A Model for Teaching Electronic Commerce Students

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ABSTRACT

The teaching of information technology in an ever-changing world at universities presents a challenge. Are courses taught as concepts, while ignoring hands-on courses, leaving the hands-on classes to the technical colleges or trade schools? Does this produce the best employees for industry or give students the knowledge and skills necessary to function in a high-tech world? At Georgia College & State University (GC&SU) a model was developed that combines both concepts and practical hands-on skill to meet this challenge. Using this model, a program was developed that consists of classroom lecture of concepts as well as practical hands-on exercises for mastering the knowledge and developing the skills necessary to succeed in the high-tech world of electronic commerce. The students become productive day one of a new job assignment. This solves the problem of students having the "book knowledge" but not knowing how to apply what has been learned.

Keywords
Teaching model, Electronic commerce students, Team-teaching, ICAPP

How do we meet the challenge of educating students in an every-changing technological discipline? In the past the educational attitude was that the universities should serve the academic and not the skill level of the student. The student attending the university would be doing “thinking” level work.

Today, this is not the case. All students, regardless of the level of education they seek, need some skills to function in the world. This is especially true in the professionals’ schools of business, health, engineering, and education. The professional school or college seeks to apply knowledge related to their field. The challenge today is how, in the professional schools, to provide students with the technical skills needed to function in this high-tech world and at the same time to teach them how to continue to learn throughout their lives. If students do not learn how to think and apply that knowledge, they will be quickly left behind in the fast changing world of technology. This was the challenge facing the Information Systems & Communications (ISC) department at the J Whitney Bunting School of Business at Georgia College & State University. To meet the requirements of students and the community, the department developed a combined model to meet both needs. The combined model consists of classroom lecture of concepts as well as practical hands-on exercises, projects, and labs for mastering the knowledge, and developing the skills necessary to succeed in the high-tech world of electronic commerce.

Background

The Georgia State Legislature funded an economic development program operated by the University System of Georgia Board of Regents known as Intellectual Capital Partnership Program (ICAPP). The Program is aimed at developing the state's workforce to meet the demand for workers in knowledge intensive jobs. Georgia College & State University’s J. Whitney Bunting School of Business’ department of Information Systems & Communications was selected as an ICAPP site. GC&SU developed a college-level credit program to teach both knowledge and skill levels to students in an informational technology electronic commerce (e-commerce) environment. These classes educate students in the management, design, and development of e-commerce websites along with the network and server administration necessary to support such a site. The program is an intensive six-month program. Students completing the program have the knowledge and skills necessary to handle challenging jobs in the fast-evolving fields of the World Wide Web and e-commerce. The students are eligible for a state loan in the amount of $10,000 to pay for tuition, books and assistance expenses for the six-month period. If the student remains in the State of Georgia working in the information system field, the loan...
will be forgiven at a rate of 25% per year over a five-year period. This becomes the state’s investment in its high
 technology workforce.

The ICAPP program provides a partnership between GC&SU and an information technology company. The
 partner provides support services to small regional Internet service providers (ISPs) across the United States. The
 company, located in the Atlanta metro area, is expanding its web site and e-commerce business into rural areas
 of the state, and requires additional employees who can design, construct, implement and maintain Web-based
 applications for wide-area networking and e-commerce.

The partner provides an entry-level job for all the students completing the program. ICAPP educated twenty-four
 out of initial classes of twenty-seven students during the first year of the project, with the partner proposed to
 have at least another twenty to thirty Georgians educated in Information Systems during the year 2001. Students
 completing the program are not obligated to accept the job from the partner.

Students entering the program have varied backgrounds. Some are young students breaking into the technology
 field; others are older students changing careers. Two of the older students were Registered Nurses; another was
 retired military.

Since the Association to Advance Collegiate Schools of Business (AACSB) accredits the J. Whitney Bunting
 School of Business, all of the ICAPP students must meet the normal academic standards of the school and the
 university. After completion of the program the credit hours may be mapped to the normal undergraduate
 information system program requirements toward a degree. An additional course is required in information
 systems as a capstone course. Management, marketing and other business courses are additional for the normal
 business degree.

Three instructors were chosen for the program. Each with a specific skill and background for the track they were
to teach. The three instructors team-teach the Core area, which is the first module. All classes consist of six
 contact hours of instruction per day, five days per week. The entire program last for 112 days spread over a six-
 month period.

The Program

The GC&SU program has a core information system technology area and three specialized tracks: Network
 Administrator, Web Programmers, and Graphical Web Developers. The core consists of introduction level
 classes in information system technology. Students must complete the Core with a grade of C or better to
 continue. After the core the students are split into one of the three tracks. Network Administrators learn the
 knowledge and skills necessary to design, build, and support websites and enterprise networks. Web
 Programmers learn how to program advanced websites with interaction with database applications. Graphical
 Web Developers learn how to integrate advanced multimedia, sound and animation into websites. The individual
 classes within the Core and specified tracks are described in the following sections.

