire or practice any prerequisite technical skills that may be

required. Advance advertising also ensures that the workshops will have adequate enrollments.

Carefully select local facilitators, and allocate time in facilitators' schedules.

If your teachers will be participating in online workshops facilitated by another organization, then this is not an issue. However, if your district is participating in a capacity-building program, in which local staff are learning how to become OPD facilitators, then it is important to carefully select these staff. In general, we have found that districts benefit from selecting a team of people to serve as OPD facilitators, rather than a single individual. You should select this team with several criteria in mind: leadership, professional development and technical skills, content knowledge relevant to the OPD courses that will be offered, time availability, and interest in online learning and teaching. Time availability is particularly crucial, since OPD facilitation is not something that can be successfully accomplished around the margins of an otherwise full schedule. Districts that have had successful experiences have selected professional development specialists, lead teachers, library media specialists, curriculum coordinators, and others whose schedules can be planned to allow time for the facilitation of an online course.

Provide incentives.

In online teaching and learning, incentive and accountability go hand-in-hand. It is important to balance the need for holding participants accountable for their work and providing compensation for their time spent either facilitating or participating in online professional development activities. Our research has found that workshop facilitators and participants who received incentives from their districts showed increased motivation and participation, and successfully completed workshop end products. Many districts have arranged to provide PDPs or CEUs for both workshop facilitators and participants based on the number of hours spent taking and/or facilitating courses. Additionally, some districts have provided their local facilitators and participants with stipends and/or computer hardware or software for classroom use. In situations where districts could not afford these types of incentives, they awarded Certificates of Completion and other forms of recognition, which were appreciated by facilitators and participants.

Incorporate face-to-face meetings.

Districts that have included face-to-face meetings at the beginning, middle, and/or end of an OPD workshop have found that these meetings are very helpful for introducing the online discussion software, creating and sustaining enthusiasm, building a sense of a learning community, answering participants' questions, recognizing participants' accomplishments, and sharing their work.

Establish clear communication with IT department.

It is crucial to establish a working relationship and clear lines of communication between those involved in online professional development and the district's information technology department. Those in charge of the district's networking and technical

infrastructure should be made aware of the OPD activities, so that they can be prepared to make any necessary adjustments to firewalls or proxy servers, and so that they will inform OPD personnel of any upcoming maintenance or infrastructure changes that would affect their ability to participate in online courses.

Provide technical support.

The quality of participants' OPD experiences often depends on the availability of timely local technical support. A lack of support can lead to frustration, whereas timely support can enable productive OPD experiences (participants may also learn a lot about computers from their interactions with helpful technical support staff). Technical support may need to cover a wide range of issues, such as: ensuring that participants have up-to-date web browsers, determining whether a problem accessing the Internet is due to the particular computer being used, a district network problem, or a problem elsewhere on the Internet; helping participants adjust their browser configurations to enable java or to accept cookies; answering participants' questions about the functionality of the OPD web site; and general troubleshooting. Since there is incredible diversity in the types of computers, software configurations, and individual knowledge, technical support is best accomplished locally. There should also be clear communication between local technical support personnel and the managers of the OPD course environment, to resolve any issues that may be due to the course site design and functionality.

6.4 Assessment Strategies

Just as with any professional development activity, it is important to assess the impact of the learning experience on participants. In addition, since the online professional development medium is very new, it is helpful to collect feedback that can be used to refine the online environment and the nature of the OPD experience. The following suggestions are based on our initial assessments of our online workshops.

Use pre- and post-workshop surveys.

To measure whether you have reached your stated goals, it is useful to repeat questions from a pre-workshop survey on the post-workshop survey (e.g., questions regarding participants' level of knowledge about a particular topic, comfort with target technologies, and any changes in attitudes, ideas, resources, and strategies.) Participants will also benefit from reviewing their pre-workshop responses and comparing them to their post-workshop responses. It is convenient to use web-based survey forms to collect this information. (Sample pre- and post-workshop surveys are provided in Appendices D and E.)

Include formative evaluation questions.

On the post-workshop survey, it is helpful to include questions to assess the success of workshop design components and facilitation strategies. This information can inform the design of future workshops.

Conduct follow-up inquiries.

Follow-up inquiries of your participants can investigate whether there have been any changes in behavior, attitude, usage, and practice. Email is a convenient method for doing this from a distance.

Analyze the workshop archive.

