Emerging Technologies, Pedagogy, and Management Education in the 21st Century

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Paper prepared for the conference
"Re-organizing Knowledge, Transforming Institutions"
University of Massachusetts, Amherst, September 17-19, 1999.

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During the last decade management educators have experienced a dramatic increase in invitations to attend workshops and sessions (some online) pertaining to various educational applications of emerging technologies, particularly the Internet. The spate and volume of these and other instructional development sessions for computer-assisted learning are noteworthy; it would appear from the widespread availability of these offerings that emerging information and communication technologies are being increasingly viewed as important threads in the fabric of management education. Perhaps one of Porter and McKibbin's (1988) recommendations for immediate improvement in business schools, that an information orientation permeates the entire curriculum, is finally beginning to come to fruition. More recently, Porter (1997, p. 5) has noted "the increasing attention business schools are giving to information technologies, both in the curriculum itself and in methods of curricular delivery."

Fortune estimates that the online student body (across all educational levels and disciplines), now about 750,000 worldwide, to double by the year 2004 (Fisher, 1999). Business schools lead this trend, offering degrees over the Net in the undergraduate, graduate, executive, and doctorate levels. Technology drives the developing diversity among business schools which are more "willing to venture out and try some innovations, even if no one else follows immediately" (Porter, 1997, p. 3). Just consider the variety of distance learning MBA programs: The minimum residence requirement ranges from none at Colorado State to nine weeks to graduate from Syracuse; and the minimum cost for a distance MBA ranges from $17,000 at some public universities to $85,000 for Duke's global executive program (Murphy, 1999). Apart from distance learning, huge investments are being made in technology-intensive arrangements

(hardware, software, wiring, training, and support systems) within management schools. More and more programs require entering MBA students to purchase laptop computers for use in class sessions and team meetings - students increasingly communicate in networks within the classroom/school (i.e., Intranet) and through the Internet. School related student services such as course registration, career counseling, and placement are increasingly online. Faculty are being asked to take advantage of the new information capabilities; to adjust and innovate in their regular teaching activities so as to utilize the opportunities presented by instructing students who are technically savvy in accessing and manipulating complex data. According to the recently published report of Pearce (1999), 263 members of the Management Education and Development Division of the Academy of Management ranked technology as the most important factor for improving business education. More specifically, faculty members ranked the proposal "Increase the availability of technology that directly supports instruction" as the most effective among 27 ideas for improving instruction at their university (see Appendix A for a complete listing of the 27 ideas and mean scores).

Yet, in contrast to the appearances and indications listed above, in our experience management instructors, particularly in the organizational and behavioral disciplines, are generally reluctant to complement their teaching with these emerging technologies. Only a few of our faculty colleagues have actually attended an instructional development session to implement computer-assisted teaching (the ones who have tend to be newly hired junior professors). Although we, like many of our faculty colleagues, now use e-mail to communicate with students, rarely do we go beyond its information dissemination function. While some of us have dabbled in creating on-line learning communities through the use of course-related bulletin boards and chat systems, more often the large amounts of our time and energy consumed by

these activities have been prohibitively expensive. And far from problem-based or issue-focussed computer simulations, far from multinational electronic student project partnerships, far from the paperless classroom, and far from real-time co-teaching with a team of other professionals across the planet, our everyday teaching activities continue to be grounded in time-tested methods constructed on the foundations of disciplinary knowledge and boundaries. In other words, the majority of us continue to admire from a distance, the occasional faculty member who is heavily invested in creatively harnessing the teaching applications of emerging information technologies.

The information technology skills and expectations of entering university students often exceed those of their professors (Pearce, 1999) and the requisite technological infrastructure of organizations often exceeds the current state of many business schools (Wheeler, 1998). As Wheeler (1998, p. 21) writes, "While many universities can boast of state-of-the-art wiring on their campuses, most business schools have not yet leveraged the full potential of these investments to improve learning." Let us give you an example that is close to home. Our university, Case Western Reserve, among pretty stiff competition, was recently declared by Yahoo as Number 1 in the 100 most wired colleges in the world. Yet, although many of our school's faculty members often use basic technologies such as e-mail and Power Point to assist their teaching, to the best of our knowledge, only one faculty member, who is in the MIS department, teaches a course which routinely employs more complex technologies (e.g., classroom videoconferencing, networked stations, asynchronous communication, groupware, etc.). Students in this course assemble in classrooms in Cleveland and Budapest.

