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Lifelong Learning for Information Systems Professionals

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A quarter century ago, Toffler (1970) speculated that the rate at which changes took place was increasing at an ever-faster pace. He surmised that this was creating a more complex environment with greater uncertainty for individuals and organizations. Since his prediction, the business world has surely experienced immense changes that have seemed to occur with increasing frequency. Product life cycles have been drastically shortened in many industries. Globalization of the marketplace has taken place in a very short time span. Fluctuating prices for raw materials and energy, currency volatility, industry deregulation, and a host of other transformations have all contributed to an increasingly complex competitive environment. These changes have had a major impact on the practice of information systems and on the careers of professionals. We will argue in this paper that the changes necessitate a complete reengineering of information systems curricula and teaching methods.

The Value of IS Education

We who teach and practice in the information systems discipline have often had difficulty explaining to others exactly what we do, but one term we often apply to ourselves is "change agent". Each new or revised program, each new system or enhancement to an old system, every new database design or business process redesign involves changes in the ways that people perform their work. We design and implement the changes made possible by information technology (IT), and we manage the process of change. A significant portion of our research has been devoted to the study of such topics as requirements definition, user interface design, prototyping, user training, and implementation issues, all of which could be said to be aspects of change management.

Since so much of our training and research involves these transitions from old to new ways of doing things, it might be logical to expect that information systems academicians would be experts at adapting their teaching to the needs of their students. It might be concluded that we would have devised methods for keeping our curricula up-to-date and flexible so that course content could be changed to mirror the changes taking place in the organizational world. Unfortunately, this would be an erroneous conclusion. As the organizational changes, driven by rapid and accelerating improvements in information technologies, occur at a faster and faster pace, we must find more effective ways to adapt our courses and our teaching methods accordingly.

It must be recognized that it is not possible to teach students all they need to know for a successful career within the confines of a four-year bachelors degree program or a two-year masters. We have long proclaimed our belief in lifelong learning, but we have not adapted our curricula to that belief. Curricula need to be developed with a model of change as its underpinning. Certainly there is a basic body of knowledge that needs to be taught, but we must be more selective than we have in the past in defining what to include. We should concentrate on trying to give students a thorough understanding of the basic concepts and skills, particularly skills of analysis and communication and those technical skills that will help them to have a productive long range career. The curriculum should be flexible enough to allow for interactive and experiential teaching methods, which take more time than straight lecture but are widely acknowledged to improve student understanding and retention. It must also be open to and garner the relevant ideas from disciplines outside the boundaries of business, particularly information science and computer science. Finally, it must be adaptable to the new terms, concepts, and facts that are constantly being added to what an educated information systems professional needs to know.

The widespread acceptance and use of IT in organizations has had effects on leadership and decision making, planning, interorganizational systems, supervision, and the basic structure of the organization.

Corporate decision making can be more dispersed, yet top management can retain greater control. For example, decisions can be made by managers in the field, providing greater customer responsiveness, with the impacts of those decisions closely monitored by headquarters executives. Rather than providing a choice between centralization and decentralization, modern telecommunications systems can allow firms to take advantage of both without the disadvantages of either (Cash, et. al., 1992).

Decisions can be made by managers in the field, providing greater customer responsiveness, with the impacts of those decisions closely monitored by headquarters executives. Widely dispersed employees can collaborate on decisions and on task performance without face to face meetings.

Planning has been affected in a negative sense; the more rapid pace of change enabled by IT, such as shorter product life cycles, has increased uncertainty about the future and has made planning much more difficult (Mintzberg, 1994). Planning is necessarily more incremental (Quinn, 1980), more based on contingencies than on actions to be taken at specific times. When an organization does take an action, the consequences are less predictable. Close monitoring of the business environment has become increasingly necessary.

The rapid proliferation of electronic data interchange (EDI) and other interorganizational systems has contributed to higher efficiency but also to increased social and technical complexity and to security concerns.