Since the text of all discussion messages from the workshop are automatically archived, it can be helpful to analyze them to track the nature of the discussions, what common themes emerged, how participants related to each other and to the course content, etc. Quantitative information, such as the number of messages posted by individuals, frequency of participation, and number of levels of responses within particular discussions can also be analyzed.

Invite reflection.

In the last week of the workshop, invite participants to post messages reflecting on their experiences in the course and what they have learned, and to discuss what they plan to do next.

7. Online Learning Software Environments

7.1 The Importance of Effective Software Environments

Effective online workshops depend upon effective software tools that enable participants to easily obtain the information they need, navigate comfortably among the different elements of the workshop, and read and contribute to the online discussions. We have reviewed a large number of software environments (see Appendix I) and have used several different approaches.

Some examples may be illustrative. Asynchronous discussion tools typically present an outline in which the subject and author of each message is listed, with the level of indentation of each item showing where it fits into the "thread" of messages—replies to message A are shown indented under message A, etc. This provides a convenient means for users to scan the list of messages and choose which ones to read.

Different tools, however, provide different capabilities that can have a major impact on how well the environment works in practice. For example, some tools, such as Lotus Notes, allow the user to open only one message at a time, rather than show an entire thread. Therefore, the user must open one message, read it, close it, return to the outline, select the next message to open, and so on. This interferes with following the flow and focusing on the information in the messages, and it makes it impossible to print a full thread to read off-line. Other tools, such as O'Reilly's WebBoard, allow the user to open a full thread of messages with one command, so they can read or print the full sequence easily. Another example is that some software will allow a user to denote messages as already read, and will inform the user as to how many unread messages he/she has,

making it easy for the user to identify and open them. In discussions that may have dozens of messages, this is a critical feature for enabling users to keep track and process new messages. While these features may seem like minor elements of software design, the better tools result in more comfortable use and more participation – compare it, for example, to the different experiences of speaking over a clear phone line versus one with lots of delays and static.

In our online workshops to date, we have worked with the HyperNews and WebBoard discussion tools, which we used in conjunction with HTML pages for presenting information. We have recently explored in depth several software environments designed to provide full online course development and delivery tools: Blackboard from Blackboard, Inc. (http://www.blackboard.com), WebCT from WebCT.com (http://www.webct.com/), eCourse from eCollege.com (http://www.ecollege.com/), and InfoPier from Izio (http://www.izio.com). There are several other such tools now available or under development.

Since the available software has continued to evolve very rapidly, reviews and analyses from as recently as several months ago can now be significantly out of date, so the key need is to understand the essential features desired in a workshop delivery environment, and then to review available systems in light of those essential features. The following is our analysis of the essential elements of a software environment to support a learning community approach to online professional development.

7.2 Presentation Capabilities

We have developed our own HTML pages for presenting information to participants within each workshop, and then linked to a discussion tool (WebBoard in our most recent workshops) for the online threaded discussions. As we explore authoring tools for online courses, we are analyzing each possibility to see whether it provides the flexibility we need while making the process of authoring a workshop simpler. Some key things we look for in these tools are the following:

Flexibility in selecting major elements

The online course authoring tools we have reviewed were developed primarily for college courses, not for professional development workshops. The standard menus within these systems are likely to include labels such as "grading", "textbooks", and other elements that don't apply to professional development workshops. In some, but not all, of these systems the options presented to participants, and the visual format in which they are presented, provide sufficient flexibility to adapt them well to formats that are appropriate for OPD.

Tools for calendar creation

A calendar format organizes the flow of activities in the workshop over time. Good authoring tools make it simple to create and revise a calendar. The most sophisticated

ones also enable each user to have his or her own calendar and for automatic email reminders of key dates to be sent to each participant.

Fluid linking across elements

Participants need to be able to move easily between all the elements of the workshop. For example, in one session, a participant might first go to the workshop calendar, click a link on the calendar to go to the assignments for a specific session, then link directly to the discussion for that session. While preparing to post a message to the discussion, the participant might want to go to the workshop resources to review a reference and then bounce back to complete the posting. Well-designed systems enable rapid movement among the elements, rather than requiring that users return to a central space to move from one place to another.

