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AUTHOR	Nelson, Tobye Rae; Snider, Sharla L.; Gershner, Vera T.
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ABSTRACT

This paper details a local experience relating to a technology integration project designed to support the ongoing refinement of faculty technology skills within the context of the teaching and learning situation. The Learning and Integrating Knowledge and Skills (LINKS) project is a 3-year technology project designed to integrate established and emerging technologies into the teacher preparation curriculum at the Texas Woman's University (TWU) and is supported by a U.S. Department of Education, Preparing Tomorrow's Teachers to Use Technology (PT 3) implementation grant. The LINKS program supports both changes in university faculty roles and changes in curriculum content and delivery. This paper addresses two primary questions: (1) how were the development of faculty technology proficiencies supported and (2) what was the progress of the participating faculty in infusion of technology in university Web-based course delivery? To address these questions, second year findings regarding the examination of changes in faculty attitudes and behaviors and the effectiveness of the implemented LINKS project are provided. (AEF)

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Implementing Technology Integration at the University Level: A Case Study of Changes in Faculty Behaviors and Attitudes

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Tobye Rae Nelson, M.S.
LINKS Center
Texas Woman's University
USA
tnelson@twu.edu

Sharla L. Snider, Ph.D.
Department of Family Studies
Texas Woman's University
USA
ssnider@twu.edu

Vera T. Gershner, Ph.D.
Department of Teacher Education
Texas Woman's University
USA
vgershner@twu.edu

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Introduction

Modeling of technology integration by university faculty into their respective course delivery structures is a crucial element in the preparation of technologically proficient teachers (OTA, 1995; Topp, Mortenson, & Gradgenett, 1995; Wetzel, 1993). These "teachers in training" need to experience technology within the context of both their learning opportunities at the university and their student teaching experiences in the field setting. In order to model this type of framework within their pedagogy, university faculty must change attitudes and behaviors toward the use of technology (Joyce & Showers, 1983; Schrum, 1999). As Strudler and Wetzel (1999) assert, the "goal of technology integration is a moving target" (p.80), and therefore cannot be studied in a vacuum. Rather, faculty must be dedicated to beginning and/or continuing professional development of their own technology proficiencies within the dynamics of their learning organization. Furthermore, they must be cognizant of the extensive technology proficiencies required by state teacher certification standards. The following proposal details a local experience relating to a technology integration project designed to support the ongoing refinement of faculty technology skills within the context of the teaching and learning situation.

Important Features of Project

The Learning and Integrating Knowledge and Skills (LINKS) project is a three-year technology project is designed to integrate established and emerging technologies into the teacher preparation curriculum at the Texas Woman's University (TWU) and is supported by a U.S. Department of Education, Preparing Tomorrow's Teachers to Use Technology (PT^3)

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implementation grant. The LINKS program supports both changes in university faculty roles and changes in curriculum content and delivery.

This paper addresses two primary questions: (1) how were the development of faculty technology proficiencies supported and (2) what was the progress of the participating faculty in infusion of technology in university web-based course delivery? To address these questions, second year findings regarding the examination of changes in faculty attitudes and behaviors and the effectiveness of the implemented LINKS project are provided.

Description of Problem

Integration of technology into university course delivery provides an essential model for pre-service teachers. Pre-service teachers recognize that, throughout the teacher preparation required coursework, they are expected to demonstrate technology integration skills prior to student teaching. Therefore, these future teachers expect university faculty to model these behaviors within the context of their university learning experiences. Increasingly, faculty from Arts and Science as well as from Teacher Education recognize the need to model within their own course delivery a variety of ways to integrate technology into teaching and learning. This faculty challenge encompasses both the new technology proficiencies and contemporary issues in pedagogy.

Description of Need, Population, and Implementation of Project

Need

A needs assessment from a purposive sample of current faculty addressed faculty needs relating to the integration of advanced technology tools into course delivery. Their perceived critical needs were in four areas of: (1) productivity; (2) connectivity; and the integration of technology.

Faculty members see **productivity** as a priority including support in development of their skills related to multi-media presentations and the creation of a professional web page for use in classroom instruction and communication with pre-service teachers. The survey data indicated the need for training to extend their multimedia presentations with more advanced media tools and the use of **connectivity** tools such as the World Wide Web and asynchronous and synchronous forms of communication.

In order to provide a model for our pre-service teachers, faculty must **integrate technology** into the design and delivery of all instruction. Advanced forms of technology must be infused throughout all courses, not just a separate technology method course, as transparent tools for thinking, learning, and constructing new knowledge. According to survey data, support for the use of web-based curriculum and instructional materials were high priorities for the faculty. They identify their need for training in evaluation and utilization of advanced forms of media, of content related Internet resources related to content areas, and of appropriate CD-ROMs and content-specific software.

