A Model for Systemic Change Management in Education

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ABSTRACT

Based on an understanding of systems thinking as practiced by successful learning organizations and derived from large-scale projects in technology-assisted teaching and learning in Mexico and Germany, we have developed a model that offers guidance to educational institutions and organizations to support their transition from lecture-based, face-to-face teaching to interactive learner-centered eLearning. As the basis for the model, we analyzed the systemic change processes of two major educational institutions: the largest private institution of higher education in Latin America, Instituto Tecnologico de Estudios Superiores de Monterrey (ITESM), a leading nationwide educational system of international scope with 33 branches in 27 cities throughout Mexico, and the federal flagship project in Germany, Virtuelle Fachhochschule (VFH), the Virtual University of Applied Sciences, a virtual organization with decentralized and distributed management and participants from twelve universities of applied sciences, two universities, the federal employers' association, unions, and businesses in six federal states.

Keywords: Systemic Change, Online Learning, and Faculty Development.

THE PROMISE OF ELEARNING

While a number of educational institutions and organizations have made major investments in information technology and eLearning, many of them have become increasingly frustrated by the gap between the promise of technology-enabled teaching and learning and the current reality experienced within these organizations. What can we learn from the successful implementation of large-scale projects in technology-facilitated education in different countries in order to help these organizations realize the promised benefits of eLearning?

eLearning as Technology-Mediated Teaching and Learning

Professionals involved in staff development for educational institutions now use the term eLearning to encompass all forms of technology-mediated or electronically-facilitated teaching and learning (National Staff Development Council, 2001). The National Staff Development Council (NSDC) has defined eLearning as including "learning experiences enabled or enhanced by technological resources that support the development, exchange, and application of knowledge, skills, attitudes, aspirations, or behaviors for the purpose of improving teaching and increasing student achievement" (NSDC, p. 7). If eLearning is to achieve the desired results "of improving teaching and increasing student achievement," it is important to understand key components of the change process that organizations undergo in their successful implementation of eLearning. What occurs in organizations when they set forth on their journey to adopt eLearning? What problems do organizations encounter? How can we plan and facilitate the eLearning adoption and implementation process in a way that helps educational institutions produce successful graduates?

CHANGE PROCESS

The adoption of eLearning changes the educational system in a way that requires a transformation not only of the teaching process through a new medium but also of the system itself (Banathy, 1991). According to systems theorists such as Banathy (1991, 1992), to change any part of an educational system requires knowledge and understanding of how the parts of the educational system are interrelated. The adoption of eLearning and the transformation of the teaching and learning process to a learner-centered model constitute fundamental changes in the educational system, starting with specific goals, values, and beliefs about learning and elements that support the learning process, such as curriculum, instruction, assessment, and policy (Fullan, 1991, 1993). Experience to date has demonstrated that piecemeal change efforts in educational organizations have not produced desired outcomes; the result has been an increasing call for systemic change (Banathy, 1991, 1992; Glickman, 1993; Goodlad, 1984; Perelman, 1987; Reigeluth, 1994). In seeking to understand the change management process necessary for eLearning initiatives to succeed, an analysis was conducted of the change management process underlying the introduction of eLearning at two different institutions: (a) ITESM, Monterrey Institute of Technology and Higher Education in Mexico, and (b) Virtuelle Fachhochschule (VFH), the Virtual University of Applied Sciences in Germany.

Monterrey Institute of Technology and Higher Education (ITESM)

ITESM was founded in 1943 in Monterrey, Mexico as a private nonprofit higher education institution. It is now a nationwide university system, accredited in the U.S. since 1951 by the

Southern Association of Colleges & Schools, with 96,000 students enrolled full time in high school, 34 undergraduate programs, 51 Master's programs, and 6 doctoral programs, 3,500 students from around the world, and 7,600 professors seeking to equip students with needed business skills (ITESM, 2002b). Created in 1989, a modern technological platform supports ITESM Virtual University (UV) (2002). With strong institutional emphasis on technology, ITESM established a robust technology infrastructure with full wireless access on all campuses. UV provides undergraduate and graduate distance learning opportunities through extension and degree programs via a satellite broadcast system. Student-centered collaborative learning, independent study, and collaborative learning communities are supported by satellite communication, video conferencing, Internet, digital libraries, and multimedia. ITESM is engaged in systemic change, with all community members experiencing and participating in the change process on many different levels of the system.