Convenient options for linking to external sites

In many activities, participants go to web sites outside of the workshop site to obtain readings, review educational resources, experience specific types of educational environments, and other such purposes. Therefore, the workshop delivery system needs a clear way for participants to go to other sites and then easily return to where they were in the workshop. This is best accomplished by configuring external links to open in a new browser window, while the workshop remains in the original window. This way the user can peruse the new resource as extensively as necessary, and then simply close that window, or switch back to the original window, to return to the proper place in the workshop site.

This need can also be handled through the use of frames, although this method introduces some potential problems. For example, opening another web site within a frame often obscures the fact that the web site comes from a different source, and can thus be perceived as an integral part of the workshop, or as something that is endorsed by the workshop. This is problematic when you wish participants to take objective and critical views of readings and resources. Another problem with the functionality of frames is that they hide the URL of the imbedded site, so that it is difficult to bookmark; participants may often wish to create a growing list of bookmarks to sites that they find useful, and the use of frames will inhibit this ability. Perhaps as the functionality of frames matures in new versions of HTML, these issues will be resolved.

Presenting audio and video clips

A course delivery system needs to be able to present audio and video clips in ways that can be integrated with other materials.

Universal design principles

The workshop presentation needs to follow principles of universal design so that it can be accessed by users with special needs, such as those who are using special input devices

due to physical handicaps and those who are using screen readers due to visual impairments. See http://www.cast.org for specifics.

7.3 Discussion/Interaction Capabilities

Since the online discussion plays such a central role in the learning community approach to OPD, we often have many and somewhat lengthy messages within a discussion for a single session. The following is to convey a sense of desirable discussion tool capabilities in general; there are lots of different ways to implement some of the features listed below.

Navigating and reading messages

Participants should be able to navigate through the discussion forum easily, finding what they need within the many threads and messages. Therefore the following features are needed:

Topic structure. Ability to lock in a top-level structure of the discussion, so that each session, and perhaps specific questions within sessions, can have a specific thread, and users cannot start new threads at the top level. That is, it is useful for facilitators and course designers to be able to control the structure of the discussion so that it matches the structure of the workshop and participants can link directly to the appropriate thread for a given session and question. For example, O'Reilly's WebBoard allows board managers to place "conferences" (or discussion threads) in any order desired.

Navigation ease. Ability to navigate easily through a long discussion (e.g., collapsing or expanding headings to see only the desired level, moving between the list of titles and individual messages, and moving to the next/previous message without returning to the list).

Full text of thread. Ability to show the full text of all messages in a thread, so it can be printed and read off-line. Ideally the software should simultaneously display both the full text of all messages in a thread and the entire outline structure of the discussion board (using frames).

Read/unread. Ability to distinguish easily between read and unread messages. Ability to mark all messages in a thread as read (to catch up on a discussion) and to selectively view unread messages only.

Message views. Ability to view messages organized by thread, author, posting date, or subject.

Search options. Ability to search for messages by author, posting date, or subject. A full text search is also useful, but not essential.

Links. From within the text of any message or any related web page in the workshop site (not necessarily a message), participants should be able to link to any other message in the discussion or to the complete list of messages within a discussion. This enables

facilitators to refer to messages within summaries and later sessions, and to link directly to the original messages. Likewise, participants should be able to link to the personal profile or electronic mail address of the person who posted the message.

Posting messages

Position of new posts. The tool should show clearly where a posting will appear in a thread. In some threaded discussion software, this get confusing for new users and messages end up at the wrong level or in the wrong thread.

Formatting/HTML markup. Participants should be able to include text formatting such as bold and italic and to use the full capabilities of HTML in their messages.

Edit/delete. Participants should be able to edit or delete their own prior messages. Facilitators should be able to control whether this is available in a workshop.

Links. Participants should be able to include working links to web sites in their messages (by simply typing the URL, without the need to type the HTML code for a hyperlink).

Image links. Participants should be able to imbed images in their messages.

Quoting from other messages. Participants should be able to include quotations from other messages, and to set those quotations within a special format (for example, indented format).

Spellcheck. Participants should be able to spell-check messages before posting.

Preview. Participants should be able to preview messages before posting, and return to write/edit mode to make any changes.

Anonymous posting. The discussion software should offer the option for anonymous posting. Facilitators should be able to set whether or not this option is available in a given discussion.

Email integration

The discussion should provide seamless two-way integration with electronic mail. That is, participants should have the option to select a particular discussion or set of discussions for which they can receive all messages—or alternatively, replies to the messages they have posted—via electronic mail. Likewise, participants should have the ability to respond to these messages via email, and have their replies appear in the proper place in the web-based discussions.

