THE CLAREMONT GRADUATE UNIVERSITY

How IT (Information Technology) becomes IT (Instructional Technology)

Mustafa CORUH
PFF531 – Teaching and Learning in Higher Education
Summer 2001
Paper

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Introduction

Today, everyone agrees that life in next two decades is going to be quite different than today. How we work, how we entertain, and how we learn will be different in 20 years. The basic foundation of these changes is the dissemination of digital information technology (IT) tools. With the help of the new production technologies, the price of these tools is going down and the percent of usage in society is increasing.

The digitization of information has brought about the convergence of voice, video, image, and data and of the electronics, telecommunications and computing industries based upon them. Digital Information Technologies call for dramatic changes in organizational structures, from the smallest firm to the largest government bureaucracy.

When we are still in the middle of the digital IT revolution another revolution is started, the INTERNET. It makes the smallest organizations like big brothers. It destroys the defined or protected national boundaries. An organization or even an individual has to compete with the rest of the world for his/her service, product or skill. Constant change and renovation are the new norms of our time.

At school, the Internet connected schools and libraries are redefining and questioning the current education systems. What is the proper role of computers and Internet in education? They are useful tools but not a panacea to solve the clumsy current education

systems. The problems of public education won't be solved by more technology or only by access to the Internet. It needs better planning, funding, updated and well-rounded curricula, all supplemented by universal access to computers and the Internet.

Right now, even when students have access to the Internet and to digital information tools, they learn almost nothing about how the Internet works, what role IT plays in society, and how they should use it responsibly. Today the exclusive focus of both the industry and educators has been on technical skills that will be obsolete in a year or two.

What students should be learning instead is what the Internet means for them and for their future, how to behave in this new electronic medium, and what it's good for. In other words, they need to put this technology into a context that makes sense and gives them guidance and norms. We need a kind of "driver's education" course for cyberspace [Unknown, 1999]. But there is no school claiming to teach such a course yet. So the likely result is that a generation of young people will be trained how to point and click but not how these skills will build a better world.

Very important changes are happening to educational system with the influx of Internet/IT, but it is not known where will end up or how it can be used in different context.

Goal

The main goal of this paper is to research how IT becomes the technology of instruction or Instructional Technology in higher education institutions.

Technology in higher education must serve the goals of higher education [Glicksman, 1986], not the other way around. The paper will answer the first question of following two questions [Glicksman, 1986]:

1. Why do we need technology and why do we want to use it in higher education?
2. How do higher educations work and what are they about?

The paper also considers three goals of higher education [Glicksman, 1986]:

1. Creation of new knowledge
2. Communication of knowledge
3. Conservation of knowledge

How to make IT work and effective in the classroom

Using technology, particularly computers, in the classroom for better teaching and learning have been in debate for many years. In 1986, Herbert Simon suggested that for the computer to bring about a revolution in higher education its introduction must be accompanied by improvements in our understanding of learning and teaching, and by changes in the organizational structure of our colleges and universities [Kozna, 1991].

As Simon pointed out, the success of a major innovation is preconditioned on the occurrence of a variety of corollary events and conditions. Consequently, the impact of computer on higher education cannot be assessed, or even discussed, in isolation. We cannot disentangle it from the cognitive requirements of the curricular goals and instructional tasks we set for our students; from the interests, skills, capabilities, and deficiencies that students bring to the classroom; and from the physical and social demands placed on students by the classroom, dormitory, and home environments. Understanding the impact of computers in higher education means understanding this complex net of reciprocal relationships between people and situations; it means examining the use and impact of technology in context [Kozna, 1991].

With the technology, students are moving away from the passive reception of information to active engagement in the construction of knowledge. We are moving past a concern with the products of academic work to the processes that create knowledge. Students learn what it is that scholars do: how historians, mathematicians, and authors write, think and solve problems. They learn how to use tools that facilitate the process of scholarly work [Kozna, 1991].

The teachers become more of a coach or mentor, helping students solve problems presented by software [Kozna, 1991]. To make IT work in the classroom for better learning, faculty members need some combination of money, released time, technical assistant, and equipments.

Developing a teaching strategy based on academic goals and objectives for learning involves integrating the elements of learning theories, learning styles, and learning technologies [Wolfe, 1998].

As Richard Sherman stated that introducing new learning technologies into college courses can produce two kinds of effects [Wolfe, 1998]:

1. Technological innovations may amplify certain capabilities, functions, or processes that already exist. For example, the Internet and the Web can greatly increase the amount and diversity of information that is available to students.
2. Technological innovations also may transform the way students and faculty function and interact, thus producing fundamental changes in their roles and relationships. For example, computer-based learning technologies frequently have been used in ways that alter the traditional roles of student and teacher by shifting the focus from instructor-centered to student-centered activities.

