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In this issue:

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"Child is Father to the Man": Social Software in the IS 2007 Curriculum?

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ABSTRACT

A case is made for the deployment of social software and Web 2.0 tools in the IS 2007 curriculum, both as pedagogical tools and as an area of study. An examination of the enrollment problem in the information systems field is conducted. The characteristics of today's millennial college students are examined, and it is posited that these characteristics contribute to the enrollment problem in the field. An ongoing study of the use of social software in industry is explained and preliminary results of the study are reported. Curricular implications of the study are then posited. Preliminary results of efforts to address these curricular implications are reported and future department directions are posed. It is concluded that the use of social software tools in the information systems curriculum has had a positive effect on student recruitment efforts while simultaneously addressing industry needs in a Web 2.0 business environment.

Keywords: Active Learning Pedagogy, Millennials, Social Software, Web 2.0,

1. THE MAJOR/MINOR ENROLLMENT PROBLEM

One of the most frequently asked questions at the last two-three ISECON conferences has been, "Where have all the students gone, and how can we get them back?" In 2006, undergraduate enrollments in computer-science, computer engineering, and information systems programs were half of what they were in 2000. Graduate program enrollments are also shrinking as the trend works its way through academia.

The industry's bust five years ago, followed by rounds of layoffs and hundreds of startup companies disappearing, tarnished the profession in the eyes of many outsiders. More recent outsourcing trends of sending some technology jobs abroad only served to solidify that perception. Many high school students, influenced by their parents, guidance counselors, and media reports, are seeking out other disciplines to avoid professional downsizing later.

A slight up tick in freshmen declaring an interest in computer majors for the 2007-08 entering class has some observers encouraged that the enrollment decline has bot-

tommed out, but the great irony is that enrollment declines hit bottom just as technology employers have grown healthy enough to hire, and this hiring growth is predicted to continue for years to come. While certainly not a return to the dot.com boom days when startup companies lured undergraduates out of school before graduation, the dearth of computer and information systems majors emerging from colleges has heightened demand for those entering the job market. Fantastic entry level job offers are the norm, and this condition is expected to continue for the foreseeable future.

Before the dot.com bust five-six years ago, the typical incoming class was two-and-a-half times larger than the class of 2006. The Computing Research Association (CRA) has tracked enrollment in computing majors at four-year universities since 1974. It counted 7,798 declared undergraduate majors in the field at the start of 2006, down from 15,958 at the discipline's high point in 2000. Stuart Zweben, Associate Dean of the College of Engineering at The Ohio State University who helps put together the annual CRA survey, believes that part of the enrollment trend is that the figures are falling from an unprecedented and unsustainable stretch during which enrollment in computer fields

doubled at the height of the Internet boom. The frenzy was fueled by the belief that the technology industry was the path to riches. Those enlarged classes graduated just as the dot.com economy crashed, making the job market that much more difficult amid the layoffs.

This seesaw of supply and demand is a common part of the information and computer technology industry, but today's thinning ranks of graduates is simply too small to meet industry's current and projected future demands. From an industry standpoint, it is likely to be a few years before the degree production catches up and the incoming talent is available. On campuses, the job market for computer and information systems majors hasn't been this good in years. Students don't even pursue some job leads because they already have three or four that they want to look into.

Fixing the enrollment decline will likely take a mixture of marketing and refocusing what gets taught. When the description of a major is simply "computer science" or "information systems", it's little wonder most students are not enthusiastic about the major. In fact, the reason that we're not having a recovery may be partially attributable to the fact that the product we're offering is simply not interesting to students. The Georgia Institute of Technology, which offers one of the nation's largest undergraduate computing programs, this past fall changed its coursework into "threads" of study emphasizing emerging niches in computer technology. The University of Colorado is doing the same thing, rolling out tracks for studying such areas as "digital and social systems", "biological informatics", and "Internet systems" - specialties and descriptions that help students understand the potential uses of what they will learn.

Thomas Frey, Executive Director and founder of the Colorado-based Da Vinci Institute and one of the nation's leading experts on the process of launching new businesses and new technologies, suspects that enrollment trends may be symptomatic of a societal shift simply too big for colleges to reverse. He predicts that this is just the starting point of an emerging shift in education to less structured, more organic forms of online learning that will eventually challenge the whole idea of a university. Frey posits that

some of those who may have signed on for a college-track computer education a mere decade ago may be just as inclined these days to log on and learn independently. Consistent with this trend, the Massachusetts Institute of Technology recently started posting course materials and videos online for free, making classes at one of the world's most prestigious technical institutions available to anyone.