An option to receive a daily collection of new messages in one email (digest style), rather than each one separately, is also useful.

Facilitators should be able to easily send an email message to all participants, or to subgroups of participants. Participants should be able to easily send emails to the facilitators and to members of their small groups.

Participant information

Participant profiles. Participants' pictures and written profiles should be easy to access from within the discussion (e.g., by clicking on the author's name either when viewing a specific message or when viewing the outline of messages), so participants can easily "look at" who is "talking".

Output

Printing. Participants should be able to download or print all messages in a discussion with a single print command. For threaded discussions, participants should be able to print all messages in a thread with a single command. Participants should also be able to print one message at a time.

Discussion administration

The following features should be feasible remotely, so that facilitators or other user-administrators can manage the discussions from their desktop computers, rather than having to work directly on the server, or send their requests to the server administrator.

Creating/removing discussions. User-administrators should be able to create/remove whole discussions and all related messages (as a unit).

Archiving discussions. User-administrators should be able to archive (remove from active use) whole discussions and all related messages (as a unit).

Editing discussion pages. User-administrators should be able to edit, using HTML or standard editing software, the graphics and text that surround the discussion, messages or message lists.

Editing/removing/moving messages. User-administrators should be able to edit/remove messages within a discussion, or move them to any other part of the discussion. (Moving messages posted in the wrong place should be doable with a simple command, rather than having to copy a message, post the copy in the correct location, and then delete the original.)

Create/remove/change users. User-administrators should be able to create/remove users, or change any of their permissions, profiles, or passwords.

Discussion options. User-administrators should be able to define, change, or revoke all options for the discussions as a whole or with regard to any single user or group of users.

Public, private, read-only. User-administrators should be able to configure discussions as public (i.e., allow guest access) or private (i.e., not allow guest access), and

additionally designate whether or not a discussion is "read-only". If a discussion is read-only, then only facilitators (or others given posting authority by the user-administrator) may post messages, and participants may only view them, without adding their own replies or messages.

Email messages. User-administrators should be able to send email messages to all participants.

7.4 Data Collection

Quizzes. Participants should be able to take short quizzes, view the correct answers, and view a summary of results from other participants (in aggregate and therefore anonymous form). Quizzes can provide a means of provoking discussions.

Surveys. Participants should be able to respond to questions (yes/no, multiple choice, numeric, and short answer) and view a summary of other participants' responses. Surveys help build a sense of the participant community and provide a convenient means to obtain feedback about the workshop. Pre- and post-workshop surveys are also a core element for evaluating workshops; ideally the data collected can be easily exported to a database for analysis.

Automatic data collection from discussions. In order to address accountability needs, and to provide information for program development, access to the following is helpful:

- Number of times logged-on, number of messages opened, and number of messages posted by each participant.

- Number of messages in each thread and distribution of number of responses to posted messages (which provides a good measure of the level of interactivity in a workshop).

- Average depth of each thread and of all threads in a workshop.

Database compatibility. Administrators should be able to export the complete text of all messages into common desktop databases such as Microsoft Access (or, alternatively, to create any kind of analytic reports on the discussion messages using tools provided by the discussion software). This is particularly needed for participant accountability, which is often a concern in school districts, as well as for research on the workshops.

7.5 Look and Feel

The discussion forum should integrate seamlessly with the larger workshop web site. Workshop designers should retain control over the look-and-feel of the overall workshop site and the discussion pages.

The workshop site (including any additional discussion software or other components) should provide clear and comprehensive help for both users and administrators.

7.6 Other Valuable Features

In our work so far, we have identified a number of tools that would be valuable in encouraging collaborative work in online workshops. While forms of each of these tools exist for the web, currently they tend to be separate systems that aren't integrated into course authoring or online discussion environments and which, in many cases, require special software.

Asynchronous/Synchronous whiteboards with structural elements

Whiteboards enable participants to post text and graphics in a common space. The process is analogous to having a whiteboard in the front of a classroom and having students each post their own items on it, without erasing those posted by others. Current whiteboards enable a user to place text in any location and typically provide very basic graphics capabilities so that users can also draw simple shapes, add lines or arrows, etc. Most current whiteboards (aside from those included in some multi-user virtual environments, such as TAPPED IN), tend to only show the information entered by a group during a synchronous session, but do not retain this information after participants have logged out, or allow others to add to the whiteboard at different times (asynchronously).

