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INFORMATION SYSTEMS EDUCATION JOURNAL

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Students' Responses to Ethical Dilemmas in an Academic Setting and in the Work Place

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ABSTRACT

It is important for students to be prepared to act ethically when they face real world situations that test their ethical leadership. The purpose of this study was to examine university students' responses to ethical dilemmas. One hundred and sixty two students in numerous majors and both undergraduate and graduate classifications responded to a survey that presented 13 ethical dilemmas. A low survey score represents more ethical responses and a higher score represents more unethical responses. The findings for respondents indicate that the mean ethics score was 5. Since all 13 scenarios were clearly unethical, a mean score of 5 indicates many student respondents stated they would act unethically in numerous scenarios. The findings also indicate that there is not a significant difference between gender and ethics scores. The findings of our study reinforce the importance of the need for educators to work toward making academic integrity valued by all university graduates. Business school administrators and faculty need to carefully examine their curriculum to see how well their school is fulfilling its obligation in providing employees who will be ready to lead and act ethically. With the extent of university student cheating reported in the literature and in our own research, it is clear that more insight into this problem would be helpful. Future empirical research is needed to explore the extent to which business school administrators and faculty are responding to the AACSB call to provide business students with the ability to be ethical leaders in the work place.

Keywords: business ethics, ethics education, ethical leadership, student ethical dilemmas, students' perceptions of ethics, university student cheating

1. TODAY'S ETHICAL ENVIRONMENT

Many news stories reporting corporate leaders' unethical and sometimes illegal behavior has brought business ethics to the forefront of public attention. Almost any day of the week, there are new stories about unethical behavior. Numerous accounts of business leaders' poor ethical choices have illustrated the high cost of unethical behavior levied on companies, their customers, their employees, and shareholders. A broad range of stakeholders suffer when ethical norms are violated. Society as a whole benefits from ethical leadership in organizations (Albaum 2006; Why Teach 2005).

In addition to the news headlines on ethical breaches in business, another sign that students entering today's organizations will be working in a very complex ethical environment is that many

corporations are now providing ethics training for their employees. Furthermore, many corporations are hiring for the newly created ethical officer position. The ethics officer's duties can include everything from training employees to advising the CEO (Should You Hire 2008; Swartz 2003). In 2004, at least 40 percent of the Fortune 500 and more than 50 percent of the Fortune 100 corporations had an ethics officer (Company Profile 2004; Corporate Compasses 2004). Another visible indicator of the increased importance of ethics officers in organizations can be seen from the fact that two different professional associations for ethics and compliance managers have experienced substantial increases in their membership numbers (Clark 2006; Company Profile 2004).

Corporation leaders are finding that business ethics are further complicated when doing business in the international setting. To address international business ethics issues, some large corporations are providing face-to-face and online ethics training to employees. This training is often directed specifically to the locale where the employees are located in the world (Brubaker 2003; French 2006).

University graduates will become tomorrow's leaders. There is a need for these university graduates to be ethical leaders who will uphold company ethical standards and develop systems that will help others behave ethically (Allen 2009; Pratt 2009; Woodward et al. 2007). When present students face real world situations that test their ability to provide ethical leadership in the business environment, will they be prepared to lead and act ethically?

Unfortunately, many question whether current business school students are in fact obtaining an adequate level of ethics training (Lawson 2004; O'Clock and Okleshen 1993; Tang and Chen 2008). Lyonski and Gaidis researched students' reactions to ethical dilemmas typical of those in the workplace and found that "once [students] become fully fledged business people, we might conclude that they are not likely to be particularly ethically minded" (1991, p. 147).

2. UNIVERSITY STUDENTS'ATTITUDES ON ETHICAL ISSUES

Some educators feel that a student's level of academic integrity goes hand in hand with a student's ethical values on other real world events that present ethical challenges. Thus, one approach employed by business school leaders is to develop the students' ethical values through enhancing the students' academic integrity (McCabe, D. L. et al. 2006; Rimer 2003).

In their research on student cheating, Salter, Guffey, and McMillan called for additional research in the area of academic cheating and stated that it is important to learn more about the ethical perceptions of students (2001). Researchers in the field of ethics believe that examining how students feel about cheating will help educators gain valuable insight in promoting academic integrity (Klein 2007; McCabe D. L. et al. 2006; Salter et al. 2001; Woodward et al. 2007).
Since it is important to know about the ethical perceptions of students, the purpose of this study was to examine present university students' responses to ethical dilemmas. Specifically, this research reports on students' responses regarding their propensity to cheat in an academic setting and their propensity to act unethically in the workplace.

3. CALL TO ACTION FOR ETHICS EDUCATION

The related literature included in this paper covers three topics: (1) the need for educators to develop a business school curriculum that fosters students' ethical understanding and reasoning abilities, (2) the extent of student cheating in the university, and (3) the relationship between cheating in school and cheating in the workplace.

Need for ethics education.

In response to lapses in the corporate ethical environment and concerns about business school students' ability to meet tomorrow's ethical challenges, various educational accreditation bodies are fostering the development of ethical thinking in university graduates (Malone 2006). For example, the Association to Advance Collegiate Schools of Business (AACSB) has reaffirmed its desire to have undergraduate and graduate business school curriculum include the development of ethical understanding and reasoning abilities in business students (AACSB 2008.) The AACSB ethics task force issued a call for administrators and faculty to "reflect on their current approaches to ethics education" (AACSB 2004, pg. 9.)