Having painted this image of contrasting realities in management education -- fast-growing technological change at the macro and institutional levels on the one hand, and, on the

other hand, slow adoption and minimal integration of emerging technologies into everyday teaching activities by the bulk of individual faculty members -- in the rest of this paper, we address three important issues. First, in what ways can management pedagogy take advantage of the new technologies? Second, what are the pedagogical challenges and issues facing us, which if resolved, would hasten the innovative use of technology in management education? Third, what would such a transformation in management education programs and institutions look like?

Technologically Savvy Management Pedagogy

Let us start by addressing the links between the emerging technologies and the nature of knowledge. As a profession, management educators work in the creation and dissemination of knowledge. Our challenge as a profession is to ensure that our teaching methods and practices most advantageously capitalize on changes in the fundamental dimensions of knowledge engendered by the advent of the information age, so that are students are most effectively prepared to lead and manage for the new business realities. We are already extensively familiar with the radical shifts occurring in the nature of knowledge, so we will only briefly highlight these here. The sheer *amount* of knowledge and information, its ease of availability, and speed of access are unprecedented, making digitalized information technology comparable in its revolutionary scope with the invention of the printing press. But as Dale Spender (1994) notes, while the printing press democratized readership, today's information technologies enable individuals to become authors, film makers, editors, publishers, and distributors, instead of mere readers. Unlike previous knowledge bases, digitalized information offers ease in data reorganization and manipulation to answer questions different from those for which the data were originally assembled (Floridi, 1995). We are increasingly capable of creating, transmitting

and extracting a range of information in a variety of formats: diverse disciplines and subjects may be accessed as text, records, numbers, symbols, images, graphics, animation, and sounds. As Floridi (1995) observes, even the ways we think are being affected: relational and associative reasoning may become as important as linear and inferential analysis, while visual thinking becomes at least as vital as symbolic processing. The skill of remembering vast amounts of facts, formulae, and structures is increasingly being replaced by the capacity for retrieving information and discerning meaningful patterns in masses of data. An added complexity is that for the first time in the history of thought, knowledge is not a scarce commodity anymore; instead, we are faced with too much knowledge, the so called infoglut. The time is fast coming when knowledge outputs (e.g., information retrieval, management, and application) are more important than knowledge inputs (e.g., storage and access).

So, what does this mean for management instructors? Most notably, the changing nature of knowledge calls upon us to shift how we conceptualize our pedagogy. Instead of teaching as telling, knowledge as facts, and learning as recall, we are being called upon to view teaching as enabling, knowledge as understanding, and learning as the active construction of subject matter (Cohen, 1989; Elmore, 1991). The following six shifts in management pedagogy deserve special attention.

Shift 1: From teaching to learning.

Alterations in fundamental knowledge creation and dissemination processes encourage educators to abandon the "performance-based" pedagogies characteristic of the modern (industrial) age, and to adopt more of a "learning-based" pedagogy relevant to the information age (Bilimoria, 1995; Bilimoria & Wheeler, 1995). The current structure and curricula of most business schools have many similarities to industrial-age management practices and emphasize

lectures and passive styles of learning. Rather, in knowledge-age universities individuals and teams should be able to quickly construct new knowledge (Bilimoria, 1995; Wheeler, 1998). Tapscott (1999, p. 9) calls this trend "a shift from instruction to construction and discovery", where teaching and learning rely less on assimilative knowledge and more on action learning (Cameron, 1999). This learning is critical and more voluntary (Delbecq, 1999) and involves questioning the underlying norms and assumptions governing existing structures and patterns (Argyris, 1977; Thoman, 1999).

Shift 2: From learning things to learning how to learn

In reconceptualizing management education in the light of the new knowledge realities, we are being called on to create educational methods and systems that develop meta-levels of awareness, understanding, and knowledge, such that students are capable of what Drucker (1993) had termed "applying knowledge to knowledge", Banathy (1987) has referred to as "gaining awareness of awareness" and what Kolb (1984) has called "learning to learn". Our pedagogical challenge, as Payette (1993, p. 452) notes, "is to teach how to learn to manage" rather than to teach things about management.