OPD workshops would benefit from whiteboards that have a number of capabilities, including the following:

- Enabling users to post pages from other files, so, for example, a sample of a student's work could be placed on the whiteboard and participants could add their comments about it.

- Enabling users to save whiteboard images so that they can return to them at another time—the equivalent of using large sheets of paper in a class rather than a whiteboard that is likely to be erased.

- Enabling users to contribute to a group whiteboard at different times (asynchronously).

- Integrating the whiteboard with both synchronous and asynchronous discussions, so that participants can discuss the items they are placing on the board—as they would do in spoken form in a classroom.

- Providing simple structural elements, such as tables, cause-and-effect diagrams, etc., that can organize participants' entries into a coherent form.

Concept-mapping tools

Concept-mapping tools enable users to enter ideas and define links between the ideas, resulting in a concept-map diagram. Most importantly, these tools enable users to easily modify their diagrams, collapse sets of concepts into single elements, and manipulate the

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organization of the concept map. One such tool, *Inspiration*, is widely used in K-12 classrooms, and also provides the capability of moving between concept map and outline formats for displaying a set of ideas and their relationships. A web-based tool with some of the capabilities of *Inspiration* would provide a very useful way for workshop participants to collaborate in building a visual representation of a set of ideas. We have not yet found a suitable tool for this purpose.

Sorting tools

In face-to-face workshops, a group process is often used in which each participant writes his/her response to a question on a large post-it note, and then the group works together to define categories and organize everyone's responses into them. To adapt this process for online use, we would need an appropriate tool that enables the visual organization and collaborative manipulation of the responses to occur asynchronously in a web-based environment.

Support for small work groups

Within some workshops, participants register as district teams. In others, groups of participants find that they have common interests and would like to collaborate on a project. And in some, the workshop designers would like to incorporate activities to be carried out by small groups, much as would be done in a face-to-face workshop. All these purposes require space and tools to support collaborative writing, peer editing, exchanging files, online discussions, and other supports for small work group collaborations.

8. Conclusion

While the field of online professional development (OPD) is still very new, our work to date has found that online workshops can provide a valuable means of professional development, one that can complement and extend—but not completely replace—other elements of complete programs of professional development. The pacing and schedule of an online workshop are convenient for many educators, provide opportunities to tap into the expertise of colleagues and researchers who would not be available for local activities, and enable workshop activities to inform and reflect participants' ongoing practice. The nature of online asynchronous communications, which are at the heart of online workshops designed with a learning community approach, allows participants ample time and space to fully contribute their ideas and to thoughtfully respond to each other. However, asynchronous communication may not be appropriate for all types of activities or for all individuals. We have found that online workshops can be most effective when they are combined with face-to-face meetings, either of all the participants or of local "study groups", that help to create and maintain a vibrant and supportive learning community.

While online professional development can be described as "anytime, anyplace learning", it should not be assumed that OPD is any easier to design or implement, or that it takes any less time on the part of facilitators or participants, than equivalent face-to-face activities. Just as with any form of professional development, successful OPD depends upon carefully planned learning activities and resources, skilled facilitators, supportive leadership, timely technical support, and committed participants.

As we look to the future, it is clear that the underlying technologies will improve rapidly, as will online course development and online discussion software. In addition, as high-bandwidth Internet access becomes readily available, new forms of "anytime, anyplace" communication and collaboration will become possible, making more use of audio and video exchanges, for example. At the same time, educators will become more comfortable with using these technologies, designers will become more knowledgeable about developing engaging online activities, facilitators will become more skilled at effectively guiding an online learning community, and researchers will provide more information about how principles of effective professional development can be applied in the online medium. In the next few years, we expect to see online workshops and online discussions become a standard, integral part of most professional development programs. We hope that our work will contribute to others making effective use of this new and powerful approach to professional development for educators.

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Serim, F. (1996). Building virtual communities for professional development. *The Future of Networking Technologies for Learning*. U.S. Department of Education's Office of Educational Technology. Available on the Web at: http://www.ed.gov/Technology/Futures/serim.html.
This article highlights the challenges to providing professional development for teachers seeking to become "cybercitizens."

Sparks, D. and Hirsh, S. (1997). *A New Vision for Staff Development*. Alexandria, VA: Association for Supervision and Curriculum Development.