New methods of supervision are needed to take advantage of alternative work styles. Teleworking (Huws, Korte, and Robinson, 1990), for example, is increasingly seen as a means to higher productivity and better customer service. Wireless technologies may, in the near future, lead to rapid growth in the numbers of workers who spend most of their working hours out of their offices (Imielinski and Badrinath, 1994). To effectively manage such alternatives, definitions of supervision must change.

The organizational structure must be fluid enough to adapt itself to changing conditions (Burns and Stalker, 1961). Handy (1989) speaks of the "shamrock organization", consisting of a central core of professional workers and managers, a group of "outsourced" workers, and a temporary or part-time work force. This enables firms to quickly expand customer services on demand, or to contract them as demand slows. Other structures are emerging, some so flexible that the word "structure" seems inappropriate.

IT has been both the enabler which makes it possible for industrial firms to cope with the changes and the driving force which makes the changes possible in the first place (Senn, 1993). The changes that are the result of IT implementation must be addressed in the education of the information systems professionals who must help to manage them.

Implications for IS Educators

What do all these changes in the business environment mean for the education of future information systems professionals? What do they signify for our curricula and teaching methods? First, a radical transformation is called for, a complete rethinking of teaching objectives and course content. We must initiate a major business process reengineering effort on our own processes (Diamond and Fletcher, 1993). We face several difficult dilemmas: an increasingly heterogeneous population of students entering the system, some with excellent preparation and others very deficient in the most basic skills; an increasingly heterogeneous job market, with many of the activities which used to be performed by professional systems analysts and programmers being dispersed to users; technology which becomes obsolete at an accelerating rate, and the rapid obsolescence of the technology used for teaching. Educators do not have enough time to learn about the major developments cited above and our research methods are too slow to capture meaningful insights about them.

Second, we must find ways to work more closely with business professionals so that we might be aware of technology advances and the consequences of IT on organizational behaviors. Such interactions must flow in both directions. Business professionals must be present in our classrooms, as guest lecturers or in other educational relationships with students. Conversely, academicians must be present in business organizations, either directly as consultants or vicariously as professors of student interns.

Third, we must keep in mind our students' long-term interests, particularly in the area of specific technical skills. Skill development is increasingly important, but the "life cycles" of specific skills are becoming shorter just as product life cycles are. It may be of value to

a student to learn to use a software package such as Paradox or Lotus 1-2-3 or Harvard Graphics. Such packages can be taught in a class in a computer laboratory. Software evolves so rapidly, however, that this knowledge may be largely obsolete by the time the student graduates. From a career perspective, a skill that seems much more valuable is to be able to take a shrink-wrapped package, such as Paradox or Lotus 1-2-3 or Harvard Graphics, and learn to use it on one's own, with the aid of the manual and the package's own "help" system. Such an exercise develops self-reliance and self-confidence; the skill will be useful for many years and on many occasions, and it is generalizable to most other software packages, not just to the specific one used in the exercise.

Fourth, we must keep in mind the needs of potential employers of the future as we design our information systems curricula. What facts, concepts, and skills are students likely to need to pursue successful and challenging careers? By identifying and prioritizing the primary functional responsibilities of information professionals, a faculty can develop a curriculum that will meet the immediate needs of its graduates and their prospective employers, as well as provide a strong foundation for lifelong development. We suggest a functional approach rather than a focus on current environments, which are much more fluid. The functions are relatively stable over time, and changes in technology can be easily incorporated. Skills in organization of information, information retrieval, and systems design and evaluation might be considered core areas on which to build. The emphasis should be on developing students' capabilities in defining problem situations, identifying the information needed for analysis of alternatives, retrieving and analyzing the desired information, and developing clear and cogent recommendations.