These developments may ultimately indicate that colleges will lose their appeal for those students most motivated to learn about technology. We're speeding up to a whole new gear in society and we need a higher education system that's designed to keep up with it. We need to understand the nature of the incoming college freshmen and how their characteristics can effectively influence how we construct our learning environments in higher education.

2. TODAY'S COLLEGE STUDENTS (THE MILLENNIALS)

Today's undergraduate students learn very differently than the way students did when we began teaching. They tend to be more pragmatic; i.e., the subject matter must be "useful" to them. Although there are exceptions, most of them are not in college to explore intellectual ideas. Rather, although they may not have very specific long-term career goals, they are focused on learning skills to help them achieve whatever short-term goals they see in their immediate future. In addition, while very adept at multi-tasking and the use of technology, many of today's students struggle to understand course texts, written instructions and assignments.

In addition to pragmatism, today's students expect action. As a generation reared on Sesame Street and computer games, they expect action movies, action commercials, and action education. They expect learning to occur in an active format, and are quick to "change channels" when their active learning expectations are not being met. For example, as a captive audience in class they will listen for a short while, but their minds quickly turn elsewhere if they are not actively engaged. Although they do not have a TV remote to switch channels, they will use their PCs to send and respond to instant

messages (IM's), or update their FaceBook or MySpace accounts if not expressly forbidden to do so. Although we may have their bodies, it's doubtful we can have their minds if we rely on traditional education strategies.

Marilla Svinicki (2004), Professor of Educational Psychology at Texas Tech University and Chair of the Program in Learning, Cognition and Instruction, states that today's students need four different types of help with their learning;

- Decreasing their focus on *memorization*;
- Increasing their *self-regulation strategies*;
- Increasing and focusing their own *motivation*; and
- Recognizing the need to *transfer* learning from the classroom to the real world.

Additionally, the works of Bean (2001) and Richlin (2006) identify the need for assisting students to interpret written materials. Fortunately, the works of McKeachie (1965), Angelo & Cross (1993), Myers & Jones (1993) and Cross & Steadman (1996) have provided us with many proven active learning techniques to help our students become more successful and self-regulated learners.

Whether or not you believe the characteristics commonly attributed to the Millennial generation, it is clear that the manner in which students are motivated to engage in higher education has been changing and will continue to do so. The priority students affix to their education is too often usurped by increasingly demanding and time-intensive life priorities such as work, family, or emotional/psychological needs. Many members of this generation of students continue to live in an age of convenience and consumption. A college education has become a commodity, understood as yet another acquisition to be made rather than a process in which to engage. Yet, as the Association of American Colleges and Universities describes in *Greater Expectations* (AAC&U, 2002), students need to become intentional architects of their own learning, actively setting goals, exploring, reflecting, and integrating acquired knowledge and experiences into existing worldviews. In today's environment of convenience and consumption, how can we persuade students to move beyond "commodity" thinking and fully engage both in and out of the classroom in activities that

enhance their learning? How can they be inspired to become immersed in the process of learning?

In considering the motivation of undergraduates, it is important to consider characteristics commonly attributed to this generation of traditional-age students. Respecting the power of relationships is critical to student motivation. Today's students appear to be the recipients of a great deal of family involvement and attention, and it is not unusual for the expectation of this involvement to continue after they enroll in college. Many students continue to have regular, sometimes daily contact with their parents, calling to provide updates or seek consultation on even minor decisions. While partnering with students' families, particularly the notoriously labeled "helicopter parents," may invite a loss of student autonomy, strategic, carefully crafted invitations that enlist limited parental support can serve us well. In particular, urging the family members to support student initiative and responsibility in the process of learning, thus employing the student's relationship with his or her family to help make learning a priority, could prove to be most beneficial. Many experts in the student development arena suggest that today's students transfer the expectation of involvement with their parents to the college. Are they expecting the same kind of support or parenting from faculty and staff? Frequent communication from course instructors and an engaged academic adviser are among the keys to maintaining student initiative and effort.

Today's students increasingly seek someone to provide structure, direction, and praise in a way previous generations of students did not. They often ask what to do before thinking through their own plans. It seems they merely want academic to be fixed or done so they can move on to the next project. The most successful coaching style in dealing with the Millennials has been to ask questions that lead students to formulate their own ideas. Whether in the classroom or in a leadership experience outside of class, this use of inquiry forces students to make the educational experience their own by requiring that they reflect on the challenge at hand and develop a solution of their own. The energy generated by these students' realization motivates them to take action

whereas providing a correct answer to their questions would not prompt them to action.