Sipusic, M.J. el at. (1999). *Virtual collaborative learning: A comparison between face-to-face tutored video instruction and distributed tutored video instruction*. Mountain View, CA: Sun Microsystems.

Tinker, R., & Haavind, S. (1996). *Netcourses and netseminars: Current practice and new designs*. Concord Consortium. http://www.concord.org/pubs/pdf/netcours.pdf.
The authors describe a sample of courses delivered on the Web for the professional development of math and science teachers and outline designs for effective use of the medium.

Treacy, B., Johnson, K., Lofton, M., & Paul, P. (1999). Online professional development for teachers: A collaborative model. *LNT Perspectives, Issue 10 (July/Aug '99).*
Available on the Web at: http://www.edc.org/LNT/news/Issue10/feature2.htm
This article is about the first in a series of online professional development workshops organized as a collaboration between EDC and two Louisiana school districts, funded by a U.S. Department of Education Technology Innovation Challenge Grant. The article describes the project background and the workshops' design and organization, and also provides a detailed focus on the facilitation model designed to support the workshop goals and participant needs.

Vrasidas, C. & McIsaac, M. (1999). Factors influencing interaction in an online course. *American Journal of Distance Education (13), 3, pp. 22 –35.*

Wegerif, R. (1998). The social dimension of asynchronous learning networks. *Journal of Asynchronous Learning Networks. (2), 1.* Available on the Web at: http://www.aln.org/alnweb/journal/jaln_vol2issue1.htm#Wegerif
This paper examines the importance of the social dimension and sense of community in the success of online courses.

Willis, B. (1995). *Distance education at a glance*. Engineering Outreach at the University of Idaho. Available on the Web at: http://www.uidaho.edu/evo/distglan.html.
This article contains excerpts from the author's book, "Distance Education - Strategies

and Tools and Distance Education - A Practical Guide," highlighting strategies for teachers, administrators, and facilitators of distance education programs.

Zorfass, J., Remz, A., and Ethier, D. (1998). Illustrating the potential of an online workshop through a case example. *CMC Magazine*. Available on the Web at: http://www.december.com/cmc/mag/1998/feb/zorfas.html.
The authors present a case study of an online workshop that was designed for educators who are involved in the selection of technology for students with disabilities. The article examines how the online workshop was designed, conducted, and evaluated.

Zorfass, J., Remz, A., Gold, J., Ethier, D., & Corley, P. (1998). Strategies to ensure that online facilitators are successful. *Journal of Online Learning*, *(9),* 4.
The authors describe strategies that emerged from a professional development model created and implemented by a project funded by U.S. Department of Education, Office of Special Education to support special educators.

LEADERSHIP AND THE NEW TECHNOLOGIES

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Online Workshops

- General Information

- Archives of Completed Workshops

- Resources for Providing Online Professional Development

General Information

Each LNT workshop runs for about 8-10 weeks (length varies for different workshops) and involves online discussions, readings, small projects, and the use of online resources. Workshops are led by a group of LNT faculty and facilitators, and are designed for school district decision-makers.

Participants are expected to devote **at least 2 hours per week** to the workshop in order to contribute to the discussions and complete the projects. The only technology required is Internet access and a web browser (such as Netscape or Internet Explorer). Reliable email access is strongly recommended. (Technology requirements and time commitment may vary with individual workshops, so be sure to read each workshop's full description and requirements before registering.)

The first time a workshop is offered on a particular topic, it will be offered free of charge (not including any materials fees). However, subsequent offerings may charge registration fees.

Click to Subscribe — Announcements about upcoming workshops will be published in *LNT Perspectives*. You can receive *LNT Perspectives* highlights via email. Simply click on the button to the left and fill out the Subscription Form.

Workshop Archives

The following workshops have been completed. Public archives are either currently available, or will be available soon.

- *Envisioning the Possibilities: Connecting the Internet with Curriculum Standards and Frameworks.* This workshop, led by Glenn Kleiman (EDC and Harvard) and Rob Ramsdell (FreshPond Education, Inc.), and funded by the AT&T Foundation, ran from March 2 to April 27, 1998. The goal of this workshop was to help school district decision-makers develop a vision of effective uses of

the Internet in K-12 education, especially with regard to addressing curriculum standards and frameworks. A public archive of this workshop is available.