Virtual University of Applied Sciences

The VFH is a German Flagship project in the field of eLearning for academic education. The VFH project started in 1999 with the participation of 12 universities of applied sciences, two universities, the federal employers' association, unions, and businesses in six federal states (Virtual University of Applied Sciences, 2002.). The project is funded by the German Federal Ministry of Education and Research to promote eLearning in Germany. The goal of the VFH project is the development, design, implementation, and operation of two complete academic programs in Computer Science and Economic Engineering through a consortium of universities. The concept of the VFH is based on an organization of universities with decentralized and distributed management that offer a combination of multimedia course materials, shared jointly by the universities, a student-centered learning process organized by each individual university, and the administration of the programs, delivered according to the required specifications of the six federal states. In April 2001, seven of the Universities of Applied Sciences founded a consortium, named the Virtuelle Fachhochschule, as the basis for sustainable development of programs. In October 2001, the consortium began operation with the Computer Science program. In autumn 2002, the Economic Engineering program followed. The project includes the conceptualization, design and production of 60 course modules for common programs. The course material, tutoring approach, and program management are all aimed at supporting progressive student-centered learning. Courses and course material are 100% shared and maintained jointly by the universities, thereby establishing procedures to assure the sustainability of the program.

THE SYSTEMS PERSPECTIVE

Technological developments can provide the impetus and platform for the improvement of existing services on the individual school level as well as on the overall educational system level (Carter & O'Neill, 1995). In addition, special types of educational services can make use of emergent technologies for improvement and change. In an information-dependent environment, the implementation of technology-facilitated approaches is becoming well accepted. However, technology-enabled educational approaches are generally implemented in a piecemeal, disjointed, incremental way, rather than as part of an overall system design. If these educational innovations function in a truly integrative fashion, they can manage curriculum design, pedagogy and assessment in a way that transforms an information-dependent environment into one that is information rich (Carter & O'Neill, 1995).

Nevertheless, according to Banathy (1991), the gap has been increasing between education, with its relatively slow response to the need for change, and the rest of rapidly changing society. Most educational institutions rely on outdated social planning approaches that seek to divide problems into individual pieces, each of which can be solved on an individual basis. This approach is based on the belief that solving the problem incrementally, piece by piece, will address the overall problem. However, to address new societal requirements, there is a need for systems thinking and systems inquiry in education, as presented by such systems theorists as Ackoff (1981), Checkland (1981), and Warfield (1990). Systems thinkers realize that optimizing the performance of the component parts of a system does not necessarily result in optimal system performance. Unlike traditional social planning approaches, the application of systems design methodology produces a comprehensive, interconnected, interdependent, interacting, and internally consistent system of solution ideas that can be seen in the design of a new system (Banathy, 1991). Systems theorists distinguish between two types of change: piecemeal change—modifying part of the system and systemic change—replacing or modifying an entire system (Reigeluth & Garfinkel, 1994). Another useful distinction is between systematic and systemic: Systematic implies a linear, generalizable approach and systemic connotes a global understanding of the problem, along with interrelationships and interconnections (Carr, 1996).

Systemic Change Management in Education

According to Banathy (1991), individual and collective adoption of a systems perspective is required for systemic educational reform efforts. With a systems perspective and a redefinition of education as a system, it is possible to design educational systems that will encourage and support learning as well as the full development of human potential (Banathy, 1991). A facilitator for the systemic change process must help the community develop a vision of their ideal educational system, stakeholders must create and take ownership of a shared vision of the new educational system, and everyone must develop a passion for their new vision. (Jenlink, Reigeluth, Carr, & Nelson, 1996). To achieve such consensus, the group must have the ability to process what is needed to achieve the vision, working in a safe environment. The group must have a sense of ownership, which is fostered by empowerment; in other words, the group must have the ability to initiate the change the members desire (Jenlink et al.,1996). Systemic change can thus be viewed as a democratic decision-oriented approach to changing fundamental values and beliefs about schools and education within the changing environment of an increasingly complex interconnected global society. Systemic change is a cyclical process that considers the impact of change on all parts of the whole and their relationships to one another. Systemic change suggests a change *of* the system rather than *within* the system. Both inner (personal-psychological) learning and outer (social-psychological) learning are required for the systemic change process to occur. Thus, *learning to change* is a necessary part of the process for change in complex systems to occur. This process of learning to change is, in turn, connected with systems thinking, generative learning, higher levels of conscious awareness, and the development of an evolutionary consciousness (Banathy, 1991; Fullan, 1993; Senge, 1990). Reconnecting stakeholders and the educational systems in which they are involved, systems design thus becomes a