Ives and Jarvenpaa (1996, p. 35) write that "rather than providing education to students in advance -- 'just-in-case' they need it -- schools will give them the skills to achieve education 'just- in-time' to apply to the task at hand." Suitable to the new parameters of knowledge, management educators are being challenged to shift from a practice where, as Banathy (1987: 137) puts it, "the learner is placed in subject-matter and disciplinary boxes and is taught in an analytical and reductionist mode" to a mode where the learner learns to "think systemically, to seek to uncover and understand relationships, grasp the patterns that connect, and recognize the embeddedness of systems and their interdependence". We are being called upon to visualize the

task of students as striving to make connections among seemingly unrelated pieces of information, and to integrate and synthesize disparate perspectives (Kolb, 1984; Frand & Broesamle, 1996). For example, approaches that address the constancy of change, focus on deep understanding of complexities, ambiguities, and unintended consequences, apply context-sensitive conceptual materials to experientially address management situations, and develop skills of critical thinking (including the questioning of assumptions and existing power relationships), creative thinking, adaptiveness and flexibility, relational thinking, synthesis (integrative thinking), systems thinking, pattern recognition, and self-directed continuous learning are means of engendering deeper and more relevant learning, compatible with the new knowledge realities facing managers today.

Shift 3: From certification to demonstration of competence and skills.

With the shift from teacher-centered to learner-centered education students will gradually take greater control of the curriculum and what they learn (Ives & Jarvenpaa, 1996). Education will become more personalized making it possible for what Papert (1996,p. 16) has called "the dream of every progressive educator to come true: In the learning environment of the future every learner will be 'special'." Tapscott (1999, p. 10) writes that "learner-centered education begins with an evaluation of abilities, learning styles, social contexts, and other important factors that affect the student". The competency-based MBA program at the Weatherhead School of Management at Case Western Reserve University is an example of such a self-directed learning process in professional education (see Boyatzis, Cowen, & Kolb, 1995). This pedagogy is more finely attuned with the trends of the knowledge-age where certification is increasingly being pushed aside by demonstrated competence and skills (Wheeler, 1998; Ives & Jarvenpaa, 1996).

Shift 4: From disseminators to guides and mentors.

Learning is becoming a social activity that takes place in contexts of physical and virtual teams in and out of the classroom. The role of educators in learner-centered contexts remains crucial (Tapscott, 1999), but the new knowledge realities require educators to be facilitators or managers of the learning environment (see Boyatzis, Cowen & Kolb, 1995), shifting roles from that of disseminators of knowledge to coaches, mentors, and guides for students.

Shift 5: From time-limited to lifelong learning.

Learning is becoming a continuous lifelong process -- from babyboomers' efforts to enrich their knowledge base, to the current Net-generation who are entering lifelong learning from a very young age (Tapscott, 1999). Business schools are called now to build the skills and motivation of lifelong learning (Ives & Jarvenpaa, 1996; Wheeler, 1998), develop different educational programs for different age and professional groups (Boyatzis, Cowen, & Kolb, 1995), and perhaps create lifelong learning communities.

Shift 6: From linear to serendipitous learning.

Finally, another important shift in our pedagogy is what Tapscott (1999) calls "from linear to hypermedia learning". Whereas traditional pedagogical tools like books were textual and designed to lead the learner from one starting to one ending point, the emerging instructional technologies like the Web are visual, interactive, and have numerous entering and ending points. Student learning is becoming more unpredictable (for the instructor) and more serendipitous (for both the student and the instructor). Dewey wrote in Education & Experience: "Perhaps the greatest of all pedagogical fallacies is the notion that a person learns only the particular thing he is studying at that time. Collateral learning… may be and often is more important than the spelling lesson or lesson in geography or history that is learned" (cf. Tapscott, 1999, p. 8). Never before has pedagogy, especially professional education, come so close to exploring the

opportunities and implications of collateral and serendipitous learning. The first indications are positive -- faculty and students who have experienced technologically infused pedagogy in different disciplines are enthusiastic about it (Greco, 1999; Scherer, 1999; Boling & Robinson, 1999; Conyers et. al., 1999). In Tapscott's (1999 p. 11), words another major shift in our pedagogy is "from learning as torture to learning as fun."