Finally, we must instill an awareness in our students of the continuous nature of these changes, and the need for a continuous learning orientation, both before and after graduation. In short, they must learn how to learn on their own, to take responsibility for their own education. Cross (1981) quotes this definition originally formulated by the General Conference of UNESCO in 1976: "Lifelong education and learning denotes an overall scheme aimed both at restructuring the existing education system and at developing the entire educational potential outside the education system; in such a scheme men and women are the agents of their own education." (p. xxiii). She points out that the definition implies a complete restructuring of the entire formal education system, from kindergarten through graduate school. Schools and universities must redefine their mission and assign themselves a narrower role. If education is to be lifelong, the university portion may be a major component, but it should be designed to fit into the larger whole and to take into account opportunities for learning from people, organizations, and other resources outside the formal school environment.

If students are to become effective at lifelong learning, they must be convinced of the necessity for this and aware of its importance to their future. Many students are accustomed to a very structured educational environment, with the instructor giving them very specific instructions for everything they do in the class. In a class with less structure and in which they are asked to take more responsibility, some will be uncomfortable, particularly those with no prior business experience. They may feel that the professor is shirking his or her teaching function. It may be necessary to point out that their future

jobs will be quite unstructured; it is rare for a college graduate to be given specific instructions at the start of every day's work. The lifelong learning approach must permeate the entire school; it will not work well unless the entire faculty accepts it enthusiastically and the students are motivated to work at it diligently.

Research on motivation suggests that for students to be motivated to learn, two underlying conditions must exist: (1) they must value or need what is to be learned and (2) they must believe they are capable of learning it. Keller (1987) has identified four motivational dimensions that can have an impact on these conditions: gaining and maintaining the student's attention; providing relevance for learning; building, increasing, and/or reinforcing student confidence, and promoting learning satisfaction. Each dimension encompasses a range of instructional strategies that can be incorporated into a single class session or an entire course. As we think about the content and delivery methods of our instruction, we might also consider each of these dimensions that address the affective side of information systems education.

Conclusions

In this paper, we have discussed the increasing complexity and uncertainty in the working environment, and the necessity for information systems professionals, and others as well, to view education as a lifelong process. Each professional must take responsibility for his or her own education planning. The role of the university is to provide the basic knowledge and skills required for students to "learn how to learn". We have long talked about our commitment to lifelong learning, but we have not taken the necessary steps to implement it. We must restructure our curricula to emphasize the development of student self-reliance and confidence, the ability to define and analyze problems and alternative solutions, and to locate and retrieve information needed for problem solving.

References

Burns, T., and Stalker, B. M. (1961). *The Management of Innovation.* London: Tavistock Publications.

Cash, J. I., McFarlan, F. W., and McKenney, J. L. (1992). *Corporate Information Systems Management: The Issues Facing Senior Executives* . Third edition. Homewood, IL: Irwin.

Cross, K. P. (1981). *Adults as Learners: Increasing Participation and Facilitating Learning*. San Francisco: Jossey-Bass.

Diamond, L., and Fletcher, P. T. (1993) "Something to Hang Your Hat On: The Information-based Organization as an Integrating Concept in an Undergraduate IS Curriculum", in *Proceedings of the International Academy for Information Management*, L. Smith, Ed., pp. 227-238.

Handy, C. (1989). *The Age of Unreason*. Cambridge, MA: Harvard Business School Press.

Huws, U., Korte, W. B., and Robinson, S. (1990). *Telework: Towards the Elusive Office*. New York: Wiley & Sons.

Imielinski, T., and Badrinath, B. R. (1994). "Mobile Wireless Computing", *Communications of the ACM*, 37(10), 18-28.

Keller, J. M. (1987). "Strategies for Stimulating the Motivation to Learn, *Performance & Instruction*, 26(8), 1-7.

Mintzberg, H. (1994). *The Rise and Fall of Strategic Planning* . New York: The Free Press.

Quinn, J. B. (1980). *Strategies for Change: Logical Incrementalism* . Homewood, IL: Irwin.

Toffler, A. (1970). *Future Shock.* New York: Random House.