creative and generative learning process for all involved in the educational system (Banathy, 1991, 1992).

TECHNOLOGY AND SYSTEMIC CHANGE

According to the National School Boards Foundation (2002), technology integration is as much about change and support for the change as it is about technology. The NSDC (2001) has indicated that "without a high level of support, even the best learning opportunities—either online or off—will remain unused" (p. 5). NSDC has described eLearning infrastructure requirements as consisting not only of hardware, software, and high-speed connectivity, but also "regular maintenance, planned upgrades, specially prepared faculty, and appropriate participant-instructor ratio" (p. 5). Based on interviews with 811 technology decision makers in school districts, the National School Boards Foundation (2002) developed guidelines for school leaders:

1) Technology is now essential for effective instruction—treat technology as an integral tool.
2) Use technology to address core educational priorities and improve student achievement.
3) Make significant investments of time and money in professional development.
4) Anticipate and plan for changes that will result from increased use of technology.
5) Involve community in technology plans, policies, and practices.

In its report, *E-Learning for Educators*, NSDC (2001) concurred with these guidelines. Both professional organizations have emphasized the importance of the organizational change process that provides the foundation for the implementation of eLearning. Furthermore, educators and researchers have agreed on the importance of faculty training and development to the success of eLearning implementation efforts (Kolbo & Turnage, 2002; NSDC). Kolbo and Turnage asserted that for institutions to remain at the forefront of higher education, faculty development initiatives are of prime importance. In a move to enhance academic excellence through faculty development in higher education, Kolbo and Turnage have recommended the following faculty development initiatives:

1) Expand their focus.
2) Employ a wider variety of methods and delivery formats.
3) Focus on the delivery of learner-centered instruction.
4) Consider potential cultural impact that can be gained through technology.

Contextual factors can support or block change efforts because change occurs within a particular context. In the change process, the human interface plays a key role, either as a facilitator or as a barrier to change. The attitudes and beliefs of people in the school shape the culture. Often, innovations are not put into practice because they conflict with deeply held internal images of how the world works, images that limit people to familiar ways of thinking and acting (Senge, 1990). Change is successfully implemented in a culture of innovation, collaboration and coordination where all participants in the system are involved in the change effort.

Development of a Model

According to Pfieffer (1968), a model is developed in order to provide insight into the working of the processes and system components. Ross (1977) presented a syntax for models, with graphic boxes and arrows; the central box denotes an activity, process, or event that is activated by the inputs that are shown entering the box from the left, constraints that are drawn as pressing down on the box from the top, and outputs that exit the box from the right. Inputs are what the activity uses, such as administration, technology, students, staff, and classrooms. Constraints consist of the elements that limit the activity in some way, such as funding program priorities, or feedback results (Ross). Outputs are the components that are produced or result from the activity, such as students with a certain skill (Ross); the outputs become inputs for the next eLearning cycle. These modeling conventions are applied in Figure 1.
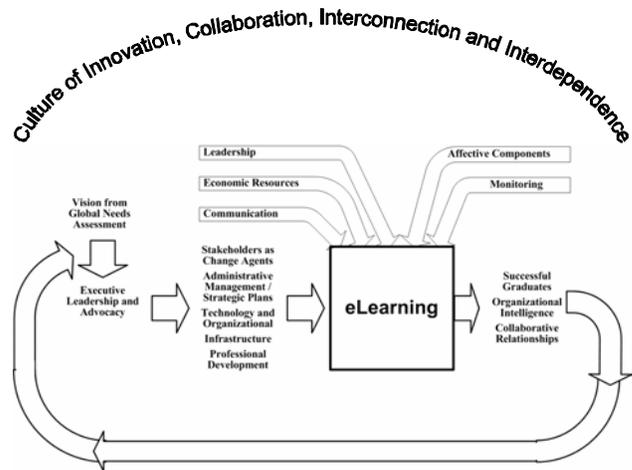

Figure 1. eLearning Adoption Systemic Change Model

In the following section, ITESM and VFH initiatives are presented to illustrate different components of the systemic change process to be managed during the adoption and implementation of eLearning in organizations.