Beginning in the spring of 1999 the LINKS program for faculty was created and implemented to respond to these perceived needs.

Population

Faculty volunteers from a variety of disciplines were recruited to attend technology-training sessions began September 2000 and were completed in April 2001. These faculty members were recruited from the group responsible for coursework within the teacher education sequence. Their only compensation was the use of a University laptop outfitted with web page browsers, Microsoft Office, multimedia software, and Ethernet connections for the duration of their participation in the LINKS project. This volunteer sample of university faculty (N=20) registered for each LINKS training session one week before the session date. If vacancies became available for any session, the training on that day was opened to interested faculty from the College of Professional Education and the College of Arts and Sciences. At each session data were collected on faculty stages of concern, levels of use, and perceptions of the effectiveness of the training they had received.

Implementation of Project

Training Goals. The primary training goals were: (1) the introduction of LINKS standards and resources, and (2) support for faculty delivery of web-based courses as models for future teachers. The goals were addressed through two types of sessions. Hands-on professional development sessions focused on specific areas for remediation or for more advanced work and whole-group development sessions addressed broad topics essential to all participants.

Training Session Overview. All sessions served as an orientation to the required technology proficiencies Texas pre-service teachers are expected to master and demonstrate. To provide a cohesive model, faculty were encouraged to integrate technology into the design and delivery of their instruction. These sessions also served as a training vehicle for the preparation of web-based course delivery via Blackboard, the University's web-based course delivery template.

Fourteen sessions were available throughout the 2000-2001 year, seven per semester. These two-hour sessions were delivered in a University computer lab providing Blackboard access. All materials were available on a "class" Blackboard site for later reference. By using a web-based course delivery system to communicate with faculty participants, meaningful learning was integrated into their own web-based course development.

LINKS infused advanced forms of technology throughout training sessions as transparent tools for thinking, learning, and constructing new knowledge. Integrating technology as a transparent tool includes the use of advanced forms of media such as optical technology, scanners, video and sound, digital and document cameras, and streaming video.

Many sessions were designed as hands-on workshops. Faculty were encouraged to bring course materials, syllabi, graphics, and other materials to use as they converted traditional courses to the electronic medium. LINKS provided practical printed reference materials, related web page URLs, and individual assistance as needed. Additional one-on-one assistance was available from

LINKS staff by request. Personnel from Information Technology Services (ITS), the Distance Education Support Team, and from the library services collaborated with LINKS personnel in organization and implementation of the training.

Training Session Topics.

- *Session I: Orientation and Data Collection.* A whole-group session which served as an orientation to the LINKS project and PT^3, including student and faculty benefits. The research methodology was outlined, and data was collected via online tools.
- *Session II: Exploring Internet Resources.* A whole-group session designed as an orientation to TWU Library resources, search engines, and other tools.
- *Session III: Searching Without Losing Your Composure.* A hands-on session with step-by-step procedures for searching the Internet using tools available on the Internet.
- *Session IV: Getting Your URLs Organized and Creating a Virtual Office.* A hands-on session designed to organize favorite and frequently used resources into directories for Bookmarks or Favorites.
- *Session V: Introduction to Blackboard.* A whole-group session designed to address questions concerning the creation of courses, getting access from a remote location, and managing information and sharing information in the course.
- *Session VI: ABC's of Preparing Documents for Blackboard.* A hands-on session which discussed the philosophy of organizing course materials.
- *Session VII: Shortcuts and More.* A hands-on session with an emphasis on keyboarding and toolbar shortcuts in Microsoft Word and PowerPoint.
- *Session VIII: Exploration of Blackboard.* A whole-group session which covered upgrades from Blackboard 4.0 to 5.0. Collection via online tools was also administered.
- *Session IX: Adventures in Uploading for the Tentative.* A hands-on session that related to the uploading of documents into Blackboard for the novice user.
- *Session X: Cliff Walking on the Rocky Blackboard Range.* A session for the more experienced user that related to uploading different document types.
- *Session XI: Refinement of Blackboard.* A whole-group session specifically related to information dissemination addressing pedagogical issues pertaining to Blackboard. Speakers discussed recent finding from EduTex, a regional conference of EDUCAUSE, in San Antonio. Spotlighted were best practices and how other TWU faculty members are using Blackboard.
- *Session XII: Beyond Simple Documents.* Adding PowerPoint presentations and graphics to online classes.
- *Session XIII: Braving New Frontiers.* Using HTML coding.
- *Session XIV: Symposium and Data Collection.* A whole-group session that consisted of closure, overview of lessons learned, best practices models and presentations, and online data collection.