Core

The Core consists of six weeks of classes. The material taught is designed to give all students a strong
 foundation in information systems technology necessary for the more advance courses taught in the specialized
 tracks. The three instructors teach an area of the core that is most related to their specific track. Each of the
 classes consists of lecture for the concept portion of the material after which projects, and lab exercises are used
 to reinforce the material and to give the students a hands-on approach to apply the concepts learned. Table 1
 shows the classes taught in the core with their duration.

Specialized Tracks

After completion of the Core, the students are placed into one of three tracks that take into consideration the
 desire of the student, the needs of the partner and the load balancing of the classes in the three tracks. These
 tracks are described below:
<table>
<thead>
<tr>
<th>Class Description</th>
<th>No of Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration &amp; Boot camp</td>
<td>1</td>
</tr>
<tr>
<td>Introduction &amp; Overview</td>
<td>1</td>
</tr>
<tr>
<td>Introduction HTML</td>
<td>4</td>
</tr>
<tr>
<td>Hardware</td>
<td>5</td>
</tr>
<tr>
<td>C Programming Language</td>
<td>5</td>
</tr>
<tr>
<td>UNIX</td>
<td>5</td>
</tr>
<tr>
<td>Database</td>
<td>5</td>
</tr>
<tr>
<td>Data Communication &amp; Networking</td>
<td>4</td>
</tr>
<tr>
<td>Track Selection &amp; Partner Interviews</td>
<td>1</td>
</tr>
<tr>
<td>Total Core Module</td>
<td>31</td>
</tr>
</tbody>
</table>

*Table 1. Core Classes*

**Graphic Web Developers**

Graphic Web Developers learn multimedia, animation, and design of e-commerce systems. They use HTML and develop sophisticated web graphics and animation using current commercial products such as Dreamweaver, Flash, Fireworks, Photoshop, 3D Studio, and several other powerful software products. The track consists of two modules described in Table 2.

<table>
<thead>
<tr>
<th>Class Description</th>
<th>No of Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphic Web Design: Web Design</td>
<td>12</td>
</tr>
<tr>
<td>HTML/JavaScript</td>
<td>13</td>
</tr>
<tr>
<td>Java applets</td>
<td>10</td>
</tr>
<tr>
<td>Study day between modules</td>
<td>1</td>
</tr>
<tr>
<td>Advance graphic design</td>
<td>12</td>
</tr>
<tr>
<td>Animation</td>
<td>7</td>
</tr>
<tr>
<td>Multimedia</td>
<td>14</td>
</tr>
<tr>
<td>Marketing &amp; E-commerce</td>
<td>7</td>
</tr>
<tr>
<td>Final Project/Exam</td>
<td>4</td>
</tr>
</tbody>
</table>

Network Administrator:
- Advance Data Communications: 5
- Routing Protocols, Programming And Configuration: 15
- System Analysis, Network Design & Management: 15
- Study Day between modules: 1
- PERL: 12
- Sun Server Administration: 5

Internetworking Services:
- Domain Name Service, Internet Mail Service, & Apache: 17
- Server Design: 6
- Final Project/Exam: 4

Web Programmer:
- Web Design: 12
- HTML/JavaScript: 13
- Java applets: 10
- Study day between modules: 1
- PERL: 12
- System Analysis for Programmers: 2
- Advance Database Design: 10
- Advance Java: 16
- Final Project/Exam: 4

*Table 2. Specific Tracks*
Network Administrators & Server Administrators

Network and server administrators learn how to design, build and implement data communication networks, servers and software necessary for e-commerce websites. They learn UNIX, network design and management, high-speed connections, Cisco routers, Sun Solaris administration, Apache, Sendmail, Domain Name Service, and server design and management. The two modules are described in Table 2.

Web Programmers

Web Programmers learn how to create advanced websites. UNIX, JAVA, and Database development are emphasized. Web Programmers further learn advanced programming, including C, PERL, JAVA, and SQL with Oracle. The two modules are described in Table 2.

The Model

In the past, universities taught theory, while the teaching of skills related tasks has been left to the technical colleges and schools. The Common Model consists of two separate methods for teach at the different institutions with no coordination between the two methods (Figure 1). The thought was that the universities should not lower its level by teaching only mundane skill related tasks. Universities teach people how to think; while this is true it is not enough in our technological world. Today, the university level courses need to teach our students how to think as well as how to apply that thinking to everyday problems and the skills needed to apply the knowledge gained in the university setting. Therefore a new model is needed to meet this challenge.

