WISE: The Smart Solution for Technology Integration Support

By **Lucie Isenhart Sommer**

A new support model delivers an instruction-driven, whole-context approach to integrating technology

A profound difference separates a professional development opportunity that targets technology training versus one that supports technology integration. Many colleges and universities have excellent programs in place for faculty who want to increase their technical knowledge and skills. Many faculty take advantage of these opportunities to familiarize themselves with useful software programs and to learn how to operate the new hardware appearing in their classrooms. Unfortunately, as instructors struggle to build these new media technologies into improved teaching and learning activities, they encounter a severe lack of technology integration support opportunities.

Kenneth Green, author of *The 1999 National Survey of Information Technology in Higher Education*, identified this lack of "instructional integration" support as one of the top two information technology issues confronting colleges and universities.[1] Though Green's research is both well respected and widely read, most technology training opportunities for faculty continue to isolate instructional media from instructional contexts.

A new support model was created to address the need for improved technology integration opportunities. This article describes the model — Whole-Context, Instruction-Driven Support for Higher Education Technology (WISE) — and its initial pilot.

WISE Model Overview

The WISE model targets specific goals in providing technology integration, as follows. It focuses on providing appropriate support for this integration.

Whole-Context Support

In many institutions, workshops that nurture best teaching practices remain separate from those that promote technology skills. In contrast, the WISE model builds on the notion that teaching and learning ideals, contexts, methods, and media are inextricably linked and should be presented as such. WISE borrows effective technology integration practices from established instructional design models and customizes them for faculty use. The result — WISE's whole-context planning framework — helps instructors consider new media options within a broad context of instructional issues.

Instruction-Driven Support

Many faculty members complain that current technology training opportunities are too far removed from course development tasks to be useful. Responding to the plea for training that is more directly applicable to teaching, the WISE model adopted an instruction-driven approach to faculty development. In this approach, instructors create tangible educational projects while simultaneously learning about new media options.

As these instructor projects evolve, new training needs and interests emerge. WISE's professional development activities are designed to respond to these changes. In this way, instructional needs drive technology support opportunities instead of the other way around.

Higher-Education–Focused Support

As colleges and universities devise support models to help meet new technology integration demands, many look to private industry for inspiration. WISE's support approach is sensitive to the reality that integrating technology into a training project for the business sector differs from integrating technology into the teaching and learning activities of higher education.

The WISE approach takes what is useful from outside models, recognizing that they have limited applicability in the higher education context with its unique purpose, players, and resources. WISE focuses on higher education, offering support activities well suited to the particular interests and training needs of faculty and to the resources that typify most higher education projects.

WISE Pilot Overview

The WISE model was created as part of the Murdock Technology Initiative, a grant-funded effort to assist several Washington state colleges and universities with technology training and integration. One hundred and forty faculty members from five institutions (all members of the Independent Colleges and Universities of Washington) formed eight professional development groups, organized by academic discipline (including Business, Education, Foreign Languages, Humanities, Health and Life Sciences, Natural Sciences, Social Sciences, and Theater and Fine Arts).

Over the course of nine months, each of the discipline-specific groups participated in a series of three linked workshop sessions, coordinated by the project's director. These sessions supported individual group members in designing, developing, and evaluating new teaching and learning media. The workshops were held on a rotating basis at the participating institutions, and technical support was provided by each school's information technology personnel.

One visiting consultant was assigned to each of the eight groups to design and facilitate workshop activities. All the consultants had demonstrated innovative, effective use of technology in their fields, though their experience working with faculty and their approach to facilitation varied widely. I was hired as the group leader for the Health and Life Sciences participants and created the WISE model specifically to pilot with that group. The WISE model reflected the lessons I learned teaching with new media in my own classroom, presenting technology integration workshops to colleagues and to other educators, and leading instructional design efforts on several technology-related grant projects.

The 16 faculty members who participated in the Health and Life Sciences group were all seasoned instructors, their teaching experience ranging from 7 to 30 years. Though they all taught within the Health and Life Sciences disciplines, their teaching styles and interests and their experience with instructional technology was highly diverse. The overall goal of the group's planning, development, and evaluation sessions (as defined in the Murdock grant) was to "advance the purposeful use of technology to enhance teaching and learning." The professional development activities that promoted this goal and the insights gained from these experiences are described below.