Vision and Leadership

The change process begins with the development of a vision and with advocacy by the organization's leaders. At VFH, the initial vision was developed by a committee, which applied for project funding through the German Federal Ministry of Education and Research. Innovation and technological progress promoted the advances of eLearning, providing the opportunity to offer two new academic degrees. The vision of the VFH, developed in cooperation with persons having the authority to act as change agents at each consortium university, was to use eLearning to move into lifelong learning, time- and location- attractive independent study to reach new student groups. The board of project managers was formed from this group and took responsibility for the project operation and realization of the shared vision. Project managers supported the board of directors of the joint universities through the formation of a consortium and implementation of academic degree programs in their universities.

The joint universities have the ability to share academic degree programs across federal borders and to develop programs of study for public academic education as well as for commercial academic extension education. With shared course modules and instructional designs, participating universities can develop innovative academic programs by combining available online materials with external courses or with face-to-face lectures. With these options,

the VFH project will serve as the nucleus for universities to be able to respond to the demands of the labor market in a flexible manner. Through the common organization, the consortium of universities is able to financially optimize the offering of academic degrees, production of courses, and resources for course tutoring.

Management and Administrative Strategic Plans and Technology and Organizational Infrastructure

Administrative and management issues are key factors in the change process. A significant component of the VFH change implementation process has been the definition of and agreement on practices that address cooperation, intellectual property rights of learning objects, responsibility for the quality of learning objects and tutoring, and sustainable financing. Important aspects of the change process to implement eLearning underway at VFH include the following:

- Development of an executable organization and administration for academic online programs adhering to political and legal requirements and the legal acceptance by the federal government of necessary measures for the implementation and operation of online courses and academic degree programs
- Shared project organization within the joint universities for the operation of two academic degree programs
- Development of common procedures for student enrollment, university administration, student acquisition, and technology maintenance and selection, development, and implementation of technical tools—hardware and software—and infrastructure
- Development and delivery of ergonomic, pedagogic, and didactic guidelines for an innovative and student-centered learning process, that includes evaluation of results for course modules and plans in the VFH
- Production of course modules for the two academic programs that includes the creation of design and production processes for online study modules in participating universities. Courses and course material are 100% shared and maintained jointly by the universities, thereby establishing procedures to assure sustainability of the program.
- Implementation of training programs and sharing of experiences among course authors, designers, multimedia producers, and tutors based on a train-the-trainer approach.

In addition to time and financial resources, successful eLearning change requires technology infrastructure and support, network, hardware, software, systems administration, and professional learning community technical support. Strategic plans providing detailed time and project schedules are important. All technological and administrative processes have been carefully planned and implemented at VFH.

At ITESM, the process began with a nationwide consultation and assessment of global and Mexican society needs. "The proposal of an educational change was the beginning of a new stage in the history of the institution and in this way Tec of Monterrey would face the most important challenge since its foundation, as stated by Fernando Esquivel, Academic Vice-President Emeritus of the institution" (Martin, 2002, p. 28). The shared vision of change was based on the needs expressed by all the stakeholders consulted, including: alumni, business leaders, and board of directors. Based on data collected and analyzed in the global needs assessment, the ITESM system chancellor, as

the highest executive, expressed the institutional commitment and became the advocate for the new ITESM educational model. As an innovative educational community with extensive emphasis on technology, ITESM adopted a technology-assisted teaching and learning model in order to help students develop as mandated by the 2005 mission statement. The technology-assisted teaching and learning process can best be described as student-centered, interactive, collaborative, and contextualized eLearning. The ITESM educational paradigm builds on a collaborative teamwork philosophy that is supported by an advanced technology platform, promoting the development of strong skills in telecommunications and informatics. Course components are designed to promote deep, active engaged learning in an authentic context. Didactic methods appropriate to the content area include case-based, problem-based, and project-oriented learning approaches. Inquiry-based learning builds self-directed learning skills and collaborative teamwork skills, promoting information exchange between students.