Today's undergraduates are very accustomed to group activity. Students still compete to be the president of an organization or the editor of a publication, but it seems they do not want to be alone with their responsibility. They are generally very peer-network oriented, preferring to work and socialize in groups. Capitalizing on this preference for group activity to promote motivation is challenging, but certainly not impossible. One simple way to encourage greater motivation is to use a student's relationship with the group to focus his or her attention. For example, today's students appear significantly affected by the evaluations of their peers. It is possible to employ peer evaluation on a regular basis, asking group members to rate each other's commitment, knowledge, and performance. The results serve to motivate students to both apply effort to improve and stimulate reflection about what they are learning from their experience. Techniques that were successful in increasing initiative for students from previous generations must be even more personalized today.

Many students come to college accustomed to a frantic schedule of academic, work, and co-curricular activities. Students often continue to maintain these busy schedules in college, sometimes from dawn until well after midnight, moving from class to student organization meetings to on- or off-campus work. While these students' frenzied schedules may create the impression that they are highly engaged in their college experience, in fact some students have created a rigid compartmentalization of many seemingly disconnected experiences. Rather than expend the time necessary to encounter new ideas, reflect, and make connections with their existing worldview, many of our students carefully budget the minimum amount of time necessary to allow them to achieve the grades they desire while fitting in as many other activities as they possibly can. As a result, students sometimes end up overwhelmed when something in their schedules shifts unexpectedly. But we can help students be more sensitive to how they use their time and, in turn, help them use their time to immerse themselves more fully in the experience of learning. For example, by scheduling regular, brief, one-on-one meet-

ings with our students, we are able to compel them to stop and reflect, refocus, and connect. In this sense, we hope that the disconnected parade of class, work, and co-curricular activities can begin to dissolve into a more seamless educational experience.

Finally, one other significant generational characteristic observed in many students is a significant achievement orientation. However, while students may want good grades to open interview doors or for graduate school admission, too often they may not want to focus on learning what they need to be successful in either the job or in graduate school. They may have long lists of honors, awards, and leadership positions in clubs without understanding that what they have learned in their positions (i.e., public speaking, critical thinking, working in groups, intercultural awareness, etc.) is what will make them successful. If they cannot articulate what they learned in the organizations listed on their resumes, they will not get the jobs or have the skills the employer is expecting. One technique found to be successful in provoking greater effort and reflection involves a tool often used in the classroom - persistent inquiry. By asking questions, we check students' assumptions and often provide them with helpful information about getting a job.

3. SOCIAL SOFTWARE IN TODAY'S WORKFORCE

The author of this paper is currently conducting a study of the use of social software in today's business environment. This qualitative research undertaking seeks to provide a preliminary answer to the following research question:

Given that the Millennials are growing up a wired generation and are used to virtually instant communication with social software tools, to what extent has their entry into the workforce changed the nature of workforce communication?

During the spring and summer of 2007 interviews have been conducted with over 25 MIS professionals from across the nation. Many more interviews will be conducted prior to the delivery of this paper. Those interviewed to date represent a wide range of companies from sole proprietors (independent computer consultants who have a

wide range of clients) to major corporations (Apple, IBM, Cisco, Aetna, etc.) and a wide range of industries (manufacturing, higher education, defense contractors, the insurance industry, computer producers, network services, etc.). Interviews have been conducted both in person and via the telephone and follow-up e-mail exchanges occurred with over 50% of those interviewed.

While the results to date are only preliminary and many more interviews will be done, there appear to be several distinct trends regarding the influence of social software and the effect of the Millennials on the corporate workforce:

- There is a marked increased use of Text Messaging, Instant Messaging (IM) and multi-function Cell Phones in Business Communications;
- Wikis, softphones, and blogs are increasingly used to build a sense of community in an increasingly geographically dispersed workforce;
- As a greater percentage of the workforce is telecommuting, the use of social software provides an effective means of socialization;
- The use of social software closes social distance by enabling remote and distributed employees to collaborate more effectively;
- The use of wikis to manage projects and for collaboration is rapidly increasing, especially so in the software development industry;
- For businesses in general there is an increasing use of MySpace as a marketing tool, wikis for project management and collaboration, and blogs to publish content.

