A Novel Junior Transition Course for Students of Applied Information Technology

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ABSTRACT
An overview of a new junior transition course offered to undergraduate students in the Bachelor of Science in Information Technology program at George Mason University is presented. The course was offered for the first time in the fall 2010 semester and integrated into the curriculum as a core requirement with the main objective of guiding students to make informed decisions when choosing an area of focus within the program that best suit their interest and abilities. Other aspects of the course include providing general information on the program, ensuring that students get the proper advising that they need, bringing awareness to the career paths that are available within each concentration area, informing students of the options they have available for completing minors, second majors as well as graduate studies. Other important issues such as insights into the senior design project experience, certifications, and school resources are also discussed. The course thus far has been offered both in a classroom setting as well as a virtual environment through the distance education initiative of the school. Results from two semesters of teaching the course across three sections indicate positive outcomes and encouraging results with more favorable effects achieved in the classroom setting.

Categories and Subject Descriptors
K.3.2 [Computer and Information Science Education]: Accreditation, Curriculum.

General Terms
Performance, Design.

Keywords
Information Technology Education, Area of Focus, Curriculum Initiative, Transition Course.

1. INTRODUCTION
The popularity of undergraduate programs offering education in Information Technology (IT) has increased significantly over the past decade. George Mason University’s (GMU) ABET accredited Bachelor of Science (BS) in Information Technology offered by the Applied IT (AIT) department is designed to educate students in the technical aspects of information technology to specifically meet business needs [1]. Students in the AIT department are trained to possess strong technical skills needed to assist in business processes and to have the ability to make decisions and provide recommendations to managers on technology alternatives that offer the best tradeoffs. Graduates of the program largely fill the gap between purely technical personnel and individuals at the strictly managerial level.

The department currently has more than 1000 students enrolled in its undergraduate and graduate programs combined, with undergraduates constituting greater than 900 of the aggregate number. The AIT department offers a wide array of courses at different levels and depth, some of which include databases, computer hardware, multimedia, management, networking and security. Students currently have the opportunity to choose one of four concentration areas including information security, database technology and programming, web development and multimedia networking and telecommunications as their field of focus to achieve specific and targeted expertise. Prior to these four areas that currently exist as of Fall 2007, some concentrations were labeled under a different name. For example, the “information security and network administration” concentration was modified into “information security” and a new concentration called “networking and telecommunications” was established to cover both networking and telecommunications technology. Similarly, “database management and programming” was replaced with “database technology and programming”. Figure 1 depicts the distribution of concentrations as of spring 2011 illustrating students that are both in the old and newer concentration areas (with the older concentrations constituting a small percentage of the total) [Charles Snow, personal communication]. More concentration options are in the pipeline and are planned to be offered in future semesters.

Through communications with students and faculty, evidence suggested that many students chose a concentration based mainly on two factors: popularity of the concentration in the department (i.e., what other students had chosen) and job outlook in the Washington DC metro area. The most popular concentration as of Spring 2011 comprised information security as depicted in Figure 1 with a total of around 39% of students choosing this field. During various encounters with students through academic advising sessions and classroom experience, it was determined as

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1 Compiled from GMU registrar data
a department that students needed to be more effectively guided in choosing a concentration area and better informed about career paths in their chosen area of focus [Faculty, personal communication].

Due to a perceived lack of informed decision making, the AIT department resolved to offer a new mandatory junior transition course with the primary intent being to more effectively guide students in this critical decision making process. This new course was also envisioned to support various important program outcomes as outlined by ABET [Irene Bruno, personal communications].

Figure 1. Spring 2011 Distribution of concentration areas in the AIT department

In addition to delivering some of the aforementioned tools necessary for AIT students, the course is also intended to assist in transitioning to an IT career as smooth as possible, as well as making sure that they obtain the maximum amount of learning experience from the department and the services offered by the school in general. Various courses at GMU also try to achieve similar outcomes including the UNIV 200 Sophomore Transition and UNIV 300 Junior Transition [2] courses, however they mainly aim to provide career readiness and guidance for students to choose a specific major, rather than an area of focus within the major.

The new course described herein is designed as a 1-credit compulsory class out of 120 credits that needs to be completed for the program and has been offered in both the fall 2010 and spring 2011 semesters. The prerequisite is to possess sophomore standing in the program (i.e. completion of 30 credits or more). One in-class section was offered for the first time in fall 2010 with a total of 32 students. In the subsequent semester, the department offered an online section as well as an in-class section. The online section had 30 students while the in-class section comprised 37 students. In the classroom setting, students met for 2 hours and 45 minutes for a total of 7 times throughout the semester whereas the online class was delivered via an asynchronous approach through recorded presentations and online discussions. More sections are planned to be offered in forthcoming semesters as students who are required to meet this new requirement enroll in the program.

