

---

# A Model of Leadership in Integrating Educational Technology in Higher Education

---

**Mariya Markova**

*Governor State University*

[mmarkova@govst.edu](mailto:mmarkova@govst.edu)

## **Abstract**

The potential impacts and implications of technology on the professional lives of instructors in higher education, and the role of leadership in integrating educational technology, present a variety of complexities and challenges. The purpose of this paper is to identify the reasons why faculty members are not fully embracing technology and what leadership exists in those institutions to help instructors adapt to technology in the teaching and learning process. The authors examine instructor's perceptions and attitudes related to educational technology as it applies to the learning process and investigated the organization-wide view of leadership in the education institutions. The authors also developed a theoretical model for how leadership can be applied in the use of educational technology in higher education. The model contains five major blocks. In addition to the concerns of higher education faculty, this paper also considers the impact educational technologies have on instruction itself and why many faculty members view the technology as being too difficult to apply to existing technology infrastructure.

## **Introduction**

The way people study has changed throughout history because of technology. Instructors have faced a number of barriers when integrating technology into instruction in the learning process (Kopcha, 2012). Instructors need to develop competencies that will enable them to be successful in using technology. The introduction of technology is transforming the learning process, and that is resulting in the introduction of entirely new definitions for what a learning management environment can be (Earle, 2002).

Instructors need to be convinced of their institution's commitment to educational technology. They need support and guidance as they move through the various levels of understanding and concern regarding what teaching and learning using technology are, and its role and value in education (Al-Senaidi & Poirot, 2009). By utilizing the resources of the Internet and the power of computing capabilities, educational technologies have the potential of fundamentally changing every aspect of the educational process.

Instructors need to embrace educational technology such that they will fully develop its potential to improve learning outcomes (Easton, 2003). The advances in technology may prove to be among the greatest forces to influence the future of colleges and universities. The innovative use of educational technologies can lead to significantly better results on examinations, indicating improved learning outcomes, in addition to improvements in problem solving skills. According to Michael Bush and Jonathan Mott, for the most part educators have "used technology to automate the past instead of employing our best thinking and efforts to create a new future. Specifically, otherwise well-intentioned reformers have missed opportunities to create learning content and tools that are open, modular, and interoperable" (Bush & Mott, 2009, Introduction,

Para 2).

The uses and adoption of instructional technologies by instructors in the teaching process (Clements & Sarama, 2003; Courts & Tucker, 2012) in higher education has been the focus of numerous research studies, position papers, standards documents, and guidelines. Those studies document the relative effectiveness of online learning, educational quality, student needs, instructional support, instructional design strategies, costs and required teacher competency.

Major higher education institutions have a large and diverse faculty, consisting of a mix of individuals possessing a variety of personal attitudes, perceptions, abilities, strengths, and weaknesses. Educational technology and Learning Management System (LMS) environments will meet a wide range of reactions (Koper, 2006) and attitudes within the faculty. The result of sudden and significant change being imposed on the lives of so many diverse individuals could significantly increase the incidence of instructor overload, stress, fatigue, and burnout (Park, Wilson & Lee, 2004).

Leadership is crucial for success in any venture (Albright & Nworie, 2008). Over the next few decades, leadership of educational technology initiatives will drive significant transformations in the field of higher education. The administrators have the important function of overseeing the academic technology, and managing the education technology resources into which their institutions are heavily invested. Their leadership must continue to the realization of the potentials of technology in education (Nworie, 2009). According to Hope (1997), leadership is a necessary requirement for an organization's process and performance in higher education.

## **Overview/ Background**

In education teaching and learning using technology are central, while commitments to generating knowledge and serving various constituencies are essential (Albright & Nworie, 2008) for faculty and students. Technology is a significant factor in increasing productivity in the higher education industry. Effective use of technology could improve educational opportunities and quality.