With the above six pedagogical shifts in mind, let us now talk more concretely about the use of technology in management education. Writers in the area have suggested that there are four levels of employing computer technologies for educational purposes (Leidner & Jarvenpaa, 1995). Technology can be used (a) to automate, that is to efficiently deliver information (e.g., instructor consoles, distance learning through video transmission of lectures), (b) to informate upwards, that is to create mechanisms for students to give input and feedback to instructors including about their learning (e.g., e-mail between students and instructors, online examinations), (c) to informate downwards, that is to create mechanisms for meaningful discussion, decision making, and problem solving by students (e.g., classroom networks using Lotus Notes, anonymous groupware, virtual reality technology, object-oriented simulation, hypermedia), and (d) to transform the learning environment beyond the spatial and temporal boundaries of the classroom, that is to rethink the entire teaching/learning enterprise to transcend conventional limitations (e.g., asynchronous communication across distances, synchronous communication across distances, real time integration of web-based resources in class discussions where students and instructors need not be physically present). These four functions fall on a continuum of increasing complexity as well as an increasing degree of faculty commitment necessary to successfully implement such teaching/learning methods. Let us now

turn to the second question of the pedagogical challenges and issues surrounding technology-infused management education.

The Pedagogical Challenges and Issues

Although the world around us is rapidly moving toward increased usage of technology for the democratization of information and decision making, faculty members in management institutions seem somewhat more recalcitrant in adjusting their teaching protocols to leverage the opportunities for learning presented by the newer technologies. The institutional reasons for faculty inertia in the face of external changes are well known, and do not require extensive treatment in this commentary. Instead, let me focus on the curricular issues, pedagogical uncertainties, and instructional dilemmas that hamper an individual faculty member's adoption of emerging information technologies in his or her management classroom. Our attempt here is to highlight some of the key areas and questions that need to be thoughtfully addressed and systematically resolved for management educators to enthusiastically invest in using emerging information technologies to improve teaching/learning processes. These questions unveil some opportunities for the development of new pedagogies. We need to know the answers to questions and issues such as:

1. The impact of emerging technologies and computer-assisted methods on learning.

- How is computer-assisted learning different from/better than other types of learning?
- How does a particular technology-based method impact learning (e.g., multimedia - telecommunication, object oriented simulation, networked communication, virtual reality technology)?

- What does learning entail when information is easily retrievable, subjectively searchable, and open to multiple interpretations?
- How can knowledge creation and application using emerging technologies, in contrast to knowledge retention, be measured? Many authors have suggested that research on the impact of technology on learning should move beyond the grade point average as indicator of learning (Webster & Hackley, 1997). Should learning outcomes be measured by such pluralistic measures like skill development (Boyatzis, Cowen, & Kolb, 1995), student satisfaction (Boling & Robinson, 1999; Alavi, Yoo, & Vogel, 1999), involvement and participation, cognitive engagement, and technology self-efficacy (Webster & Hackley, 1997)?
- How can computer-assisted methods be best used in action learning projects?

2. The viability of computer-assisted methods in enhancing experiential management education.

- What are the best technologies to teach an essentially interpersonal and artful practice such as management?
- How can diagnosis and analytic skills, critical thinking skills, problem solving and action skills, as well as leadership and interpersonal skills be developed using computer-assisted methods (e.g., computer simulations, virtual reality spaces, CD ROM cases and multimedia scenarios, drill and practice exercises)?
- Which skills are more effectively developed using technology?
- How are the technology-infused pedagogies an improvement on face-to-face, discussion oriented, or iterative skill building teaching/learning practices?

- What exemplars and models do we have of innovative uses of technology to coach and mentor students?
- What is the role of technology in supporting action learning and other educational project work?

3. The creation of meaningful virtual learning communities and collaborative learning environments.

- Should we be aware of the possible consequences of not anticipating student and faculty sensemaking of the newly implemented technologically-driven pedagogies? (Griffith, 1999)
- What are the relative advantages and costs involved in the use of computer-mediated communications (e.g., newsgroups, list-servers, chat systems, virtual learning environments, and desktop audio and video conferencing) to enhance management education?
- How can a virtual learning community best be nurtured? How does group development occur in online settings? What happens to the notions of discourse, argument, and community? (Greco,1999; Tweney, 1999)
- How are class participation patterns changed through the use of computer-assisted methods?
- What benefits, other than simply additional opportunities for participation, are posed by computer discussion lists, bulletin boards, and chat systems?
- Are computer-mediated networks more conducive to collaborative knowledge creation and application than other types of face-to-face networks?