The model used for the ICAPP program (Figure 2) was designed as a blend of lecture/theory-based and hands-on/skill-based teaching. The lecture/theory-base segment is composed of the normal university style classes to deliver the knowledge base of the subject matter. The hands-on/skill-based segment, designed as authentic activities (Ormrod, 1999), is composed of projects, labs and homework exercises where the student must apply the knowledge learned from the lecture-based classes. Ormrod defines authentic activities as “tasks that are identical or similar to those that the student will eventually encounter in the outside world” (p. 400). The hands-on/skill-based segment requires the students to convert the knowledge they have learned into practical everyday productive experience. They create animated web pages; write functioning programs interacting with databases; build operational networks, which they designed, using routers, switches, and hubs interconnected into the main university network.
Figure 2. The ICAPP Model

The final project/exam of the program is to build a complete working e-commerce website. The three tracks must work together on this final project much as they would in the real work team environment. The network team assists the web programmers and graphic web developers to install and secure the web site created. Each of the tracks function as a team, which must also function as part of a larger team for the overall completion of the project. The final project/exam test the students knowledge level, ability of applying that knowledge with a given skill set, as well as the communications and cooperation needed in team projects. Successful completion of the project assures the student is productive day one of the employment experience, which builds confidence of the student and the employer.

Business must have increased productivity of their knowledge workers in today’s changing environment. Drucker (1993) suggests that a team approach is the only way to increase the productivity of knowledge workers in the current society. But, he advises, for success a team that is appropriate to the work itself must be used. Drucker describes three types of teams: (a) members function on a team in fixed positions but do not function as a team (e.g., baseball team or a surgical team); (b) members function on a team in fixed positions but do function as a team (e.g., soccer team or symphony orchestra); and (c) members have a preferred rather than a fixed position and they adjust themselves to the strength and weakness of the other members of the team and function as a team (e.g., doubles tennis team or senior executives on a “President’s Office” team). The ICAPP model uses the team approach as described as the third type. It even uses the type three within type three.

The need for this form of education is being recognized by society. The National Science Foundation summarized this concept in their report on undergraduate engineering education (NSF, 1998), which is applicable to many forms of information technology education. Quoted from the report:

As this century draws to a close, the environment for engineering practice is changing dramatically and irreversibly, impelled by the shift from defense to commercial competition as a major driver for engineering employment, the impact of exploding information technology on education and practice, the globalization of both manufacturing and service delivery, and the imperatives of environmental protection and sustainable development. Employers emphasize that success as an engineer increasingly requires, in addition to strong technical capability, skills in communication and persuasion, ability to lead and work effectively as a member of a team, understanding of non-technical forces that profoundly affect engineering decisions, and a commitment to life-long learning. Multiple reports over the last 12 years show remarkable consistency in recommending these attributes for engineering graduates of the future.

Acquiring such characteristics is unlikely with traditional, lecture-base instruction. A new engineering education paradigm is needed, characterized by active, project-based learning; horizontal and vertical integration of subject matter; introduction of mathematical and scientific concepts in the context of application; close interaction with industry; broad use of information technology; and a faculty devoted to developing emerging professionals as mentors and coaches. (p. 3)

Sounds like the ICAPP program! While this quote represents the consensus among undergraduate engineering educators in the United States, it also articulates succinctly the needs of information technology education in business. Information technology education requires teaching the concepts of the knowledge in the field; the
skills set to apply that knowledge, and a methodology for the student to continue to learn throughout their life. The life–long learning is of enormous importance since the information taught today will be obsolete within a very short period of time. The successful way to teach the skill sets is by project-based, hands-on, lab-based, troubleshooting, “authentic”, journal-and-portfolio-based education. This is fundamentally important for all information systems, computer science and technician education.

The Initial Results

The initial results using the model have been encouraging. The first class commenced in January of 2000; two classes were taught through December 2000 with two more in 2001. As in all new programs there were some initial logistical problems in getting students accepted at the university and approved by the partner. As a result the first two classes were short of the preferred number of students. Twenty-seven students were processed through the two classes. Of the twenty-seven, twenty-four completed the program with twenty-two accepting positions with the partner. The twenty-four students were comprised of ten from network administration, seven from graphic web developer, and seven from web programmer. The smaller classes gave the instructors the required time to fine-tune the classes as the program progressed.

The 2001 Class

The January 2001 class accepted a larger number of students to balance the shortage from the first year. Twenty-seven students were accepted for the class. These students were divided into approximately eight to ten for each track. The graphic web developer’s lab will only accommodate ten students.

Conclusion

In information technology, students are expected to have a certain level of skill sets along with their knowledge of the field; they also are expected to show their ability of working as a team member with good verbal communications skills. The teaching model developed by GC&SU for the ICAPP program strives to blend lecture-based instruction with project-based, hands-on learning, while teaching the student to function in a team-oriented environment. Their communications skills are developed through essay questions on exams at the end of each module. This model has been tested over the course of a year and half with success. The course content continues to be enhanced to more fully meet the needs of the students, the partner, and the university.

The department is looking to implement the techniques learned from ICAPP into the regular undergraduate curriculum for their computer based information systems majors. Since GC&SU is the public Liberal Arts University of the State of Georgia, the majors have a strong liberal arts foundation. Combine this liberal arts foundation with the knowledge and skill based education from this model in an AACSB accredited school of business and the graduates should be in very high demand.

References