In higher education, a significant transition is underway that is being driven by several institution-molding forces. Of the forces driving the transition, economy and technology were found to be the most powerful (Finkelstein & Schuster, 2008; Evans & Peel, 1999). Academic emphasis is starting to shift from a focus on course completion based on required attendance, to promoting and assessing student competency (Pope, Hare & Howard, 2002; ZhaoY, Cziko, 2001). Higher education faculty attitudes regarding the use of educational technologies are influenced by both the way and the rate at which technologies are adopted by higher education institutions (Anderson, Groulx & Maninger, 2011; Easton, 2003). Educational technology (which commonly referred to tools and theories for effective learning) delivers instruction using a computer network and the Internet. Educational technology emphasizes the processes of teaching and learning and the instructional contexts in which information is used (Lawless & Pellegrino, 2007). Educational technology is concerned with learning outcomes and it is a broad field that has the potential to touch virtually every element of teaching and learning at every education institution.

Assogbavi and Maurice (2005) identified that, the skepticism of instructors toward the use of technology has as much to do with their institution's traditions and culture as with their own attitudes toward education technology. The difficulties instructors face in using technology limits their ability to function effectively as both instructors and as designers of advanced instructional materials (Savery, 2005). For the individual instructor, technologies have the potential to fundamentally alter their working environments and the processes by which they

present course content, interact with learners, and assess their learners' progress toward meeting learning objectives (Koper, 2004).

The significant transformation through technology that is underway is resulting in the need for further faculty development plus improved technical training and support opportunities for all faculty members (Jugovich & Reeves, 2006). The promise of better teaching and learning through technology has many excited about the prospects for the future (Massey, 2001).

Educational technology has been developing quickly in the higher education marketplace. Every institution has its own traditions and culture that help its members to define who they are, how they should perform their jobs, and what they believe in as a group. Sound leadership is needed to positively influence the motivation of faculty to adopt educational technology. A critical factor affecting the technology adoption process is leadership (DeBlois, 2006; Krauth, 1998).

### **The Educational Technology and Instructional Design in the Learning Process**

In this paper, the term educational technology applies to any use of multimedia, computer technology, Internet and networked communications for improving instructions, and assessment in the learning and teaching process. Educational technology applies whether an activity is performed in an in-person, face-to-face classroom setting, between individuals occupying two or more remote locations, or the classroom presentation of broadcast television documentaries (Mandinach, 2005). It also applies to the conducting of instruction, via automated interactive computer simulations in virtual reality that combines the process of instruction with assessment. Educational technology refers to the use of communications media - hardware and software (Molenda, 2004) to help instructors to teach and the learners to learn. Technology can be beneficial in education and it can increase educational productivity, effectiveness and efficiency. Furthermore, studies identified the need to change the roles of faculty in higher education (Jugovich & Reeves, 2006).

Instructional design is defined in accordance with its use in the field of educational technology. It includes the design of a Learning Management System environment that provides learners with conditions that support the planned learning processes. As a result, its definition relates to the design of applications that utilize instructions developed around a variety of educational theories and communications technologies, in an effort to improve learning outcomes. Kanuka (2006) defined instructional design, as the process of translating general principles of learning and instruction into plans for instructional materials and learning activities. Historically, instructional design has its origin in the field of education where it refers to the application of educational theories during the planning, preparation, and presentation of course content to promote optimum learning outcomes. As the use of communications and computer technologies in education grew, instructional design started to take on a new meaning that was much more closely aligned with the fields of network and computer systems design.

New trends using technology are developing quickly in the global marketplace through innovations developed by instructional designers in the fields of education, educational technology, and industry. There are many areas where progress is being made toward realizing the promise, and the full potential, of educational technologies and instructional design. William Winn and Daniel Snyder (1996) advocated that (as cited in Koper, 2000), a distinction should not be made that separates development, execution and evaluation, such that there might be a better relationship between the classic instructional design approach and a modern technology enhanced approach. In addition, instructional technologies can be used to create a learning environment that can be both supplemented and adapted over time as needed. The resulting system definition then becomes more all-encompassing, than is the case in the more traditional instructional-design approaches (Koper, 2000).

The development of the types of course content and assessment materials that would significantly improve learning performance would involve a level of information technology and design expertise that far exceeds that possessed by all but a very small percentage of the instructors practicing in the field of higher education (Kanuka, 2006). It is also impractical at this time to expect that most practicing instructors would acquire the necessary level of information technology and design expertise (Jugovich & Reeves, 2006). For the time being, the actual use of educational technologies will continue to be limited to that which the instructors can create on their own or in collaboration with other resources that might be available to them. The field of higher education is undergoing a broad-based reconfiguration that involves among other significant changes, the widespread introduction of instructional technologies. Most higher education faculty members understand that it is important that they adopt technology, and are willing to learn more about how to apply it (Swan & Dixon, 2006) in the learning process.