The Planning Session

I had two primary goals for the planning session: to establish a productive partnership with participants and to assist them in building instruction-driven foundations for their projects.

Establishing a Productive Partnership

An expert on teacher training, Ann Liberman has studied the elements that contribute to lasting professional development. Based on a thorough review of related literature, she notes that in most programs, instructors are "developed by outside experts," rather than participating in their own development.[2] Indeed, support opportunities conceived and developed by IT professionals or by faculty development offices without significant input from instructors are, unfortunately, all too common in higher education. This is not surprising, given the challenges associated with creating a truly collaborative program.

The WISE model aims to equally value and thoughtfully integrate input from both educational practitioners and other professionals. This was especially true during the planning session, where all activities were carefully designed not only to respond to faculty-defined needs, but also to incorporate my technology integration expertise. To nurture a productive partnership, I employed diverse leadership strategies, including a balanced approach to planning future workshops,

an early attention to alliance building, and a tolerance of individual development paths.

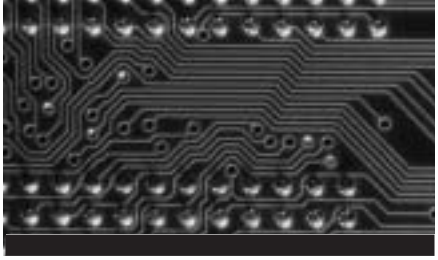
Balancing Goals and Needs. One of the Murdock grant's goals was that all the planning sessions include a participatory planning process. This process looked different in each of the groups.

For the Health and Life Science participants, I guided the process to steer them toward useful paths of exploration. For instance, I structured the order of the planning workshop activities so that those exploring instructors' personal teaching ideals, definitions of higher education, and availability of resources came before those that solicited ideas for the content of future workshops.

For the final design plans of the development workshop agenda, I liberally added topics that I knew to be important to technology project development. Participants did not seem to mind being asked to share control over future sessions; rather, they responded positively to this inclusive, collaborative planning atmosphere.

Creating a Productive Climate. Most faculty members have considerable teaching experience but are new to the task of integrating electronic media. In previous technology integration workshops, I found that seasoned instructors often seemed uncomfortable with the novice status that resulted from their inexperience with new tools. The fact that participants were simultaneously accomplished and "green" sometimes created a challenging workshop atmosphere, often characterized by defensive attitudes. To address the complex training issues inherent in this kind of professional development, I worked to establish a cooperative, respectful work climate with the WISE pilot group.

Paying close attention to the design structure of early workshop activities helped to create such a climate. Building in time at the start of an activity for participants to reflect upon and solidify their own personal teaching and learning ideas, as well as providing activities that fostered collegial connections, seemed to create a favorable climate for participation. Additionally, I carefully defined my role as facilitative rather than directive, which went a long way to establishing a positive development environment.



The WISE approach takes what is useful from outside models, recognizing that they have limited applicability in the higher education context.

Throughout the planning workshop, I attempted to capitalize on the academicians' teaching experience while addressing their lack of technology design experience. To this end, I combined regular opportunities for personal reflection and collegial discussion with carefully timed presentations of more established design principles. The approach succeeded in helping forge positive alliances with and among group members. These, in turn, resulted in a productive work dynamic that carried into future sessions.

Supporting Individual Development. Not surprisingly, participants possessed highly varied levels of teaching expertise and opinions about teaching style and practice. Consequently, their initial technology plans were extremely diverse, as were their related professional development needs. What else could anyone expect given the lack of formal teaching training for higher education faculty, the widely variable "in the trenches" experiences that inform their teaching practices, and the other myriad influences that shape their teaching styles?

I did not attempt to rectify these inevitable differences in experience and opinion, nor did I try to prescribe a single "correct solution" for their technology integration plans. Instead, initial planning discussions valued traditional pedagogical approaches while encouraging progressive teaching practices. My previous experiences working with faculty had taught me that they strongly resisted the concept of a single teaching style or idea. So, I focused on providing a "safe" climate (one that tolerated different teaching practices) and useful opportunities (based on common development needs) for faculty development. In this group, as likely in any other, some of the group members made great advances in their "teaching evolution," while others took small yet significant steps.