The results obtained from interviewing corporate MIS professionals are consistent with information contained on the blogosphere. Most articles about the business use of social software are either published in a social software venue themselves (blogs or wikis) or in online journals. Excellent examples of blogs dedicated to the effects of social software on the workforce include *Elusa: The Knowledge Management Blog* in which Luis Suarez explores the role of social software on the business collaborative process, and *Open Culture*, in which Dawn Foster ex-

pounds upon the influence of social software on the culture of today's workforce.

Investigations of the use of Web 2.0 tools in business have recently moved beyond the blogosphere to online journals and online newspapers. Articles appear at least on a weekly basis espousing the use of these tools to the betterment of corporate America. Recent articles by Brian Watson (Feb, 2007) in *Baseline Magazine* and Karen Henrie (Feb, 2007) in *CIO Insight* have touted Web 2.0 tools in adopting successful enterprise strategy. Articles by Lynda Grafton (June, 2007) in the *Wall Street Journal Online* and Larry Barrett (June, 2007) in *Baseline Magazine* have examined the necessity of virtual teams and the new social networking tools that are being developed explicitly for corporate America.

It would appear that the Millennial generation is rapidly making an impact on the process of business communication. But there is also a downside to this trend. Almost to a person those interviewed stated that they recruit more for "soft" skills than for technical skills. While they expect graduates to possess technical competency in Web 2.0 skills, they also expect recent graduates to possess basic business competency and leadership potential. The following issues/areas were cited most often by MIS professionals as corporate expectations that are not being adequately met by most of today's college graduates:

- New graduates are frequently shocked by business norms, especially in terms of expectations for effective communication. While the graduates electronically communicate more in terms of sound bites and slang, business still expects high-quality written and oral communication skills;
- New graduates are frequently cited as being too dependent upon electronic communication, to the extent that it limits their ability to effectively communicate in person. The graduates do not realize the extent to which they must work effectively in team environments, both electronically and in person;
- New graduates frequently cite the information contained in blogs and wikis as evidence – they frequently are unable to distinguish what is published in a blog or wiki from reality;

- New graduates are not aware of professional standards for finishing work on time and within budget – they do not seem to understand that as a professional in today's corporate community it's about what you get done and the quality of the finished product, not about how many hours you worked on the project.

So while MIS professionals confirm the need for new graduates to have a solid underpinning in Web 2.0 skills, they also firmly state the need for new graduates to display a marked improvement in the "soft" skills so necessary for long-term corporate success. The challenge before us in developing IS 2007 is to pay attention to both the technical and soft skills corporate America requires of new graduates while simultaneously increasing our undergraduate enrollments by studying topics and employing pedagogy that is both relevant to the needs of industry and sensitive to the needs of the Millennials.

4. IMPLICATIONS FOR INFORMATION SYSTEMS EDUCATION

As we move forward in developing the next iteration of the Information Systems curriculum it is imperative that we strive to reflect the needs of both a business environment that will be increasingly effected by Web 2.0 technology and the Millennial students who have grown up as a wired generation. In particular, we need to pay attention to both the content that we teach and the pedagogy/methods we employ to teach the content.

The following suggestions are proffered to start a dialogue of how best to incorporate Web 2.0 concepts into the IS 2007 curriculum while simultaneously addressing the enrollment and student motivation issue so critical to addressing today's industry needs:

- Incorporate Web 2.0 topics into the *Personal Productivity with IS Technology* course; in particular, minimally include the use of blogs as a content authoring tool both on campus and in industry, and the use wikis as a group collaboration and problem-solving tool both on campus and in industry. In is imperative that we not just talk about these tools and their use as emergent technologies, but that we employ both blogs and wikis in delivering the course content;
- Introduce Web 2.0 topics into the *Fundamentals of Information Systems* course; minimally, explore how the use of Facebook is changing the nature of information systems collaboration on campus and how the use of MySpace and YouTube are changing the face of industry information systems applications. We should explore the social implications of Facebook, MySpace, and YouTube by involving students in the construction of Facebook accounts, MySpace accounts, and YouTube production. Our students should actively learn by doing wherever and whenever possible;
- Address the issue of "student self-regulation" by employing an inquiry-based pedagogy consistent with current advances in student learning theory. In particular, construct questions of relevance to students and have students "discover" how information systems are used in solving problems of particular relevance to them. Doing these activities in project teams will further address the issue of student self-regulation as students respond to peer pressure to effectively perform their portion of the group activities;
- Increase "student motivation" by understanding the "hot cognition" theory which posits that students are motivated to learn if they are emotionally involved in the learning scenario. We can employ inquiry-based pedagogy to scenarios to which students can effectively relate such as constructing teaching/learning scenarios around their campus experiences. At the end of each section/chapter we can have students address how the topic just covered is relevant to them at this particular point in their lives;
- Assist students in transferring class content to their major and career interests by explicitly addressing how the topic applies to them now or as future business professionals. The author has found study guides addressing ethical issues to be particularly useful in this regard. Another technique that has proven effective is to have students address how the material just covered has increased their net worth as a potential employee and family member;
- In upper-level project-based courses, consistently employ Web 2.0 tools to deliver