### **Faculty and the Technological Integration in the Teaching and Learning Process**

Significant integration in the teaching process has already taken place, and there is every reason to believe that additional transformative changes will come in the very near future. In fact, it is likely that the educational environments of the future will become almost unrecognizable to today's practicing instructors. Full integration of educational technology in the teaching process would result in a significant impact on the professional lives, and instructional activities and objectives, of many of the instructors practicing in the field of higher education. In 2000, Tony Bates examined the deployment of technology in colleges and universities. Bates noted that strong leadership was a critical factor in the successful application of technology. Bates concluded that without leadership and support for change in higher education organizations, the barriers of inertia will be too great (Bates, 2000).

A significant transformation is underway that is affecting our society in ways that only time will reveal. Powerful economic and technologic forces are driving the transition among societal institutions, including those involved in higher education (Anderson & McGreal, 2012). Internal and external economic stressors are among the most critical of those forces acting upon institutions of higher education. The financial stressors are defined by increasing operating costs and decreasing state funding. There is a growing perception within society as a whole that technology should be integrated into all levels of education (Kopcha, 2012).

The first problem to be overcome toward the goal of integrating technology is to get many educators to embrace educational technology. The second goal is to enable educators to apply their knowledge, skills, insights, and initiative toward the development of new and innovative ways of applying emerging technologies. The transformation toward technologic integration is not complete, and faculty resistance is still present. The amount of technologically augmented courses offered should be limited to that which the existing technology infrastructure can support (Koper, 2000, 2004).

Higher education faculty are far more focused on being content or subject matter experts, than they are on being experts in the practice or theory of education. For example, a law professor should be a content expert in the discipline of law. However, the only introduction to teaching methods such a professor may have, could have been the result of that professor's own experiences gained while still a student. That professor's practices, beliefs, teaching styles and use of technology may all be the product of the professors own past experiences (Earle, 2002; Major & Palmer, 2006).

Faculty development programs are a key component of effectively managing the integration of technology in higher education (McGriff, 2001). Faculty development involves a commitment to developing competency in the use of various technology and instruction applications through an

ongoing process of professional training and retraining. Instructional designers can serve as change agents within faculty development programs (McGriff, 2001), through their interaction with faculty during the content development process.

The prevailing strategy for content development in higher education places a significant obligation and responsibility upon the individual instructor. To meet that obligation and responsibility, instructors must develop the technical skill sets needed for both navigating the technology interface, and learning how to make the most of its learning design features and capabilities (Belland, 2009).

The problems that the instructors have in realizing the theoretical potential of using technology are no longer defined by the level to which the technology has advanced (Swan & Dixon, 2006). Instead, the technology knowledge level of the instructors is limiting their ability to make practical use of existing technology. Instructors must also invest their own time in formal training or individual learning to acclimate themselves to the ever changing and advancing features and functions that present themselves with each system upgrade (Landry, Griffeth & Hartman, 2006).

### **Instructor's Perceptions and Attitudes Related to Technology**

In order to develop appropriate and effective faculty development programs for LMS platforms adoption in a classroom context, administrators and technology professionals must assess the factors that influence the adoption process (Landry, Griffeth & Hartman, 2006). The effective and efficient development of technology will require a few important changes. Some of the changes will involve a shifting of the way faculty and administrators think about innovation, institutional culture, instructional beliefs, academic values, plus institutional policies and procedures (Duderstadt, 1999/2000).

Many of the organizational changes that are required to facilitate efficient content development for optimum instructional efficiency and effectiveness threaten the traditional territorial boundaries that separated faculty from administration. Furthermore, as Finkelstein and Schuster (2008) point out, "IT weakens the role of the individual faculty member as "gatekeeper" of knowledge" (p. 333). The growing trend toward deployment and coerced implementation of educational technology is resulting in institutional administration and governance becoming increasingly "shrinking spheres of faculty work, responsibility and involvement" (Finkelstein & Schuster 2008, p. 325).