Data Sources. The purpose of related research inquiry and associated program evaluation of the LINKS project was to assess the changes in faculty behaviors and attitudes related to the integration of technology and to measure the effectiveness of training. Intrinsic to the examination of behaviors and attitudes of participating faculty was the use of the Concerns Based Adoption Model (CBAM). The module was developed by Hall, Wallace, and Dosset (1973) at the University of Texas at Austin Research and Development Center for Teacher

Education. Because the faculty could be followed and supported as they adopted the innovation (i.e., use of a web-based course delivery system), the CBAM model was implemented with this population through the Stages of Concern Questionnaire (SOCQ) and the use of a modified online survey structured from the Levels of Use (LoU) interview process.

Hall et al. (1973) discovered that an individual progresses through three clusters of concern as she or he adopts an innovation--self concerns, task concerns, and impact concerns. Three diagnostic dimensions were identified that are used to monitor a person's progress through these stages: Stages of Concern Questionnaire (SoCQ), Levels of Use Interview (LoU), and Innovation Configuration (IC). Both the SoCQ and the LoU were used to assess progress toward innovation adoption or the IC.

To gauge the effectiveness of the provided training opportunities, faculty completed evaluation questionnaires at the end of each two-hour session. The evaluation questions related to the session's impact on their motivation to apply new knowledge and skills and the ability to use technology more effectively in the classroom. Additionally, an overall perception of session quality was obtained. The evaluations of individual training sessions were utilized to refine management and enhance training in subsequent semesters.

Analysis. Pre- and posttest data were collected for the SoCQ and Levels of Use. Parametric paired-sample t-tests assessed differences across time. Qualitative analyses were conducted for open-ended items on session evaluation forms.

Implications for the Local Setting

The primary goals for the university faculty were introduction of the LINKS standards and resources, and support for faculty delivery of web-based courses as models for the future teachers. Descriptive statistics and profiles for the SoCQ suggested that the faculty had high informational and personal concerns as well as increased consequence and collaboration concerns. These types of concerns are consistent with movement through the change process. Analysis of the LoU revealed that all individual faculty made significant progress in levels of use, although they began at different levels. Qualitative analyses of open-ended evaluation questionnaire items suggested issues related to individual technical ability, to the time needed for implementation and integration of technology, and to the applicability of new learning to specific teaching situations. Additional analyses of implementation data have been conducted and will be reviewed during the course of this paper presentation.

The LINKS project provided a wealth of training opportunities for TWU faculty volunteers relative to the teacher preparation program. The following are key findings:

- Personnel from various campus departments collaborated to deliver staff development for faculty.
- LINKS training was tailored to accommodate faculty' broad range of technology abilities.
- LINKS activities raised university faculty' awareness of technology proficiencies needed by future Texas teachers.

- LINKS training positively impacted university faculty' motivation to use and capacity to integrate technology.
- Suggestions for training improvement centered on the individualization of training to meet faculty' particular needs.
- Faculty' main concerns centered on time, personal skill proficiency, skill retention, and resources.
- Faculty' concerns with web-based course implementation, as measured by the SoCQ, changed over time.
- Progress toward higher levels of web-based course delivery use varied for particular faculty.

Implications for External Settings

Even though the benefits of technology integration has been well established in the literature, the United States Department of Education (USDE) finds that "relatively few teachers (20%) report feeling well prepared to integrate educational technology into classroom instruction" (2000a). In a separate report, USDE suggested that "teachers have been prepared for a model of teaching dramatically out of step with what is needed to prepare the nation's students for the challenges they will face in the future" (USDE, 2000b). Findings presented regarding the implementation and effectiveness of the LINKS project has implications for increasing the technology proficiencies of entry-level teachers as well as providing a model for other universities undertaking similar changes and institutionalization efforts. Findings have particular relevance to explain how university faculty can be nurtured and supported as effective models of technology use in web-based course delivery and electronic communication with students.

Through the examination of the change process and the utilization of this information to support faculty to become users and modelers of technology, multiple benefits are evident. By providing a supporting scaffold, university faculty become less fearful of change and their attitudes take on a willingness to engage in increased learning experiences. When pre-service teacher witnesses technology integration within the auspices of their university coursework they are more likely to adopt the same technology integration and model that back to their future students thus encouraging a true technology integration model.

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