ELECTRONIC PERFORMANCE SUPPORT SYSTEMS:
USING TECHNOLOGY TO TEACH TECHNOLOGY

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Background:

In the last twenty years, mass production has radically changed access to state-of-the-art media technology. In the 1980s there was an market explosion of affordable, high quality audio and video equipment followed by the introduction of powerful, low priced, easy-to-use computer systems in the early 1990s. Such sophisticated media equipment, once only affordable by large organizations, was now within the budget of small companies, educational institutions and even individual users.

Before about 1980, instruction in media technology was "hands off," as equipment was complicated, expensive and almost always operated by trained technicians. Media technology was taught largely from a textbook; students were instructed how to creatively supervise equipment operators to produce their desired end product.

Since the influx of inexpensive media equipment, students and corporate video users are no longer required to supervise the operator of a video camera or a graphic artist using a computer. They can now have both creative and technical control of their media project. Education has embraced this new technology, but the instructional plan in today's average media technology course still uses the pre-1980 "results first" philosophy.

The user-friendliness of today's media technology makes it easy for students to produce results without delving into too much technical detail. Media courses and corporate training programs are typically planned with little or no time for basic technical concepts because the focus is on results, usually in the form of a media project. Textbooks, operation manuals and class handouts may be helpful at times, but lack a coordinated, thorough approach to provide the employee or student with clear, pertinent technical information exactly when needed.

Review of Literature:

As new technologies have become available, many organizations have moved toward electronic performance support systems (EPSSs) to replace traditional training programs. An EPSS is a system of online job aids, support tools, and information systems designed to assist users with workplace performance (Sherry, Wilson 1996). This computer-assisted self-learning process is being implemented increasingly in education to supplement the traditional classroom environment.

Instead of relying solely on information from the classroom instructor or textbook, students are encouraged to use information resources prepared specifically for their class in a "learn-on-demand" model. Technical concepts can be self-taught as needed outside of the classroom with better understanding and memory retention. Schools will gradually shift from a teaching/learning model based almost exclusively on human instruction to a new approach that combines teachers and machines (Sleight 1992).

Media technology courses will always be very task-based but should ideally require the student to also understand the technical basics behind every task. Sadly, these basics are often neglected in the pursuit of results. Students spend a lot of time trying to find the information they need to do a task, instead of spending time doing the task. We are not teaching our students how to

function in this new world (Sleight 1992). Media software has become very sophisticated with many levels of menus, commands and functions. Knowing how to use the application's menus is not the same as knowing how to accomplish a work task (Raybould 1996).

The teaching of technical concepts to non-technical individuals is best accomplished by presenting such concepts with metaphors and analogies. Developing powerful metaphors to represent data, objects, tasks, and concepts is a high-leverage element of performance-centered design (Gery 1995).

Statement of Position:
For a media technology course to be truly effective, I believe the student must learn the technical basics behind each of the creative tasks they perform. Without this contextual understanding, true learning often does not take place; instead the apparent learning is simply a repetition of learned tasks. A grasp of technical basics allows the student to ultimately troubleshoot and solve problems in real world technology scenarios; this is a rare and valuable skill in today's workplace.

Technical concepts are best taught to media students and corporate users in a non-technical, non-threatening language. The use of analogies and metaphors to explain relatively complex concepts to students is very effective and a fun way for students to learn. Simple modular lessons (modules) address one technical concept at a time, always building on definitions and concepts learned in earlier modules.

Self-taught technical learning modules can be used to supplement any media class with minimal impact on established class schedules. Module assignments would be made to complement current class topics and tasks, making the learning very pertinent, and therefore very valuable. Simple quizzes can be given regularly to gauge students understanding of their independent study.

Media textbooks are often quickly obsolete with advances in technology. Learning modules can be easily updated and new ones added quickly as needed to insure students receive a "state-of-the-art" education.

Application to Program Planning:
The creation of a module-based EPSS as a supplement to media technology classes is an ambitious effort. However, the real challenge is the development of a consensus among all involved that the EPSS is necessary, and that its preparation and implementation costs are justified. Contextual factors in the educational organization that will affect the success of the EPSS are structural, political and cultural (Caffarella, 2002).