2. COURSE COVERAGE

The main topics of the course are covered through guest speakers both from within the university as well as from the industry. Guest speakers are chosen and invited by the coordinator of the course such that each concentration area is adequately covered through the material presented. Academic guest speakers mainly include the full time faculty coordinators of each concentration who are responsible for managing all aspects of the area of focus including curriculum and course development. The academic speakers primarily provide information on the courses within the concentration as well as a general snapshot of the field. Industry guest speakers, on the other hand, predominantly talk about their job experience in the field as well as convey information on other job titles, job outlook, salary range and desired certifications and education related to various positions. For example, a network engineer invited to speak to the class covers the main technical responsibilities that the job entails as well as provides an overview of what kinds of qualifications (educational and personal) are desired to excel in the position.

In addition to guest speakers that focus on concentrations and careers related to each area, other invitees include career counselors from the career services center of GMU, GMU libraries liaison, department heads, writing center tutors, CISCO academy director, Dean of university life, senior design (Capstone) project coordinator, and alumni of the department. All speakers are aimed to enrich a certain aspect of the learning experience at GMU and many of the various components of the course were recommended by AIT faculty members.

Various additional items that augment the IT education experience is conveyed to the students. For example, the instructor provides information on the range of important IT and management related certifications available including CISCO, PMP and a variety offered through Microsoft. Students are also anxious to find out about the Capstone experience so the coordinator of the senior design courses elaborates on the project proposal and implementation process, provides examples of previously implemented projects as well as what is expected of the students throughout the duration of a typical year that it takes to complete the Capstone project.

The transition course also provides the necessary material on a variety of Master of Science (M.S) programs offered at GMU including accelerated options. Accelerated versions of the M.S programs are becoming even more popular among students of the department and provide undergraduates with an opportunity to complete a Master’s degree in less time by substituting some graduate level courses in place of concentration and/or core requirements at the undergraduate level [3]. It is essential to impart this information earlier on in the student’s undergraduate learning process so that they may have the opportunity to more effectively and efficiently plan for future education and work and choose classes earlier on in their academic career.

As will be explained in the forthcoming section, the course requires students to write a self-assessment report (similar to that required by UNIV 200 [Charvis Campbell, personal communication]) outlining their strengths and weaknesses in both technical as well as personal aspects with as much openness or discretion as they prefer. Results gathered from these reports indicated a common denominator among students in that many identified three common personal weaknesses that they would be keen to improve: procrastination, personal networking and fear of
public speaking. This new course was determined to be a good platform to identify and improve on these self-professed shortcomings. The coordinator therefore incorporated some opportunity for students to speak out publicly, to initiate conversations with each other and provide resources on overcoming procrastination. On one occasion, a speed networking event was organized (similar to those utilized in professional environments) during a class period whereby students had a few minutes to introduce themselves to fellow classmates and to strike up a conversation with them. Once the time was up, they had to switch to another group and start the process again. Students indicated that they liked this approach and found it very useful.

Due to the large array of important information found on the departmental website, it was also vital to review the contents of the webpages during the first class. It was found that many students were not aware of the resources contained in these resources despite being introduced to it during departmental orientation when first attending GMU.

Another item that was incorporated into the course (as a result of discussions between AIT faculty members) was to require students to attend an academic advising session with an advisor of the AIT department as early as possible (preferably every semester). As outlined within the section below, students were required to meet with an advisor at the end of the course to declare a concentration area and to discuss their plans with the advisor to ensure that they are on track towards their degree completion path.

3. ASSESSMENT

Students are required to complete an array of diverse assignments throughout the semester to fulfill the goals of the course described in the previous section. Below is the grading scheme used to assign an eventual grade for each student in the new junior transition class described in this paper.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Self-Assessment Report</td>
<td>10%</td>
</tr>
<tr>
<td>Job Description Submission</td>
<td>10%</td>
</tr>
<tr>
<td>Professional Organization Membership</td>
<td>10%</td>
</tr>
<tr>
<td>Job/Internship Fair Participation</td>
<td>10%</td>
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<tr>
<td>Career Services Workshop Participation</td>
<td>10%</td>
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<tr>
<td>End of class survey</td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>10%</td>
</tr>
<tr>
<td>Advising Session</td>
<td>20%</td>
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</tbody>
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Table 1. Grading Scheme

3.1 Self-Assessment Report

Each student is asked to compose a self-evaluation report to identify individual strengths and weaknesses both in the technical and social aspects of their personality. They are also asked to elaborate on specific areas of interest as well as areas of dislike within the IT field. The report must contain an initial career plan as well as a list of goals aspired for the next five years after graduation.

