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Preparing Teachers To Use and Apply Technology: New Models For A New Era

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Abstract: The paper presented here discusses the need to develop a technologically oriented trauning model for K-12 teachers. This model would have, as its core, a context, process, and content emphasis. To implement the type of design discussed, a series of training modules that incorporate context, process, and content are developed. Each is patterned for specific school needs and rescources. Implementation strategies are also included.

Key Words: Professional Development, Inservice Training Models, Technological Integration

1. Introduction

The integration of computers and telecommunications into primary and secondary education has become a high priority for schools world wide. A wealth of initiatives are currently being funded by federal, state, and local governments, as well as private industries, to bring a variety of these technologies into the K-12 schools. It is estimated that $4.1 billion dollars, or $92.70 per student, will be spent on educational technology in the United States alone during the 1996-97 school year [Quality Education Data, 1996]. Building an infrastructure to support these activities has been both a technological and fiscal trial for these entities. Parallel to these efforts has been the additional challenge of training a core of teachers, and support staff, that understand how to use the technology, when to use the technology, and the types of technological applications that are amenable to the myriad of classroom environments that appear in schools [Warren and Seaton, 1996].

Spurring this on has been the ongoing evolution of various types of media for classroom use [Dede, 1996]. For example, the Internet now allows us to readily reach wider, more diverse learning based audiences. What will this mean for both teachers and students ? How teachers learn to use this tool, as well as the development of new learning and thinking processes based on representations like language and imagery and the new types of instructional messages we can now exchange with students is one of the great challenges now facing educators [Dede, 1996].

These new forms of distributed learning are also leading to a reconceptualization of education's mission, clients, process, and content [Dede, 1996]. This new instructional paradigm, based on shifts in what learners need, is centered on preparation for future technological advancements as well as the development of new capabilities in the pedagogical repertoire of teachers. To prepare teachers, both in preservice and inservice situations, for these new learning venues a different type of training model needs to evolve.

2. Training for Change

Research indicates that there are three key dimensions embedded in effective training models -- context, process, and content [NSDC and NAESP, 1995]. Context addresses the organization and culture in which training occurs. Process refers to the ways in which training is organized and delivered. Content refers to the knowledge and skills that will be delivered through training. The following offer a combination of context, process, and content factors that can evolve into a distinctive model for technological training.

3. Context

Within any organization, and school culture, the ways in which change is addressed is key to its acceptance. This is especially true in terms of technology [Negroponte, 1995]. Within the context paradigm effective leadership becomes especially critical to the success of training and eventual use of technology within school environments.

In addressing this dimension, Guskey, 1994 and Sparks, 1995 note that if technological innovations are to flourish a strong school leader with a vision for the school community must be in evidence. This individual must value the active participation of teachers in leadership roles if technology is to become part of their school's daily practices. This person also needs to hire teachers who assume active leadership in both hardware acquisition and training development. In turn, as these two factors begin to arise, the facilitation of school-wide goals through active processes that result in acceptance of technology as a useful classroom tool on an ongoing basis will also begin to emerge.

4. Processes

There are a number of processes that appear to result in effective technological training initiatives. At the head of these are the teachers and leaders within schools that can create a collaboratively formed vision for a school based on its unique strengths and its particular technological needs. These individuals need to be encouraged, by their leaders and their vision, to identify their environmental focus for their technological training needs.

These teachers, leaders and learners, in collaboration, can then create a professional development plan based on the school's technological vision. This plan needs to respond to the overall community's technological needs the school serves, be based on the school's focus and the teacher's and learners strengths and needs. Inherent in this are a variety of delivery models for training including: traditional courses, informal sessions facilitated by diverse experts, peer led sessions, traditional inservice sessions, and the use of distance learning resources. In addition, to be truly effective, the progress of this training plan needs to be constantly monitored and refined

5. Content

Without a focus for collaboration, efforts too easily become diffuse and have no significant impact. It is critical that the focus be identified, collaboratively, by each, individual, school environment. Thus, the content of training is unique to each educational situation, and grows directly from the vision and concomitant focus of

each school. This should include a holistic view of technology and how it might "fit" into the school's short and long range plans for its learners.

This segment of the model bases its success on student achievement. For example if a school's content vision was on the improvement of reading, the training for and primary use of technology would be in this area. Agreed upon measures to gauge these efforts would be part of the goals and objectives of the overall school training plan.

6. A Training Model

To realize the type of training discussed above, an intensive, systematic program in which participants assume leadership roles is necessary. This idea incorporates the notion that in order to improve educational outcomes, the knowledge and skills of teachers and administrators must be continually upgraded so that they are better able to perform their assigned roles (Sashkin and Egermeier, 1993). This effort needs to be longitudinal, (in the sense that change will not occur overnight) as well as interwoven within other plans that the school might have for change and restructuring. Further, in order for it to succeed, the process should also be part of an overall school wide strategy for professional and institutional reforms [Fullan, 1990].