Building Instruction-Driven Foundations

An effective planning process is key to successfully integrating technology, yet few instructors are encouraged or rewarded for beginning their technology projects with solid planning. By default, most projects are initiated by some sort of software application training. These training sessions often inspire faculty to contemplate — usually in the isolation of their offices — how they might fit new technologies into their classroom activities.

Whether intentional or not, the lack of proper planning opportunities promotes a problematic design framework. In this faulty framework, new technology tools (and their inherent design structures) guide instructional media rather than instructional goals shaping technology use.

A primary goal of the WISE pilot was to help keep instructional objectives at the forefront of technology integration. The planning framework offered to faculty was derived from several widely recognized design models — the ADDIE model,[3] the Dick and Carey Design Model,[4] and the Kemp model[5] — all of which describe step-by-step processes for designing context-sensitive, objective-oriented instruction. I adapted the design principles from these models to specifically target the participants' needs and resources. The resulting planning process — a set of whole-context planning activities — was much more manageable and appropriate for higher education use than the more cumbersome, resource-intensive models that inspired it.

As part of this whole-context planning process, each faculty member drafted a list of personal principles of good teaching practice, targeted a specific instructional context for a potential tech-

Whole-Context Planning Activities

To begin, I encouraged faculty members to briefly consider the "background ideals" that might subtly shape their projects. As a way of exploring these ideals, each faculty member was asked to reflect on several factors that influenced their teaching and learning values, including

- Personal definitions of "meaningful learning" and "successful teaching"
- Institutional and departmental missions (both formal and informal)
- Mainstream changes in educational media and practices

Participants contemplated these issues privately before engaging in a shared discussion about them. Focusing on these kinds of value issues early in the planning process provided a solid, instruction-based foundation from which to launch future planning discussions.

Next, participants analyzed and discussed the specific contexts that their projects would target. They examined

- "Higher learning" as a shared context for all the projects
- Student population profiles unique to their individual courses
- Specific content development needs within their upcoming courses
- Individual teaching and learning environment issues (including both physical equipment and human support resources)

Lastly, the group considered how the learning activities and media of their projects might relate to their instructional goals — what I called "purposeful practices" planning. The group identified and discussed

- General teaching and learning strategies for promoting higher education learning
- Their personal teaching preferences
- The benefits of various teaching and learning approaches, such as tightly structured activities versus loosely structured activities, teacher-led activities versus student inquiry-based activities, and the potential for specific teaching methods and media to enhance (or detract from) project goals

As they moved through these whole-context planning activities, participants drafted individual summaries of their reflections. These summaries acted as preliminary guides for future project development efforts.

nology project, and reviewed potential resources. (See the related planning activities in the sidebar). Given the diverse needs of workshop participants, they had the option of engaging in these outcome-oriented planning activities in either a face-to-face or an online format.

These planning activities and their related group discussions influenced group members as they shaped initial visions for their individual projects. This initial emphasis on planning reinforced the notion that creating effective new media begins with individual reflection about teaching goals and methods.

Paul Hagner wrote about a research project he conducted that examined faculty support needs. He highlighted the difficulty that faculty face in integrating new technologies: "Since one requirement for transformation is coming to grips with how the new technologies can enhance learning objectives, a problem results in that many successful teachers have never engaged in this form of articulation and self-evaluation and may be disinclined to do so."[6] WISE provides both the framework and the support for these important reflective activities.

The Development Session

A successful development process must respond to faculty needs and interests; provide opportunities for discussion; explain links among principles, practice, and media; encourage project-based experimentation with new media applications; provide supportive consultation; and make the most of participant's limited time.

Responding to Faculty Needs

As mentioned, participants discussed their professional development needs during the planning session. The group felt strongly that subsequent workshops should emphasize technology integration support rather than duplicate the software and hardware training available at their home institutions. They preferred to work on individual technology projects, despite being presented with a wide range of project frameworks (including collegial, departmental, and institutional collaborations). Above all, they wanted the chance to talk with others who were beginning to integrate technology, to consult with experts, and to review useful examples.