Faculty is only passively embracing technology for a variety of reasons, among which are their own lack of knowledge, lack of readily available training opportunities, and non-user-friendly interfaces. There are also indications that some resistance is arising out of the institution's academic culture (Bradshaw, 2002). However, there is not yet sufficient evidence to support the belief that academic culture is a major contributor to any resistance that is occurring with regard to educational technology integration (Albright & Nworie, 2008).

There is also insufficient basis to assert that the frustrations of faculty are arising out of poorly implemented faculty development and training programs (Anderson & McGreal, 2012). The gradual evolution in the use of technology to facilitate new strategies has not only influenced the classroom environment, but also the instructor's perceptions of it. Meanwhile, in the tradition-bound field of higher education, many instructors still believe that the preparation and presentation of subject matter is a central responsibly and function of the instructor.

It is likely that many instructors using different technology in their instructions would actively resist changes in educational practice that might relieve them of the professional responsibility

of being directly involved in the preparation and presentation of their own course content. Figure 1 shows various types of technology that are used in the learning process:

- TV, VCR (Low Tech)
- Audio-visual on digital media (High Tech)
- Computers and Internet (Information Tech)
- Virtual Reality Learning Environments (Automated Tech).

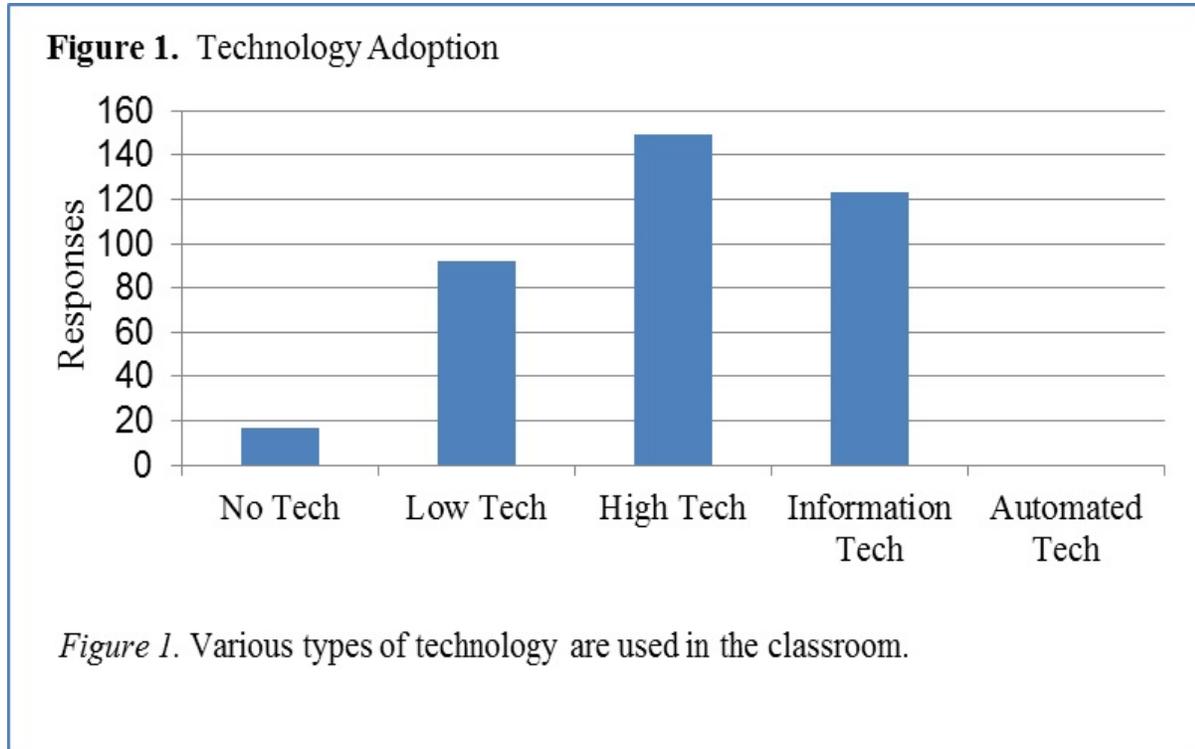


Figure 1. Various types of technology used in the learning process

Key to the most effective integration of technology is how the technology is introduced in the instruction and assessment process. Technological integration into instruction and assessment will require that all faculty members acquire a high degree of technological expertise. It is not feasible to expect faculty to learn the technical elements of technology. The faculty is faced with the dilemma of relinquishing most of their instructional and assessment discretion to those who would prepare the technologically integrated course content for their courses.