course content and have student teams use Web 2.0 tools to manage group projects. In particular, employ interactive course web pages, course blogs, and course wikis as content delivery mechanisms and have students use team-based wikis to manage projects. Numerous other ideas should come to mind upon minimally exploring these possibilities;

- Develop a department blog to support major recruitment efforts, a department blog to keep alumni and other stakeholders involved in the department activities, and a department wiki to enable alumni, potential student employers, and other stakeholders to actively participate in department planning activities. This will provide for greater stakeholder involvement in our department which will lead to greater stakeholder input to our department planning and assessment processes. Employing these techniques is also consistent with the premise that our students do not learn what we tell them; rather, they learn what we do. We should consistently employ Web 2.0 tools as a means of managing our department activities.

5. RESULTS/CONCLUSIONS

Many of the proposals suggested in the prior section have been implemented at the author's home institution and in his courses. Early results are most promising as is evidenced by increased student interest in the introductory information systems course, the prime vehicle for recruitment of students who are undecided on their major. Students greatly enjoy publishing their own content to a blog, particularly when the blog is on a subject of interest to them. The author's use of classroom wikis is as of yet a bit unorganized, and the author strongly recommends giving explicit instructions on how students are expected to interact with instructor supplied wikis.

As of this writing the use of FaceBook, MySpace, and YouTube in the *Introduction to Information Systems* course is in the design stage. Details are currently in the requirements definition phase. It is hoped that by the presentation of this paper at ISECON 2007 in process observations will be made available to the audience.

The author has introduced both inquiry-based pedagogy and hot cognition concepts in his summer 2007 *Introduction to Information Systems* course. This strategy has yielded both increased student motivation and increased student self-regulation in that most students are very interested in exploring the use of information systems to answer questions of relevance to their life experience. Simultaneously, the weaker students are experiencing much more difficulty and frustration with inquiry-based pedagogy in that they prefer to be told the one correct answer to each of the posed questions. At the conclusion of the course studies will have to be conducted to see the effect of such pedagogy on student performance and student interest in this area as a potential major/minor area of study.

Students have been assisted in transferring course content to both their major and their career by inquiry-based assignments which ask them to assess how the concepts introduced increase their personal net worth as a prospective employees in their major area of study. In particular, they have been required to research the use of information systems in their future career aspirations and to analyze how the information garnered from doing the assignments assist them in meeting the requirements for their potential careers. They then posit how this increased knowledge base will aid them in living more fulfilling personal lives.

The author has not yet to introduce Web 2.0 tools to his upper level courses, but one colleague has introduced wikis into a graduate *HealthCare and Information Technology* course offered in the Summer of 2007 and feels that the collaborative work environment and the formulation of virtual project teams is beneficial. Discussions regarding the introduction of Web 2.0 tools into other courses, both undergraduate and graduate, will be ongoing as part of our continuous improvement efforts across the curriculum in the 2007-08 academic year.

A prototype of a department blog to use as a recruitment tool for potential majors and minors was developed in the Spring of 2007. Current plans are for this blog to go online during the fall 2007 semester. Discussions are underway regarding the content specifications of the department's proposed

alumni/stakeholder blog and the department alumni/stakeholder wiki.

Finally, the discussion of the most effective use of Web 2.0 tools both to support department operations and as content/pedagogy in the curriculum has emerged as a hot topic in the department. It has generated an excitement among both faculty and students that is virtually impossible to measure and has served to rekindle the competitive juices of both students and faculty. It is hoped that this excitement is more than just a passing fancy and that it will substantively contribute to reinvigorating faculty continuous improvement discussions across a wide path, ultimately benefiting students, faculty, and the information systems profession.

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