In addition to surveying participants' general needs during the planning session, I reviewed their written ideas (generated from the whole-context planning activities) to learn about the group's particular teaching styles and interests. This information, combined with the training requests described above, helped shape the activities and content of the development session — an intensive, five-day workshop aimed at supporting individual project development. The final agenda for this session included daily opportunities to discuss effective technology integration, to review pertinent media examples, to actively experiment with new teaching and learning applications, and to receive experienced consultation.

Providing Opportunities to Talk

Innovations in educational media have sparked new conversations among colleagues about what happens in their classrooms. The WISE pilot nurtured this trend, providing useful opportunities for collegial interchange.

The pairing of sample teaching and learning principles with associated readings (see the sidebar) stimulated and focused discussion sessions each morning. Each morning began with a discussion about how to employ new media to support various instructional principles and practices. Topics for these discussions were derived from the teaching and learning principles that group members defined during the previous planning session. Participants reviewed associated readings before each discussion to stimulate and focus their sharing of ideas.

Most participants included a statement about fostering thoughtful classroom discussion on their personal principle lists. Reflecting this interest, the sample principles and the reading for the first day centered on the issue of how to stimulate productive student discussion. Faculty members began the session by sharing their frustrations as well as their secrets for promoting academic discussion and classroom community. As they did so, they translated the morning's teaching ideals into real teaching terms.

Next, participants examined how to integrate new technologies to support the goal of active student engagement. Using the face-to-face strategies described in the reading as a springboard, they explored issues surrounding online discussions and fostering online communities.

Though the instructors taught within similar disciplines, their project interests and experience with technology differed. The shared readings aided the group by providing an immediate avenue for collegial connection. Everyone involved reported that these discussions greatly benefited their individual technology projects. Many also commented that the exchanges were a welcome respite from the isolation that often characterizes the academic profession.

Highlighting Links

In addition to the readings and discussions, the group reviewed model technology projects, some of which they had created themselves. Each demonstration project illustrated how a sample set of teaching principles and related practices might be integrated into a multimedia project. Since all participants taught within the fields of health and life sciences, it was easy to find relevant examples.

These discipline-specific demonstrations inspired faculty to share related project ideas and deepened discussions about teaching practice issues. They also led to colleagues' trading useful graphics, Web site addresses, and even entire lecture presentations.

The development session also provided significant blocks of time daily for individual project development. The participants had identified this as an important need during the planning

Sample Teaching and Learning Principles and Related Readings

These principles were derived from the lists generated by planning session participants.

Day 1: Good teaching practice…

- Targets multiple levels of learning.
- Requires interactive discussion.
- Builds a community of learners.

Related reading: B. G. Davis, *Tools for Teaching* (San Fransisco: Jossey-Bass, 1993, pp. 83–89)

Day 2: Good teaching practice...

- Promotes critical thinking.
- Provides opportunities to make real-world links.
- Encourages student ownership of learning.

Related reading: *Enhancing Critical Thinking in the Sciences*, L. W. Crow, ed. (Washington, D.C.: Society for College Science Teachers, 1989, pp. 17–27); J. Chaffee, *Thinking Critically* (New York: Houghton Mifflin Company, 1996); H. S. Barrows, "Problem-Based Learning in Medicine and Beyond: A Brief Overview," *New Directions for Teaching and Learning*, 68, 1996, pp. 3–12

Day 3: Good teaching practice...

- Actively engages participants.
- Provides structure as well as opportunities for self-directed learning.
- Is personally meaningful to participants.

Related reading: C. Uline, "Knowledge in the Information Age: Effortless Communication and the Effort of Reflective Thought," *Educational Technology*, 36 (5), 1996, pp. 29–32; P. M. King and K. S. Kitchener, *Developing Reflective Judgment* (San Fransisco: Jossey-Bass, 1994, pp. 1–19)

Day 4: Good teaching practice...

- Targets adult learning needs.
- Understands today's students.

Related reading: P. Sacks, *Generation X Goes to College: An Eye-Opening Account of Teaching in Postmodern America* (Chicago: Open Court Publishing, 1996, pp. xi–xiv); S. Lieb, "Principles of Adult Learning," publication source unknown, posted online at <http://www.hcc.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/adults-2.htm>

Day 5: Good teaching practice...