The self-assessment report reinforces the idea that choosing an area of focus should be based on what strengths each individual possesses while keeping in mind weaknesses and dislikes. Both the instructor as well as academic and industry guest speakers emphasize on the importance of pursuing a career that is prosperous and fulfilling to the individual. The main message that is conveyed throughout, is for individuals to choose an area of focus they truly enjoy and are passionate about, while avoiding making a choice solely on other reasons such as trends or what others are doing.

3.2 Job Description Submission

Students are required to research three “dream jobs” from various job search engines and to submit a report containing these descriptions. At the end of each job description, the student is asked to elaborate on why he/she would be interested in such a position and which aspects of his/her background or skill set makes them particularly suitable for that job. Resources such as websites/job search engines utilized for this purpose are required to be indicated at the end of the document.

This assignment brings awareness to the types of careers that individuals may be interested in pursuing as well as identifying early on what qualifications these positions entail. By being conscious of these skills, students are better prepared to plan for future transitions and initiate educational efforts (such as obtaining certifications or higher degrees) in a timely manner. The task also provides some practice in using job search engines especially for novice students who have not yet been effectively involved in any job search process.

3.3 Professional Organization Membership

Another component is to require research on various professional organizations in their area of interest and to become a member of one of these organizations. Proof of membership is submitted to the instructor and is an integral part of the course. Many organizations do not charge any fees for student members and individuals in the class are made aware of such a list of organizations. Professional organizations may include campus based student chapters of larger entities such as the student chapter of the Institute for Electrical and Electronics Engineers (IEEE) or the Information Society Movement (ISM) established by students of the AIT department [4]. As part of this course component, the instructor also provides information on various technical websites (and RSS feeds) that provide news on the newest developments and trends that are vital for an IT professional to follow.

This assignment aims to increase professional awareness amongst students and fosters an environment for networking. Depending on the type of organization students join, they may be given access to an array of resources such as magazine subscriptions, professional email accounts, access to job databases, industry contacts, etc. Joining such an organization essentially also instills a sense of belonging to a technical community.

3.4 Job/Internship Fair Participation

Each year, GMU hosts two job/internship fairs. One fair is organized in the spring (around February) and one in the fall
(around October) semester. Participation in the job/internship fair is mandatory for students and proof of participation is required. Other courses at GMU have also made it mandatory for students to attend the fair by making participation part of their grade in the class. Students are expected to interact with at least three potential employers during the fair and to write up a report outlining the scope of the meeting with each employer. Based on a survey performed at the end of the semester, many students indicated that they thoroughly enjoyed this assignment. Quite a few students even obtained interviews, internships and job offers as an outcome of participating in the fair.

The goal of this assignment is to encourage those students who are especially close to completing the program to get their resumes out to potential employers and establish a network that would assist them in securing a relevant position. The assignment also addresses the lack of a personal network that many students had indicated that they wanted to improve in the self-assessment report by exposing them to potential employers and corporate personnel.

3.5 Career Services Workshop Participation
The GMU career center offers various workshops throughout the semester and attendance at one of these workshops is mandatory. These workshops include (but are not limited to) resume and cover letter writing, behavioral interviewing, personal networking, and job hunting [5]. Professional awareness is increased and various skills are honed by requiring students to participate in these workshops. It is interesting to note that many students were not fully aware of the existence of such workshops prior to enrolling in the course despite attending informational sessions such as orientations etc. Students probably focus on other items relevant to their immediate needs as they start college and may not retain much information relating to future activities presented during these informational sessions.

3.6 End of Class Survey
A survey is performed at the end of the semester to gather data, receive suggestions for improvement for future semesters as well as measure outcomes from the course.

Valuable feedback has been obtained in these surveys indicative of the degree of effectiveness of the course. Through comments and ratings, the coordinator is able to determine how much impact the course had, what assignments were mostly found useful and which were not, and which guest speakers were particularly enjoyable and impactful. Student ideas are considered to be indispensable and have been used to improve the quality and effectiveness of the junior transition course to reach its main objective.