As the role of faculty in governance decreases, along with the availability of funding for research, the faculty is finding that their own role is being limited to instruction. The end result is that the forces (economic, market and technology) are now acting together on higher education institutions to reinforce “the unbundling of faculty work roles (teaching split off from research and service) and the differentiation of professional tasks” (Finkelstein & Schuster, 2008, p. 336). Research into higher education faculty attitudes regarding the use of technology, have found that the way and the rate at which technology are adopted by higher education institutions is influenced by the way faculty perceive it will affect them personally (Austin, Ahearn & English, 1997; Ertmer & Ottenbreit-Leftwich, 2010; Mueller, Wood, Willoughby, Ross & Specht, 2008).

### **Leadership in Higher Education Institutions**

Transformational leadership is a process that can be very easily adapted in any organization (Leithwood, 1992b). It arises when leaders are more concerned about gaining staff cooperation

and energetic participation than accomplishing particular tasks. Leaders in any field who undertake a process of transformation are committed to change, innovation, experimentation, and taking risks. They must have knowledge of the relationship between the culture of their institution and the established leadership structures that will challenge the process of transformation (Fullan, 2001). Leaders should be concerned about the effects that any institutional transformations produce on the relationship between the market and the institution.

In 1997, Bulach, Boothe, and Pickett interviewed 375 educators enrolled in graduate programs, and asked them to list and rank the types of mistakes their administrators made. They identified several major mistakes:

- Poor-human relationship skills
- Poor interpersonal communication skills
- A lack of vision
- Failure to lead
- Lack of knowledge about instruction/curriculum
- A control orientation
- Lack of ethics or character (Bulach, Boothe, 1997).

At this time, transformational leadership is very important to the field of education. The organizational culture and creativity produces challenging workplace assignments that require influential rather than positional power, encourages training and self-development, and rewards those who encourage leadership (Latchem and Hanna, 2002). Higher education institutions performance is closely tied to competent administration, effective supervision, and dynamic management (Mitchell, & Tucker, 1992).

Effective leadership in educational technologies could result in radical changes in educational theory (Wheatley, 1999) that could transform the concept of what the limits of a learning environment might be. Ultimately, one of the objectives in the development of the new educational technologies has been to facilitate the implementation of the new instructional strategies. Another objective of technology development activities is to improve upon the learning process and learning outcomes that were being achieved through the more traditional instructional approaches (Albright & Nworie, 2008; Jugovich & Reeves, 2006). However, despite the best implementation of technologies, many other factors will have a role in determining how quickly and effectively instructors will be able to adapt their existing instructions and methods to the educational technologies.