- Invites assessment.
- Incorporates assessment feedback.

Related reading: S. Ehrmann, "Asking the Right Questions: What Does Research Tell Us About Technology and Higher Learning," *Change*, March/April 1995, pp. 20–27

Sample Whole-Context Design Summary

Guiding Teaching and Learning Principle

Effective teaching provides students with chances to experience the joy of learning discovery, the challenge of taking risks, and an emotional connection to course content. Effective instructors recognize individual learning differences and create flexible learning environments.

Desired Outcomes

I will develop a set of Web-based course resources for OT466 (Technological Adaptations for Function) that allows students with varying levels of experience as occupational therapists (entry level as well as post-professional master's students) to participate together and learn from each other in the ways described above. I am still working on firming up the learning objectives for the individual sections of my project.

Project Description and Development Activities

I will be a one-woman show, in terms of both design and production on this project. During this workshop, I made lots of headway with the overall structure for the project, though I'm not quite settled on an interface design. Once I get one in place and begin developing the content for the Web site, I'll be asking for regular tech support from the staff in our Technology Lab. I'll begin to present these new resources to students fall semester, but, realistically, things won't be complete until the following spring.

In terms of the project's structure, my plan is that the course resources will include a beginning section that reviews core content — something that all students in the course will be required to visit. From there, each student will develop an independent learning agreement with the professor, focusing on their special areas of interest within the adaptive technology curriculum. The Web resource will be flexible to accommodate the many different learning levels and interests that characterize this class. I plan to build in opportunities for ongoing communication between myself and my students and among fellow students so that all students can be exposed to a greater breadth of adaptive technology content. Many different kinds of learning experiences — including lectures, student discussions, lab experiences to apply knowledge, and both simulated and real professional experiences — will be woven into the design of these Web resources.

Initial Evaluation and Assessment Ideas

I'll present what I have done as it becomes ready for student use. As formative evaluation, I will gather written and verbal feedback from this initial group of students. Once I finish (this should be mostly done by the start of spring semester), I'll do a more in-depth evaluation with my spring semester students. More details to follow.

workshop. During this relatively uninterrupted independent work time, participants developed general design plans and specific content for their projects. The structure suggested for their technology plans helped participants keep a whole-context, instruction-based focus to their projects (see the sidebar). All were encouraged to treat these plans as evolving maps of their project ideas.

As they solidified design plans during the workshop, faculty members began to develop the actual resources they would later use with students. This was a iterative rather than a linear process, where working on resource content influenced project design and vice versa. Participants' project ideas ranged from small-scale technology integrations to full-blown electronic course development.

Encouraging Experimentation

Given the diversity of projects and the variability of technology expertise among the participants, application-based technology training — where a facilitator leads learners through a shared tour of software functions — poorly suited the group's needs. Participants had already identified the need for support that more directly addressed their teaching and learning endeavors. The WISE approach complemented existing training available to instructors at their home institutions.

Since participants opted to use the development session primarily for technology integration activities, they agreed to pursue their preparatory technical training outside of group time. Instructors left the planning session with an initial project vision, and during the three months between sessions, they firmed up these visions and reviewed the software applications (and in some cases, the peripheral hardware) that they were likely to need to support these projects. Though their reviewing strategies varied widely — from structured workshop attendance to focused technical consultations to independent exploration — all came to the development session with at least a rudimentary familiarity with the applications that suited their projects.

Participants developed these basic skills during the independent project time structured into each day of the five-day

session. During this time, I encouraged them to dive into the project design and development. As they did so, they kept one list of specific technical questions and another of ongoing reflections about their efforts. This training approach was loosely based on Kolb's experiential learning theory, where concrete experience, reflective observation, and active experimentation and application help promote new learning.[7]

Providing Supportive Consultation

Using such an approach, critics might assert, could leave behind faculty lacking the technical skills to proceed with their projects or those needing more structured guidance. Two important support mechanisms prevented this: consultative support and peer coaching.

J. Drinan, an expert in problem-based learning, responded to criticisms about experiential methods by pointing out that it is the facilitator's role to "watch, challenge, encourage, constructively criticize, and retrieve learners from the holes into which they occasionally fall."[8] I attempted to do just that, urging experimentation, keeping a close eye on frustration levels, and intervening when technical difficulties impeded project progress.