4. The content and delivery of the knowledge base of management.

- How should the management knowledge base be organized for communication to students?
- How can just-in-time learning, rather than just-in-case learning, be developed?

5. The role of instructors and students.

- How can instructors best facilitate learning in a computer-mediated environment?
- How should instructors design and prepare for class sessions in technologically sophisticated management education?
- What is the role of students and how should they be selected?
- Who should assess learning, and on what criteria?
- How should instructors use the emerging technologies to accommodate students individual differences in learning styles, preferences, and degree of self-discipline and self-efficacy?

The above questions remain largely unanswered since neither research nor faculty training in the new technologies have kept up with the implementation speed of technological innovations in pedagogy (Boling & Robinson, 1999). Contemporary doctoral education too, responsible for preparing the next generation of management educators, seems to be just about the same as it was 20 or 30 years ago (Porter, 1997), emphasizing disciplinary boundaries and traditional instructional pedagogies.

An Ongoing Conversation with Business-School Deans on Technology and Management Education in the 21st Century

In summary, academic pundits and the popular press have achieved a rare convergence on the notion that we stand on the threshold of a new era in which the creation and dissemination of information and knowledge will occur in remarkably new and different ways. To this point, pedagogy in management institutions has largely consisted of within-classroom, discipline-specific, instructor-driven, information dissemination. A variety of indications suggest that advances in technology have the potential to transform these routine pedagogical practices by extending the conventional spatial and temporal classroom boundaries, by introducing rapidly

retrievable, transdisciplinary, context-sensitive, just-in-time, and problem-focussed information, by emphasizing self-directed continuous learning, and by propelling to students control of knowledge creation and application. Today, management education stands at the threshold of realizing this potential. How distant will this learning be for us? What would management education, and our professional lives, look like if an information orientation permeated our teaching and learning activities?

For this we are currently conducting a series of interviews with 30 Deans who were randomly selected from the AACSB population of management schools. The sample of Deans was stratified to equally represent three categories of management schools -- Ph.D.-granting, AASCB accredited but non-Ph.D.-granting, and non-accredited schools. To whet your appetite about the research findings (which we will present at the conference in September) we attach in Appendix B our interview protocol.

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Appendix A

Table A

Faculty proposals to improve business education (Pearce, 1999, p. 107).

Rank	Proposal	Mean
1.	Increase the availability of technology that directly supports instruction.	2.13
2.	Provide prestigious and financially-augmented awards to faculty for superior instructional performance.	2.23
3.	Initiate post-tenure reviews of faculty.	2.41
4.	Alter curriculums to include a business work experience component.	2.42
5.	Increase school budgets to permit the continuous updating of instructional facilities, hardware, and software.	2.43
6.	Design a more skills-based curriculum.	2.62
7.	Require business experience as a corequisite to Ph.D. education for aspiring faculty.	2.63
8.	Require coursework on 'how to teach' in business-related Ph.D. programs.	2.64
9.	Increase the level of student mentoring activities by faculty.	2.66
10.	Require faculty to use some sabbatical time to gain meaningful business experience.	2.70
11.	Institute an overseas faculty exchange.	2.71
12.	Increase the international studies requirements for business majors.	2.83
13.	Sacrifice some current instructional attention to theory in favor of more attention to management practice.	2.86
14.	Institute an overseas internship program for students.	2.91
15.	Offer sufficiently generous early-retirement to motivate faculty past the age of 60 to participate.	3.05
16.	Increase the liberal arts requirement for business majors.	3.08
17.	Increase the grade-point-average admission requirements for business majors.	3.15
18.	Decrease the publication demands on faculty.	3.17
19.	Require testing on a nationwide basis to measure the business knowledge of graduating seniors.	3.28
20.	Raise salaries but sharply restrict faculty from pursuing supplemental income options during the academic year.	3.34
21.	Eliminate functional departments in our school.	3.35
22.	Decrease the instructional load on faculty to less than nine contact hours per week.	3.44
23.	Have faculty share power with business executives in making decisions on curriculum issues.	3.44
24.	Place faculty on 12-month contracts (with prorated adjustments in salaries).	3.60
25.	Greatly increase reliance on distance learning technologies.	3.76
26.	Eliminate tenure as a possibility for all future faculty hires.	3.78
27.	Fund AACSB to produce a quality ranking of scholarly and professional journals in the business education.	3.83