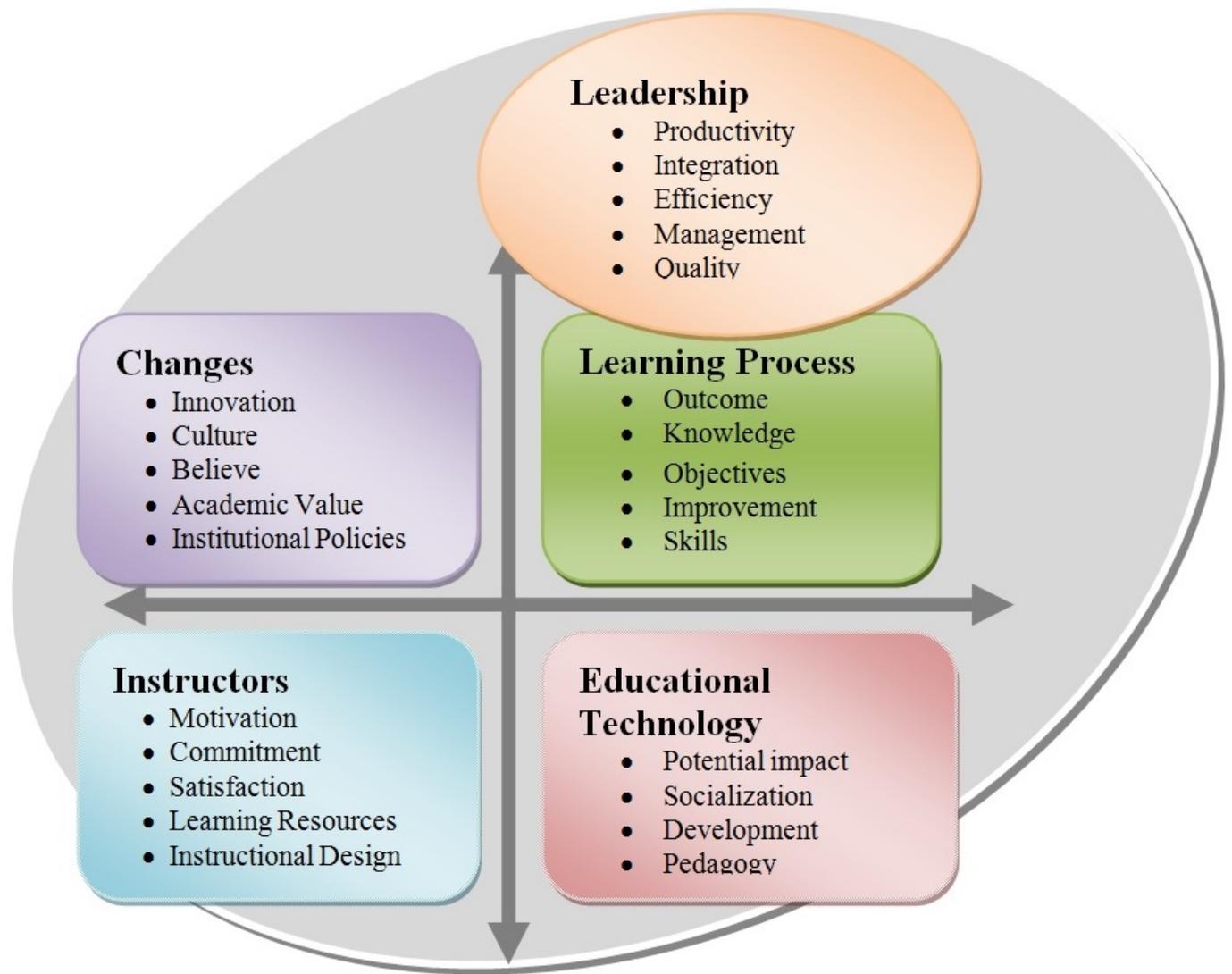


Figure 2. Model for leadership in the use of educational technology

A theoretical scenario of a model for leadership in technology in higher education was designed with five major blocks:

- Leadership,
- Changes,
- Learning process,
- Instructors and
- Educational Technology.

Leaders in effective organizations have a variety of characteristics that are identified as hope (unwarranted optimism), (Fullan, 2002) enthusiasm, productivity, integration and management. Knowledgeable and effective higher education leaders are extremely important in determining whether technology use will improve learning for all students. However, many higher education administrators may be uncomfortable providing leadership in technology areas. They may also be uncertain about implementing effective technology leadership strategies and principles for inspiring, motivating, and influencing others, in ways that will improve learning. Such principles can be applied in any organization to foster integrity, self-discipline (Maxwell, 2000), efficiency, quality and positive change.

The higher education leader's role is not to identify and promote any particular reform strategy, but to develop leadership. However, in order to increase the school's success and improvement efforts over time, technology leaders in higher education must communicate with the instructors, staff, parents, and community members. Organizational leaders should focus on establishing the right reform initiatives, developing collaboration, and establishing models for changing corporate leadership. Survival skills now require change (James, 1996) efficiency, energy, and the creation of new patterns. Leadership creates change, and the goal of leadership is to create a permanent capacity for change through organizational and collective leadership (Fullan, 2002).

Leadership is a relationship between a leader and the followers. A leader is a person who has the capacity to implement change and helps others to develop their capacity as well. Leaders support and guide others through the change process (Noonan, 2003). Few institutional leaders today would not acknowledge that technological innovation is perhaps the single most compelling factor that is driving them toward new organizational structures and new educational models.