In addition to quick technical check-ins, each faculty member scheduled more intensive consultation as needed. Consultative support varied greatly from one project to the next, from answering in-depth technical questions to addressing many curriculum design issues. Questions about options within (and between) media tools were common, with a great deal of discussion about matching specific learning activities with the capabilities of the new media tools. Many participants asked for review and comment on initial design plans or on specific teaching strategies. We also explored and tightened learning objectives for individual projects. Nearly all faculty members wanted to articulate their design ideas and integration strategies, and to have an experienced outsider share in their excitement.

A large degree of peer coaching occurred. As participants worked side-by-side, technology-savvy instructors assisted less experienced instructors with their technical questions. Instructors with more experience in fostering interactive learning made informal suggestions for alternate learning activities to those hungry to expand their teaching practice repertoire. Instructors with strong organization skills commented on initial design outlines. Many participants preferred to work independently, turning to familiar applications (such as Word or PowerPoint) or curriculum development activities (such as writing discussion questions) if they encountered temporary obstacles in new applications.

The development session also offered just-in-time training to meet emerging training needs. Participants compiled lists of technical questions and reflective observations as they experimented with new technologies, which led to several breakout sessions during the workshop. These short sessions featured productive discussions about teaching and learning issues as they applied to the functionality of various new media. Consequently, even though the breakout sessions cut into individual development time, most participants chose to attend.

Individuals reported that even though the technology tool discussed in a breakout session might not suit their projects, the teaching practice discussions benefited their designs. Additionally, these breakout sessions often inspired "lessons learned" contributions from faculty already using the tools. These educational insights were usually brief but golden, often saving others valuable time and energy.

Making the Most of Time

When it comes to integrating technology, time is a highly relevant issue. Like most higher education faculty, the workshop participants were, by and large, busy instructors with limited time for instructional media development. Given these inherent limitations, they had to make difficult choices about how best to use their time and expertise during the development session.

The WISE model encouraged faculty to focus their efforts on developing a solid design plan for their projects. It also supported them in gaining novice familiarity with the technology tools specific to their needs as opposed to spending all of their time developing technology expertise.

The development session provided time merely to begin developing projects. Since the completion of these projects would require a great deal more time, the WISE model included opportunities for participants to review the resources they might employ when they returned to their home institutions. Positive examples of faculty/student collaborations were shared, such as the American Association of Higher Education–funded Student Technology Assistant Program, coordinated by Stephen Gilbert's Teaching, Learning, Technology Group.[9] Although encouraged to consider these kinds of collaborations, the instructors were also cautioned to critically analyze when and how to best employ such assistance.

Most participants agreed that outside resources (such as student assistants and technical support personnel) could be more judiciously targeted if they first armed themselves with a clear design direction and a working knowledge of the tools selected for their projects. Having learned the basics of the tools, they also were better prepared to deal with the inevitable transience of student help and the unending tasks of project editing and maintenance.

The Evaluation Session

As part of the concluding evaluation session, participants were asked to formalize their project evaluation plans. They also reviewed and compared measurement strategies during this session, framed useful research questions, and discussed early evaluation results from those projects already in process.

Assessment Plans

As part of the Murdock grant, all participating faculty were asked to gather assessment data on their projects. Evaluation issues were raised in the first session. Although minimal time was spent directly addressing these issues during the planning session, the whole-context planning model that guided the session's activities complemented the grant's evaluation objectives.

As for the development session, measurement issues were brought into sharper focus on the last day, when the sample teaching and learning principles, related readings, and discussions specifically targeted educational assessment. The third and final session was entirely devoted to helping participants formalize their project evaluation plans.

All participants came out of the development session with a project summary, the last section of which detailed their initial evaluation ideas. The scope of these projects was extremely diverse. To expect that all faculty members would achieve the same progress in terms of project development and assessment by the final session (one semester later) was simply not realistic. Hence, after seeking and obtaining the grant director's approval, I accepted different assessment timelines according to different project needs.