The most important structural factor in the establishment of a department-wide technical EPSS is the change in the operating procedures of media courses. Some educators may view the EPSS as a threat to academic freedom, when in reality it provides a structured, thorough method of technical education to all students in media classes.

Political factors may involve the perceived lost power of the establishment, funding and maintenance of this shared resource. These concerns can be allayed as no more a threat to department members than the now commonly accepted funding and sharing of media

laboratories used by all classes. Cultural factors such as language should not stand in the way of the implementation of a technical EPSS.

The initial work in establishing a technical EPSS is not trivial, requiring the concentration and coordination of department faculty members, staff and outside expertise if needed. A typical team is composed of a program or instructional designer, a content expert, and a technology specialist (Caffarella, 2002).

Format and content are two concerns that will be encountered early in the development process. The learning modules can be created in a variety of formats: on paper, CD-ROM or via the Web. A Web-based EPSS has many advantages:

- No duplication or distribution required
- Viewable from educational, corporate and home computers
- No special software required
- Relative simplicity in the creation and updating of modules
- Modules can contain links to other resources, including media and URLs

Potential topics for each module can be solicited from members of the department faculty from which a master list of topics will be produced. Modules must be organized in a sequence to insure each explanation will always build on the concepts and terminology learned in previous modules. Clearly stated learning objectives will be included in each module to assist the students understanding.

A series of multiple choice quizzes can be developed as part of the EPSS. These quizzes will not only gauge the students' grasp of technical concepts, but will evaluate the transfer of learning in a formative evaluation. Transfer of learning is the effective application of what program participants learned as a result of attending an education or training program. A formative evaluation is done to improve or change a program while it is in progress (Caffarella, 2002). Analysis of these quizzes will also serve the instructor with immediate feedback on whether certain technical concepts may require further explanation during class time.

A cost-benefit analysis of a media technology EPSS may be difficult to perform. The costs of education and training programs are related to the benefits they produce. These benefits are spelled out in monetary terms to determine the economic viability and efficiency of a program or a set of activities (Caffarella, 2002).

The benefit of this EPSS will be the improvement in the quality of education that media students receive, rather than any monetary benefit. Most of the cost will be incurred in startup and debugging of the EPSS; maintenance and updating of modules can be done cost-effectively by graduate assistants on a regular basis. Since all media technology classes will benefit, this effort could be considered a departmental expense. To help offset the cost of EPSS development, the entire collection of technical modules could be offered as a distance learning credit class for undergraduates, administered by graduate assistants.

Annotated Bibliography:

Caffarella, R. (2002). *Planning Programs for Adult Learners: A Practical Guide for Educators, Trainers and Staff Developers* San Francisco, CA Jossey-Bass

I have a new found respect for our AHE 578 text after using it extensively for the Program Planning section of this paper. Caffarella's style now appears to me relatively straightforward and easy to understand after my review of numerous articles by others in the field. This is an excellent Program Planning textbook.

Gery, G. (1995) Attributes and Behaviors of Performance-Centered Systems. *Performance Improvement Quarterly, 8(1) pp.47-93*

A valuable article in Performance Improvement Quarterly by EPSS expert Gloria Gery. She discusses several important concerns in the layout of software and computer-mediated systems and how performance centered systems function in real life examples.

Raybould, B. (1996) Performance-centered Design. *Training & Development, Mar96, Vol. 50 Issue 3, p72, 1p*

Another guru of EPSS, Barry Raybould discusses performance-centered design of software and resources and its effect on education effectiveness in this article for Training and Development.

Sherry, L., & Wilson, B. (1996). Supporting Human Performance Across Disciplines: A Converging of Roles and Tools. *Performance Improvement Quarterly, 9 (4), 19-36.*

An eye opening article by authors Sherry and Wilson discussing design and implementation of EPSSs in technology settings for Performance Improvement Quarterly. They are strong advocates of supplying information to workers and students just when needed for maximum impact and learning.

Sleight, D. (1992). The Potential of Electronic Performance Support Systems in Schools. Retrieved May 5, 2002 from http://www.msu.edu/~sleightd/school.html

One of the best articles found; it projected what the future may bring for EPSSs in the field of education. Author Deborah Sleight describes what a typical class day in an elementary school would be with the intelligent integration of an EPSS to assist the teacher.