## **Conclusion**

The new trend of using technology in higher education significantly affects instructors both in the classroom through the introduction of more advanced technologies, and in distance learning through a redefinition of the role and function of instructors. At the leading edge of these changes will be the technologically based teaching tools that are being developed to facilitate both the preparation of instructional materials and the process of instruction and assessment. The model presented provides a framework for leadership in the use of technology for teaching that is integrated with pedagogically based teaching strategies. Leadership models provide strategies to help with the implementation of educational technology. Leaders must support instructors through the necessary changes in the learning process. There is no right or wrong model for leadership in instructional technology. The only way that leadership will be effective in the field of instructional design for higher education, is to create a capacity for change. In addition, effective leadership in the integration of educational technology still does not exist.

---

## **References**

- Albright, M. J., & Nworie, J. (2008). Rethinking academic technology leadership in an era of change. *Educause Quarterly*, 31(1), 14-23.
- Al-Senaidi, S., Lin, L., & Poirot, J. (2009). Barriers to adopting technology for teaching and learning in Oman. *Computers & Education*, 53(3), 575–590.
- Anderson, T., & McGreal, R. (2012). Disruptive pedagogies and technologies in universities. *Educational Technology & Society*, 15 (4), 380–389.
- Anderson, S., Groulx, J., & Maninger, R. (2011). Relationship among preservice teachers' technology-related abilities, beliefs, and intentions to use technology in their future classroom, *Journal of Educational Computing Research*, 45(3).
- Assogbavi, T., & Maurice, G. (2005). Addressing a missing link in higher education on-line content development: Toward a tripartite collaborative model. *Journal of College Teaching & Learning*, Volume 2, Number 9.
- Austin, M., Ahearn, F., & English, R. (1997). Guiding organizational change. *New Direction for Higher Education*, 98, 31-57.

Bates, T. (2000). *Managing Technological Change: Strategies for College and University Leaders*. San Francisco, CA: Jossey-Bass.

Belland, B. R. (2009). Using the theory of habitus to move beyond the study of barriers to technology integration, *Computers & Education*, 52(2), 353–364.

Bradshaw, L. K. (2002). Technology for teaching and learning: strategies for staff development and follow-up support, *Journal of Technology and Teacher Education*, 10(1), 131–150.

Bush, M., & Mott, J. D. (2009). The transformation of learning with technology: Learner centrality, content and tool malleability, and network effects. *Educational Technology*, 49(2), 3-20.

Bulach, C. Boothe, D., & Pickett, W. (1997). Mistakes educational leaders make. 10 pages. ED, 404 737

Clements, D., & Sarama, J. (2003). Strip mining for gold: Research and policy in educational technology-A response to “fool's gold.” *Educational Technology Review*, 11(1), 7–69

Courts, B., & Tucker, J. (2012). Using technology to create a dynamic classroom experience. *Journal of College Teaching & Learning*, 9(2), 121-128.

DeBlois, P. (2006). Leadership in instructional technology and design: An interview, *EDUCAUSE Quarterly*, vol. 28, N 4, pp. 12–17.

Duderstadt, J. J. (1999/2000). New roles for the 21st century university. *Issues in Science and Technology*, 16 (2), 37-44.

Easton, S. (2003). Clarifying the instructor’s role in online distance learning. *Communication Education*, 52 (2), pp. 87–105.

Earle, R. S. (2002). The integration of instructional technology into public education: promises and challenges. *Educational Technology*, 42(1), 5–13.

Ertmer, P., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: how knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284.

Evans, M., & Peel, M. (1999). Factors and problems in school and university transition. Cited in *Transition from Secondary to Tertiary Performance Study*, DETYA Report No. 36, 6-8.

Finkelstein, M., & Schuster, J. (2008). *The American Faculty: The restructuring of academic work*. Baltimore, Maryland: The Jones Hopkins University Press.

Fullan, M. (2001). *Leading in a culture of change*. San Francisco, CA: Jossey-Bass.

Fullan, M. (2002). Leadership and sustainability. *Principal Leadership*, 3(4), 14–17.

Hope, C. (1997). Why technology has not realized its potential in schools: A perspective. *American Secondary Education*, 25, 2-9.

Jugovich, S., & Reeves, B. (2006). IT and educational technology: What's pedagogy got to do with IT? How IT staff can have an increasing role in teaching faculty about the pedagogy of technology. *EDUCAUSE Quarterly*, 29 (4) pp. 58-60.