Those faculty developing small-scale projects that could be presented to students during fall semester were encouraged to conduct formative evaluations before the last workshop session. For others, it made sense to focus their autumn planning time on developing project content instead of on creating measurement instruments.

Though the grant project officially ended with the final evaluation session, all group members agreed to complete and share their evaluation results with me by year's end. At present, all are in slightly different places in their process of piloting projects with students, gathering and summarizing their assessment results.

Building on Previous Work

Given the needs-driven, project-based approach of the previous sessions and the fact that group members had already spent significant time focusing project goals and desired outcomes, conversations about measuring project success flowed easily and naturally. The final evaluation session began by giving participants a chance to revisit and revise their initial project summaries. The activities and discussions that followed helped them solidify their research purpose and review and compare effective measurement strategies. The session ended with each participant adding a section to his or her project summary articulating the assessment purpose and describing evaluation methods and timelines (see the sidebar).

Framing Research Questions

The broadly defined assessment objective of the supporting grant allowed instructors considerable freedom in their individual evaluation designs. Faculty were encouraged to develop evaluation tools relevant to their teaching situations. The group reviewed Stephen Erhmann's article[10] about developing useful assessment questions in order to provoke critical analysis and productive dialogue about each participant's research focus.

The group also read an article by Randall Bass, another expert in educational technology evaluation. His ideas about the need to redefine teaching evaluation were discussed, including his call to "submerge teaching evaluation not as part of an accountability process but rather, in a context of innovation, inquiry, and reflection."[11]

The diversity of the group's final assessment plans suggested that they took to heart the advice to create individually useful evaluations. Some instructors planned to measure student learning outcomes and the effects of new media additions. Others chose to focus student surveys and interviews on measuring the effectiveness of teaching practice and teaching method enhancements. Several decided to design instruments that would elicit collegial feedback on their instructional design innovations. Some planned to distribute these assessments to faculty from the pilot group or within their departments or divisions.

Reviewing Effective Strategies

Fortunately for the group, several participants had the time and the inclination to do early evaluations. They came prepared to share their experiences and examples of their research instruments with the group during the final evaluation session. In informal presentations, they talked about how they fleshed out their early assessment ideas into concrete measurement tools and shared initial assessment data. One individual even chose to include his research results as part of the Web site he developed for students.[12]

Sample Final Evaluation and Assessment Plan

Definition of Purpose

To evaluate the effectiveness of new course resources and to develop a plan for ongoing refinement.

Description of Methods/ Timeline

December 2001: Interview fall semester students who used preliminary version of new resources. Include questions about individual learning differences, time spent in specific units of course content, overall learning satisfaction, and recommendations for improvements.

January 2002: Integrate student feedback.

February 2002: Enlist adjunct faculty to observe several spring semester students in their initial use of revised resources. Review their recorded observations.

May 2002: Interview spring semester students who used revised version of resources.

June 2002: Compare to previous courses (taught without technology resources) by looking at

- student grades (on specific assignments and overall course),
- enrollment and retention numbers,
- instructor evaluations, and
- teacher time in resource preparation for course.

Colleagues who listened to these presentations asked pointed questions, took careful notes, and borrowed relevant ideas. Those who presented reported that the group's inquiries greatly stimulated their thoughts for future revisions.

The group also considered a more formal evaluation example. As a way of modeling best evaluation practices, I presented details about the evaluation goals and methods from the Web-based curriculum on which I had recently worked (a National Library of Medicine-sponsored project). Participants had the opportunity to review observation protocols and samples of student surveys used in the project, which they said was "enormously helpful." Other online evaluation resources were also shared, including a useful set of considerations developed by the creators of the highly regarded Flashlight Surveys.[13]

Spending time considering evaluation goals and methods might not have been high on participants' original priority lists, but all agreed that the exercise benefited their projects. While many of the plans that came out the session would gather, at best, only superficial evaluation data, group members unanimously reported that taking the time to look at the issue of effectiveness improved their technology efforts. For this group, whose planning and development process consistently focused on educational outcomes, encouraging them to ask questions about the impact of their new teaching and learning resources was welcome as a natural outgrowth of their previous work.