Education is based on mentoring, internalization, identification, role modeling, guidance, socialization, interaction, and group activity. In these processes, physical proximity plays an important role. Technology would augment, not substitute, and provide new tools for strengthening community on campus [Wolfe, 1998].

Information Technologies in Higher education

Elements of IT infrastructure in higher education include:

- Platform technologies (Hardware and Operating Systems),

- Network and telecommunication technologies (WAN, LAN, VPN, Satellite, Radio, TV, cable, Internet)
- Backend IT Servers (database, WEB, Email etc.)
- IT utilities (EDI, email, universal file access, video conferencing, and teleconferencing services)
- IT Application development tools (VB, C++, HTML, XML, COBOL)
- IT productivity applications (MS Office (Word, PowerPoint, Excel, Access, Publisher, FrontPage), SAS, SPSS, Smart suite, CAD, Visio, DTP)
- Enterprise Applications (ERP, CRM, KM, HR)
- IT staff (network administrators, DBAs, Application Developers, QAs)
- IT Training (CBT, WEB based training, Technical training schools).

Any one or combination of the above components can be used to facilitate teaching and learning in the college classroom as instructional technology.

The most important idea learned from the research on technology was to be skeptical about claims for revolutionary advances in education brought by technology and technology does not substitute for teachers; there is little likelihood that the classroom will be robotized. However, technological tools can facilitate student learning. How much learning takes place still depends on student activity and thought [McKeachie, 1990].

The biggest difference between previous Instructional Technologies and PC/Internet tools is the former are becoming cheaper, more powerful and more people are using them. This

gives the PC/Internet combination a big advantage to impact learning or educational system with lasting effects.

Benefits from using technology are entwined with the benefits of course redesign. Often redesigned courses have new goals, making comparisons between original and technology-enhanced courses troublesome [Linn, 1995].

Some of the benefits of using IT in the classroom [Linn, 1995]:

- Trial and refinement--better courses result from evaluating effectiveness
- Efficiency--more material is taught and learned
- Authenticity--courses feature more authentic, complex, comprehensive problems and potential solutions
- Motivation--students more satisfied with their courses
- Visualization--alternative models, simulations, and other approaches reach more students, resulting in more students succeeding
- Career advancement-- students better prepared for the workplace as result of learning workplace software, collaborative problem solving methods, and electronic retrieval strategies
- Autonomy-- students are better lifelong learners as result of experience with sustained, independent learning. Students learn to critique as well as understand new information and to monitor their own learning strategies
- Integrated understanding-- students gain broader, more comprehensive view of individual fields (e.g., nature of scientific advance) and make more

connections between course experiences and life experiences (e.g., link statistics to environmental risk assessment)

New roles for teachers and learners [Linn, 1995]

Digital libraries, communication tools, and software products transform the roles of teachers and learners. Advances in technology challenge course designers to rethink the needs of students. New skills for the information workplace must be taught.

Disciplines are often transformed by technology, making it necessary to devise new goals for learning. Calculus transformed by symbolic computation, physics transformed by working model, and engineering design transformed by CAD. Many issues including tradeoff between learning basic ideas and developing software skills

Digital libraries allow all users to be contributors to the corpus of information, raises new issues concerning ownership, review, and authority in publishing.

Boundaries between informal conversation and class lecture have diminished. Social nature of learning more accessible with communication technologies

Increased access to software tools and digital information requires learners to be better critics, more efficient integrators, better social learners, and more autonomous learners

Conclusion

Electronic mail and Internet are bringing computing into instruction in the way that word processing brought computing into personal use for students and faculty in the 1980s [Gilbert, 1996]. Universities have to update their IT infrastructure and use IT innovatively in the classroom settings to win the competition for students, faculty and funding.

Steven W. Gilbert explains the reasons of slow transformation, "Education is being transformed but the inertia of system is enormous, and the cost associated with widespread, deep integration of IT into teaching and learning are significant…. The cumulative impact will be revolutionary, changing how people teach and learn, and what is taught and learned." [Gilbert, 1996]

Technology can enhance the speed, detail, economy, and efficiency of communication, but is tempered by practical and humanistic realities [Cox, 1993]. IT is not solution for better education but a tool set for improving education like in any other usage of IT in other fields. On the contrary, the users are encouraged in inductive thinking in the usage of IT, which is asking, "I have this tool, what kind of problem I can solve with it in my field?" for innovation, productivity, effectiveness, or efficiency in higher education.

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