Kanuka, H. (2006). Instructional design and eLearning: A discussion of pedagogical content knowledge as a missing construct. *The e-Journal of Instructional Science and Technology*, 9(2).

Koper, R. (2000). From change to renewal: Educational technology foundations of electronic learning environments. *Educational Technology Foundations*. Retrieved from <http://hdl.handle.net/1820/38>

Koper, R. (2004). Use of the semantic Web to solve some basic problems in education increase flexible, distributed lifelong learning, decrease teacher's workload. *Journal of Interactive Media in Education*, (6).

Koper, R. (2006). Current research in learning design. *Educational Technology & Society*, 9 (1), 13-22.

Kopcha, J. T. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development, *Computers & Education*, 59(4), 1109–1121.

Latchem, C., & Hanna, D. E. (2002). Leadership for open and flexible learning. *Open Learning*, vol. 17, no. 3, p. 5.

Landry, B., Griffeth, R., & Hartman, S. (2006). Measuring student perceptions of Blackboard using the technology acceptance mode, *Decision Sciences Journal of Innovative Education* Volume 4 Number 1.

Lawless, K. A., & Pellegrino, J. W. (2007). Professional development in integrating technology into teaching and learning: knowns, unknowns, and ways to pursue better questions and answers. *Review of Educational Research*, 77(4), 575–614.

Leithwood, K.A. (1992b). The move toward transformational leadership. *Educational Leadership*, 49(5), 8-12.

Major, C., & Palmer, B. (2006). Reshaping teaching and learning: The Transformation of Faculty Pedagogical Content Knowledge. *Higher Education*, 51, 619-647.)

Mandinach, E. (2005). The development of effective evaluation methods for e-learning: a concept paper and action plan. *Teachers College Record*, 107 (8), 1814-35.

Massey, W. E. (Ed.). (2001). Uncertainties in the changing academic profession. In S. R. Graubard. *The American Academic Profession*, (p.67-94). New Brunswick, NJ: Transaction Publishers.

Maxwell, J. C. (2000). *Developing the leader within you*. Nashville, TN: Thomas Nelson.

Mitchell, D. E., & Tucker, S. (1992). Leadership as a way of thinking. *Educational Leadership*, 49(5), 30–35.

McGriff, S. (2001). Leadership in higher education: Instructional designers in faculty development programs. Retrieved March 13, 2006 from <http://bookstoread.com/framework/>

Molenda, M. (2004). Issues and trends in instructional technology: Bad economy slows technology investment. In M. Orey, M. A. Fitzgerald & R. M. Branch (Eds.), *Educational media and technology yearbook 2004* (Vol. 29). Englewood, CO: Libraries Unlimited.

Mueller, J., Wood, E., Willoughby, T., Ross, C., & Specht, J. (2008). Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration. *Computers & Education*, 51(4), 1523–1537.

Noonan, S. J. (2003). *The elements of leadership*. Metuchen, NJ: Scarecrow Press.

Nworie, J. (2009). Managing the growing complexity of administration of academic technology in higher education, *AACE Journal*, 17 (1), 23-44.

Park, K., Wilson, M., & Lee, M. (2004). Effects of social support at work on depression and organizational productivity. *Am J Health Behav*, 28(5), 444 -55.

Pope, M. Hare, D., & Howard, E. (2002). Technology integration: closing the gap between what preserve teachers are taught to do and what they can do. *J Technol Teach Educ* 10(2):191–203.

Savery, J. (2005). BE VOCAL: Characteristics of successful online instructors. *Journal of Interactive Online Learning*, Volume 4, Number 2, pp. 141 to 152.

Swan, K., & Dixon, J. (2006). The effects of mentor-supported technology professional development on middle school mathematics teachers' attitudes and practice. *Contemporary Issues in Technology and Teacher Education*, 6(1).

James, J. (1996). *Thinking in the future tense: Leadership skills for a new age*. New York, NY: Simon & Schuster.

Zhao, Y., Cziko, G. (2001). Teacher adoption of technology: a perceptual control-theory perspective. *Technol Teach Educ* 9(1):5–30.

Wheatley, M. (1999). *Leadership and the new science: Discovering order in a chaotic world*. San Francisco, CA: Berrett-Koehler.