WISE Technology Integration

There never has been, nor will there ever be, a one-size-fits-all approach for the teaching and learning activities of higher education. Not surprisingly, the most common form of technology integration in higher education continues to be individual faculty members designing focused instructional media to support specific courses. The sheer number of these instructors, combined with their highly individualized support needs, presents enormous challenges for those attempting to provide professional development support. Increasingly, faculty are asking not only for technical training in new learning technologies, but also for significant support in integrating these new media.

The WISE model stands out among current support solutions in that it carefully considers the specific needs of higher education faculty and provides them with customized professional development support. Instead of replacing or duplicating existing support efforts, it enhances them, adding essential technology integration opportunities. The support model recognizes that instructors may feel threatened by expectations that they develop technology expertise and begins by building an atmosphere that fosters cooperation rather than defensive postures. It actively solicits and integrates participants' teaching interests and needs into workshop activities. The support approach acknowledges the limitations of faculty planning time and offers a project planning framework that is manageable and useful for the average instructor.

To support participants in developing effective technology projects, the WISE model also provides opportunities for literature-based, discussion-oriented learning — a format both familiar and credible for most educators. Faculty's need for direct application learning is addressed through the model's project-based approach to experimenting with new media as well as the emphasis on and support for developing personally useful assessment questions. As faculty dive into technology project development tasks, "just-in-time" training sessions are combined with collaborative consultation support to provide responsive support.

In a survey completed by pilot participants, all respondents agreed that the professional development sessions met the objectives of the grant project, helping each faculty member make purposeful use of technology to enhance their teaching and learning activities. With support needs outpacing support solutions, the success of the WISE model may provide useful inspiration to other groups as well.

To learn more about the Murdock Technology Initiative, visit the project's Web site at <http://www.waicu.org/murdock/index.html>. There you will find a link to the Health and Life Sciences page, which includes many resources from the WISE pilot. e

Endnotes

1. K. C. Green, *The 1999 National Survey of Information Technology in U.S. Higher Education*, The Campus Computing Project, 1999, <http://www.campuscomputing.net/summaries/1999/>.
2. A. Lieberman, "Networks as Learning Communities: Shaping the Future of Teacher Development," *Journal of Teacher Education*, May/June 2000, p. 221.
3. A. Maggs et al., *Instructional Design — A Systems Approach* (Sydney: SRA, 1990).
4. W. Dick and L. Carey, *The Systematic Design of Instruction*, 4th edition (New York: Harper Collins, 1996).
5. J. E. Kemp, G. R. Morrison, and S. M. Ross, *Designing Effective Instruction* (Upper Saddle River, New Jersey: Prentice Hall, 1998).
6. P. Hagner, "Faculty Engagement and Support in the New Learning Environment," *EDUCAUSE Review*, Sept/Oct, 2000, p. 31.
7. D. Kolb, *Experiential Learning — Experience as the Source of Learning and Development* (New York: Prentice Hall, 1984).
8. J. Drinan, "The Limits of Problem-Based Learning," *The Challenge of Problem-Based Learning*, D. J. Boud and G. Feletti, eds., 2nd edition (London: Kogan Page, 1997).
9. The TLT Group, The Teaching, Learning, Technology affiliate of the American Association of Higher Education, created the Student Technology Assistant Program, <http://www.tltgroup.org/programs/sta.html>.
10. S. Ehrmann, "Finding a Great Evaluative Question: The Devining Rod of Emotion," *Assessment Update*, 12 (6), November/December 2000, pp. 5–6.
11. R. Bass, "Technology, Evaluation, and the Visibility of Teaching and Learning," *New Directions for Teaching and Learning*, (83), Fall 2000, p. 47.
12. R. Stone created Ron Stone's Murdock Technology Initiative Page, <www.ups.edu/faculty/stone/murdock>.
13. S. Ehrmann, Director of the Flashlight Program and Vice President of the Teaching, Learning, and Technology Group, offers "Evaluations that Can Improve the Benefits of Technology Use in Your Course: A Flashlight Starter Kit," <http://www.tltgroup.org/resources/Starter_Kits/Faculty.htm>.

Lucie Sommer (lucie.sommer@attbi.com) is a technology integration consultant for higher education projects. Based in Boulder, Colorado, she does most of her work for learning institutions in Colorado.