In sum, the overall goals of this design are: (1). assisting instructors in acquiring the understandings and strategies needed to integrate technology in classrooms; (2). applying proven technologies to systematically improve student performance and achievement; (3). increasing accessibility to a variety of traditional and non-traditional technologies; and (4). training a core of instructors in each school setting that can assist others in attaining these objectives.

7. Stages of Development

To implement the type of design discussed above, a series of training modules that incorporate context, process, and content need to be developed. Below are a set of examples of these. Each incorporates the constructs and ideas previously presented. For maximum effect, each should be patterned for specific school needs and resources. Any, and all, might be modified and adjusted as situations change.

Module 1: In this module teachers learn how to use technology for record-keeping, word processing and other basic computational operations. Here, teachers get first hand experience in both application and problem-solving situations. As part of this process, a learning environment that values and encourages teachers to review and learn how to use a variety of technologies by establishing developmental/demonstration facilities needs to be encouraged through curricular and administrative leadership efforts. Exploring the use of emerging technologies, in individual and group efforts, are also advocated.

Module 2: Technological applications are extended into the classroom at this stage as teachers select, use, and evaluate commercially developed software as lesson extensions. This becomes critical as one notes that over the past decade there has been a proliferation of software packages. While reviews of these products are available from a variety of sources it has become a challenge to understand if any of this software works as advertised and if the content applies to individual teacher needs. Within this module teachers need to become proficient at curricular decision making, application, and evaluation through a systematic assessment process.

Module 3: At this level teachers begin to tailor various types of technology to address specific content and curriculum goals. They also begin to develop their own technologically-driven instructional paradigms to provide a basis for classroom activities. Within this context, teachers now begin to assume the role of an instructional design team. They learn how to break down and analyze student instructional needs and apply technological solutions. For example, what are the most effective ways to use technology in a social studies classroom when the content is the right to privacy ? How can technology demonstrate this concept most effectively ?

Module 4: This phase allows for teachers to involve students in open-ended projects which require exploration and investigation. Within this context teachers encourage students to use telecommunications and electronically stored information as well as traditional resources to facilitate research. Such projects will allow for a refining of the understanding of course concepts and compel students to formulate hypotheses and begin to draw their own conclusions. Compiling their findings in various technological and multimedia presentations will let students practice the skills of data organization, analysis, and decision making.

Module 5: In order to fully integrate technology in their school setting, teachers in this module will learn how to utilize diverse models of instruction that can capitalize on technology. This includes co-operative learning, inquiry, and independent study. Instructors, in this setting, will learn that technology can be used as part of disparate instructional devices and not necessarily only within the environment of a computer laboratory.

Module 6: The understanding of how to apply technology to the needs of diverse student populations, including those intellectually, emotionally, and physically handicapped, as well as those whose first language is not English, is the focus here. Learning how to use technology for diverse populations has taken on new meaning with the adoption of inclusion of these populations in regular classrooms as part of most state and local school district policies in the United States. As student populations continue to change, applying technology for differential learning situations will become increasingly important.

8. Implementation Strategies

To introduce these ideas in a K-12 school setting several thoughts need to be kept at the forefront. First, it should never be forgotten that the "what" of schooling is defined by the education community within the community at large. Therefore, if technology is to be truly a part of the instructional schema of any school, it must be part of the community as a whole.

As part of this, all the stakeholders, within and outside the actual school buildings, must be responsible for evaluating the success of technology. School doors must be thrown open and all invited inside to share. This means incorporating technological skills, training, and hardware, within a broad, instead of a narrow population.

Finally, it must be understood that learning takes many forms. It can be distributed in time and space, and has become accessible in many ways. Technology has allowed

it to occur when and where learners want it, hindered only by the adequacy of local and remote resources. This is a fundamental shift in information flow and will cause major shifts in the ways we obtain knowledge. If technology training is to have any direct meaning to its participants, this new directionality of instruction must be incorporated in its prototypes.

9. Concluding Thoughts

Systemic change is always difficult. It is especially difficult when the opportunities for change include technology and education. Historically, there has been a temptation to believe, at least in the United States, that solving the educational problems of the late twentieth century has somehow been centered in a school environment's lack of technological hardware. As such, the root of the solution rested simply with putting more and better technology in classrooms. We have learned, time and again, however, that simply acquiring hardware will not in itself assist teachers in improving themselves and the performances of their students. Rather, the basis for real change in the culture of schools rests in what we do with the technology, how we place it in classrooms, what software we install for teacher and student use, and, most importantly, how we support and develop teachers who will harness the tools of technology for the betterment of their students.

The continuous advances in technology over the past two decades have radically altered our access to information, facilitating prospects for a truly world-wide community of learners. The growing number of computers in schools and the rapid proliferation of instructional software, coupled with the rich educational content being added to the Internet on a daily basis, have the potential to provide an effective and exciting learning environment for teachers and students alike world-wide.

All this rests upon several premises, not the least of which is continual, developmental based training. Without knowing how to apply and use the hardware, any new technological breakthroughs will be meaningless and without structure.

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