Notes: Reproduced from Pearce (1999, p. 107). He notes that faculty members indicated how effective each of the above ideas "would be in improving instruction at their college or university. Responses were recorded on five-point scales ranging from 1 indicating 'extremely effective' to 5 indicating 'not at all effective" (p. 107)

Appendix B

Interview Protocol

1. What opportunities do emerging technologies provide for innovations in pedagogy?

2. What new ways of teaching and learning can the emerging technologies serve?
   2a. How can emerging technologies be used to stimulate and develop the creativity of students and faculty?

3. What are some of the implications of emerging information technologies for the way knowledge is conceptualized and delivered?

4. What are the implications for disciplinary knowledge and boundaries?

5. What are the implications for University's traditional privilege in accessing, possessing, and using information?

6. What will be the mission of management education in the 21st century?
   6a. What will be the mission of your school?

7. What are the institutional challenges limiting the potential offered by emerging technologies?
   7a. How does your faculty respond to the rapidly changing technological arrangements?
   7b. How do you / should you cope with inertial forces?

8. How heavily do you depend on IT for delivering courses and other services?
   8a. What kind of IT problems do you encounter and how frequently?
   8b. How prepared are you to deal with IT problems?

9. Could you describe to me what would the day of a student look like in 2009?

10. What would the day of a faculty member look like in 2009?

11. If I come back to interview you in 2009, what will be some of the issues we will be talking about?

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September 19, 1999

Six Shifts Toward A Technologically Savvy Management Pedagogy

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1. From Teaching to Learning

2. From Learning Things to Learning How To Learn

3. From Certification to Demonstration of Competence and Skills

4. From Disseminators to Guides & Mentors

5. From Time-Limited to Life-Long Learning

6. From Linear to Serendipitous Learning

Interviews With 22 B-Schools Deans

22 Deans randomly selected from a
stratified population of AACSB schools

- **8 Deans of accredited Ph.D. institutions**
- **8 Deans of non-Ph.D. accredited institutions**
- **6 Deans of non-accredited institutions**

- **20-30 minutes long interviews**
- **11 open-ended questions**
- **Interviews conducted in summer 1999**

What are some of the implications of emerging information technologies for the way knowledge is conceptualized and delivered?

- **Acceleration & enhancement of knowledge** **64%**
- **Molecularization of knowledge** **18%**

What are the implications for disciplinary knowledge and boundaries?

- **Boundaries will become blurred** **50%**
- **Boundaries will break down** **23%**

What are the implications for University's traditional privilege in accessing, possessing, and using information?

- **Privilege will be lost 86%**
- **Value of certification will decrease 14%**

What will be the mission of management education in the 21st century?

- **Mission will stay the same 64%**
- **Reach of mission will be expanded geographically & demographically 59%**

How can emerging information technologies be used to stimulate and develop the creativity of students and faculty?

- **Delivery of information** **68%**
- **Access to information** **50%**
- **IT may inhibit creativity** **32%**

What are the institutional challenges limiting the potential offered by emerging technologies?

- **Cost of IT** **86%**
- **Faculty inertia** **86%**
- **IT Support systems** **27%**
- **Parochial Academic governance** **18%**

What will be the important issues in 2009?

- **Social issues of technology** **32%**
- **Needs of virtual communities** **23%**
- **Industry's dramatic change** **23%**

Information Technology & Competing Trends in Management Education

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- **Industry Consolidation VS Niche Programs**
- **Increase VS Decrease of Students**
- **Increase VS Decrease of Faculty**
- **Improvement VS Deterioration of Faculty's Quality of Life**
- **Generalist VS Specialist Faculty**

What does it mean…

- **Learner-centered classroom?**
- **Learner-centered education?**
- **Life-long learning?**
- **Just-in-time learning?**