Executive Leadership Commitment and Advocacy

Organizations differ in the way leadership is established. Some are hierarchical; others tend to be flatter. Leadership is not only key to develop and to launch systemic change, but also a constraint of the change process. Shared decision making and shared responsibility that include the installation of task oriented expert working groups (distributed responsibilities) and frequent communication are components of critical importance in the successful systemic change process.

VFH is a consortium project with decentralized and distributed management. In the consortium, each university—represented by the president and rector—is responsible for the running and administration of the online academic programs at the campus location. Commitment is signified by a consortial contract, which demonstrates the desire of the universities to run programs at their sites with a guarantee for sustainability. The universities maintain the course material and share a small service bureau for technical and administrative support. Members of participating universities initiated the change and implementation process, and within this team, a shared vision was developed. To realize this vision, the VFH project was funded by a ministerial program with an initial budget of approximately $21 million. The project itself delivers required resources for the development and operation of the academic programs in the participating universities. At the end of 2003, the project will be complete, and the academic programs will be fully integrated into the universities within their existing organizations, responsibilities and hierarchy.

At ITESM, the system operates in a more hierarchical fashion that needed to move to a different leadership process. A special intervention occurred in 2002 to help more than 500 top-level administrators (rectors; deans; and division, department, and program chairs) examine their leadership style and make them aware of the advantages of transformative leadership in a systemic change process. The meetings created a space for the use of their shared experiences with the challenges in the systemic change process to engage in joint problem solving and intra-institutional collaboration with the underlying philosophy that everyone is a change agent: board members, rectors, administrators, faculty, and students. The time spent together revising change management strategies and analyzing the implementation challenges in collaborative working teams, using the group intelligence to brainstorm solutions and to share success stories of their campuses, increased their human

interconnection and increased system-wide collaboration and interdependence.

Professional Development in eLearning, Community Building, and Didactic Methods

At ITESM, the chancellor empowered the regional rectors to develop action plans for 10 years. A critical component of ITESM's change process has been to help faculty integrate online and face-to-face collaborative learning into their instructional practices. Teaching and learning go together. The ITESM system is aware of the radical and transformative change the educational model requires of the student. Thus, a program is in place to create awareness and to assist students to relate to the changing role of faculty, helping students actively construct their own knowledge.

Other constraints of the systemic change process are the human reactions to change. The affective components of change, such as the acceptance and fears of new technology and adjustment to new faculty and student roles, are of key importance in the management of change. A complex change process requires monitoring to assess progress and difficulties in the adoption of eLearning. Often, change participants are not immersed in an evaluation culture where assessment is performed to gauge progress and manage problems and difficulties.

Intended outputs of the change process to implement eLearning include educating students who become effective contributors to society and are qualified to enter the labor market, increasing in the understanding and knowledge of the organization, and developing ongoing collaborative relationships among organizations.

Limitations and Further Work

Change management in education is a complex matter, particularly with the adoption of eLearning. Tools and measures need to be developed through further analysis of these projects with other international projects.

CONCLUSIONS

The model represents the implementation of eLearning along with the interrelations of educational system components (Suchman, 1972) and the change process that is part of the journey to implement eLearning. As a tool to discuss the change process which supports the implementation of eLearning in an organization, the model enables institutions: (a) to assess their state of participation and preparation for eLearning, (b) to analyze the requirements for the implementation of eLearning programs, (c) to plan necessary activities for the change, (d) implement the program, and (e) execute the program with the highest level of sustainability.

As demonstrated through two large-scale eLearning implementation projects (Bischoff & Granow, 2002; Gonzalez & Resta, 2002) and the successful management of systemic change, factors essential to the effective implementation of eLearning include: (a) transformational leadership and advocacy from top-level administrators, (b) regular communication among all institutional stakeholders, (c) professional development programs to help faculty incorporate collaborative and technology-enabled learning into their teaching methods, (d) robust technology infrastructure capable of supporting new learner-centered educational methods, and (e) training students on eLearning.

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