- *Keeping Kids Safe: Policy Implications of the Internet in Schools*. This workshop, led by Libby Black (Boulder Valley School District), and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from October 26 to December 18, 1998. Participants explored the implications of Internet presence in our schools, including issues of acceptable use by students and staff, filtering of content, the role of an Acceptable Use Policy, and other steps you can take to provide a safe environment for students. A public archive of this workshop is available.

- *Planning a District-Wide Technology Infrastructure*. This workshop, led by Bob Spielvogel and Terry Dash (EDC), and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from October 26, 1998 to January 31, 1999. This workshop introduced basic concepts of computer networks and infrastructure, in order to prepare school district leaders to understand the options and make informed choices about implementing a district-wide technology infrastructure. A public archive of this workshop is available.

- *District Technology Planning for All Students: Helping to Meet the IDEA '97 Mandate.* This workshop, led by Denise Ethier (EDC), Skip Stahl (CAST), and Judy Zorfass (EDC), among others, and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from March 5 to April 16, 1999. Participants examined cases and collaborated in district teams to explore ways that effective technology planning can promote learning and participation by all students—whether they are labeled as having "disabilities" or not. A public archive of this workshop is available.

- *Multi-User Virtual Environments: From Research to Classroom Practice.* This workshop, hosted by Susan Metrick (EDC) and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from March 1 to April 11, 1999 as the first in a series of workshops entitled "Emerging Technologies for Active Learning". Sessions were led by guest facilitators Chris Dede (George Mason University), Alan Epstein (Watertown Public Schools), Judi Fusco (SRI International, TAPPED IN), Amy Bruckman (Georgia Institute of Technology), Lizzie Edwards (Georgia Institute of Technology), Daniel Couturier (U.S. EPA), and a 5th grade student from Watertown, MA. Participants

explored text-based and 3D virtual worlds, and discussed ways in which they might be used for classroom practice and professional development, as well as strategies for successful implementation. A public archive of this workshop is available.

- *From Information to Knowledge: Visualizing Real Data in the Classroom*. This workshop, hosted by Kristen Bjork and Terry Dash (EDC) and funded by the AT&T Foundation and U.S. Department of Education through NetTech, ran from April 5 to May 2, 1999, as the second in a series of workshops entitled "Emerging Technologies for Active Learning". Sessions were led by guest facilitators Kathryn Keranen (Thomas Jefferson High School for Science and Technology), Randall E. Raymond (Detroit Public Schools), Paul Rooney (TERC), and Ray Sambrotto (Lamont-Doherty Earth Observatory, Columbia University). Participants explored remote-sensing and GIS technologies, discussed current research, and examined issues of classroom implementation. A public archive of this workshop is available.

- *Exploring the Possibilities: Using the World Wide Web in Your Classroom.* These concurrent workshops, one for high school teachers and one for middle school teachers, connected faculty from Concordia Parish and Catahoula Parish, LA school districts in an examination of the opportunities, possibilities and key steps to using the World Wide Web effectively in the classroom. Co-facilitated by Kirsten Johnson and Barbara Treacy of EDC and Merrick Lofton and Paula Paul of Concordia and Catahoula Parishes, the workshops ran from January 25 to March 28, 1999 and were funded by the U.S. Department of Education America 2000: Technology Innovation Challenge Grant, *Making Inroads to the Backroads*. Participants gained valuable direct experience using the Web as they explored current models of using the Internet in the curriculum and as they developed their own standards-based, interdisciplinary units. Through an in-depth examination of the WebQuest approach, participants learned how to evaluate World Wide Web resources, and developed their understanding of collaborative, inquiry-based projects that utilize the Web. Public archives of both the High School and Middle School workshops are available.

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Resources for Providing Online Professional Development

The LNT team prepared several handouts for sessions they conducted at the National Educational Computing Conference (NECC) on June 23, '99. These resources may be useful to educators interested in providing online professional development workshops, so we are posting copies of them here, in PDF format. If you do not have the free Adobe Acrobat Reader, click here to get it. If you are interested in obtaining further information regarding our NECC presentations, please contact Terry Dash at tdash@edc.org.

- Online Workshops for Education Leaders (slides from NECC presentation, describing LNT online professional development work, a close look at one example, lessons learned so far, technology tools, and next steps)
- Resources for Web-based Discussions (guidelines for software, hardware, & personnel)
- Designing, Implementing, and Assessing Online Courses (recommendations and strategies)
- References (articles about online learning)

Additional resources are available in the LNT Library's *online professional development* section.

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