3.7 Final Exam
The final exam is targeted to test understanding of the general concepts that prevailed in the semester and is administered around a week after the last day of class. The exam is open notes, comprising of 50-60 multiple choice questions and administered online. Both in-class, as well as distance education students take the exam in an online environment to achieve a sense of uniformity across both sections.

3.8 Participation
Each student receives a maximum of 10 points for participating in class discussions during the semester. Participation includes contributing various ideas and initiating discussions with the instructor and guest speakers. This component fosters an interactive learning environment and encourages students to practice their public speaking skills. Online students participate through the discussion tool on Blackboard.

3.9 Advising Session
It is mandatory for all individuals to meet with an academic advisor of the AIT department to declare a concentration and determine a plan of study as part of their grade in the class. A list of concentration courses the student is planning to take is required as part of the advising session verification report.

As mentioned earlier, this is a critical component of the course grade and minimizes the chance that a student is held back for graduation for not accurately adhering to the degree completion requirements.

4. IN-CLASS vs. ONLINE SECTION
Various challenges were encountered in teaching this new class in both a classroom setting as well as an online environment with the intent of achieving the same goals and outcomes. Some differences did naturally exist in the learning experience specifically in the online environment.

The distance learning section was taught using an asynchronous approach whereby the presentations in the classroom section were video recorded, edited and streamed online for the students to view at their own pace. The online section therefore lagged a few days behind in getting access to the learning materials compared to the in-class students. Albeit having the advantage of convenience, the impact of the guest speakers was not achieved at the same level in the online section. This is demonstrated through the results which indicated that the online students rated the class to be overall less useful than students who attended a live lecture.

A further reason why this may be true is perhaps because of the two other components of the course that were different between the two learning environments: career services workshop and classroom participation. Students in the online section were not required to physically attend one of the career services workshops and instead could attend a webshop (again offered by the career services of GMU) which many eventually ended up doing.

Another aspect is in the effectiveness of the classroom participation. Participation in the online class was conducted through the discussion tool on Blackboard and students only had the opportunity to ask questions to the instructor and discuss ideas with fellow classmates through text postings. Compared to the students in the face-to-face setting where anyone could freely ask questions to the guest speaker, the level of involvement and immersion is less in an online setting.

Furthermore, students did not have the opportunity to physically network with each other through the speed networking event (even though this was not a graded activity). Both categories of students were required to attend the job/internship fair, though a few online students suggested that they would not be able to attend due to full-time work commitments. The following section
provides insights into the level of differences achieved in the effectiveness of the course for both categories of students.

5. RESULTS

Surveys conducted on both online and in-class students indicated that approximately 62.2% of in-class students and 75% of online students had a concentration declared prior to taking the transition course. Figure 2 illustrates the distribution of concentrations that students had already declared prior to enrollment in the class.

Another result extracted from the end of class survey was that around 85.7 % of the in-class students who did not have a concentration declared prior to taking the course thought that the course was useful in helping them choose a concentration while only about 71.4 % of the online students thought that the course helped them make a selection. Of the students who already had a concentration declared prior to taking the course, 23.8 % switched their mind once the course finalized whereas only 8.69% of students in the online section encountered a change of heart. Both results suggest that the effectiveness of the online section was somewhat less pronounced compared to the classroom setting.

Of particular interest was to determine how much, on a scale of 1-5 (with 5 being the strongest), students thought the course equipped them with some of the tools necessary to complete their degree and transition into a career in IT. Figure 3 illustrates the results of responses to this question.

6. CONCLUSION

Overall, the course proved to be highly beneficial to students of the AIT department, effectively equipping them with the tools necessary to make a good choice. For those students who already had a concentration declared prior to enrolling in the class, the transition course reinforced their decision and increased their awareness of the opportunities in their chosen field. Furthermore, it caused a fraction of these students to switch to another concentration. Even though individuals in the in-class section demonstrated more benefit as opposed to the online section, both categories of students gained from the information presented to them.

Due to the limited time frame (i.e. only two semesters across three sections) that the data presented in this paper was collected, future research will inevitably focus on gathering, analyzing, and interpreting data collected across a larger number of semesters and sections. Furthermore, the online sections will need to be modified especially in terms of fostering more interactive class participation and deeper involvement in discussions to make sure that a similar level of learning experience is obtained.

7. ACKNOWLEDGMENTS

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8. REFERENCES