Other groups that have issued calls to action for ethics education are business school deans, program leaders, faculty, and ethics center directors. One such call, by Jeffrey Garten, dean of

the Yale School of Management, stated "students need a stronger moral compass than many of today's CEO's have exhibited;" he called for educators to begin a major reevaluation of ethics education (2005 p. 1).

Business school administrators and faculty are now striving to integrate ethics education throughout the business school curriculum also possibly adding stand-alone courses (Velthouse and Kandogan 2007). However, the related literature does not reveal empirical evidence that indicates to what extent business schools are incorporating ethics education by teaching a stand-alone ethics class.

Extent of student cheating.

The authors of this study examined the related literature to gain knowledge about the extent of student cheating. Josephson Institute's (Report Card 2008) findings on high school student cheating indicated that: 64% of the students stated that they cheated on a test in the past year; 36% had plagiarized an assignment with the use of the Internet; and yet, 92% said they were satisfied with their own character and ethics. These findings indicate that far too many students are entering college with a history of cheating and the belief that cheating is not ethically wrong.

Scholars have examined whether or not business school students cheat more than other majors. When examining the extent of cheating among college students of various majors, McCabe, Butterfield, and Trevino stated that undergraduate business school students cheat more than other majors (2006). Another, similar research study by Nill, Schibrowsky, and Peltier (2004) found that, when competitive pressure increases, business majors act more unethically than non-business majors. However, Klein (2007) found no difference in the amount of cheating reported by business school students versus students in six other professional schools. The mixed findings point to the need for more empirical research on this topic.

Granitz and Loewy stated that there is a proliferation of student cheating using the Internet due to easy access to a world of information just keystrokes away; their research examined students' justification for Internet plagiarism (2007). Researchers at a European university found that the information technology, with its ease of information handling and anonymity, contribute to a rise in academic plagiarism (Comas and Sureda 2010). In another study in which Internet plagiarism among undergraduates was examined, 38% of the student respondents said they had committed one or more instances of 'cut and paste' plagiarism involving the Internet (Rimer 2003).

In Premeaux's investigation of cheating at Tier 1 and Tier 2 AACSB accredited business schools, the author found student cheating was "fairly common" at both Tiers. Results indicated cheating on written assignments to be more prevalent at Tier 1 schools; cheating on exams was higher at Tier 2 schools (Premeaux 2005).

Some believe that ethics scandals in the business world can be attributed to graduates of MBA programs and the type of education they obtained in business schools (Beggs 2007; Dean 2006). In 2006 McCabe, Butterfield, and Trevino reported on their findings regarding the extent of cheating among MBA students compared to non-business graduate students at 32 universities in the USA and Canada. The authors state, "A significant number of graduate business students cheat, and that they cheat more than their non-business graduate student peers" (McCabe, D. L. et al. 2006, p. 300). In addition, McCabe, Butterfield, and Trevino pointed out the need for more research pertaining to cheating among graduate business students (2006).

Administrators and faculty must meet the call to action by effectively addressing ethics education and developing a culture of academic integrity. It is evident that as administrators and faculty, we need to do all we can to reduce the problem of student cheating and provide the workplace with ethical leaders. In her research that presents a ten-step model for fostering academic integrity, Caldwell warns of the implications of failing to act, "university faculty and administrators who fail to instill principles of academic integrity in their students implicitly contribute to the cheating culture" (2010, p. 9).

Do students carry their bad habits of cheating in school into the workplace?

Several researchers have examined student cheating in college and the tendency of those students to cheat in the workplace. In his research, Lawson surveyed undergraduate and graduate students enrolled in business schools at three universities. Lawson examined the relationship between students' cheating behavior, degree to which students are upset by academic dishonesty, and attitude toward ethical behavior in

a non-academic setting. Lawson found a strong relationship between "students' propensity to cheat in an academic setting and their attitude toward unethical behavior in the business world" (2004, p. 198).

DuPont and Craig examined university students with majors in retail management to see if there was a significant change in the students' ethical perceptions after participating in a professional retail management internship. The researchers also examined the ethical perceptions of recent graduates after completing an entry level management training program. DuPont and Craig found that "internships and management training programs have little effect on the ethical perceptions of participants" (1996, p. 815).

In his study involving AACSB accredited business schools Premeaux stated that, "Since many students at AACSB accredited business schools tend to embrace, condone, or at least tolerate academic dishonesty, despite their exposure to ethics as mandated by AACSB, it is possible that they will be open to dishonesty and unethical behavior in the workplace" (2005, p. 416).

Another study looked at the issue of graduate student cheating vs. workplace dishonesty. Sims surveyed MBA students; the findings indicate that "students who engaged in behaviors considered severely dishonest in college also engaged in behaviors considered severely dishonest at work" (1993, p. 210). If students who cheat in the university setting subsequently cheat in the workplace, then educators have all the more reason to intervene as early as possible and strive to help business students develop ethical understanding and reasoning abilities.

The following section details the methodology used to study undergraduate and graduate students and is followed by the findings and a discussion of those findings. Limitations and conclusions are also presented.

4. METHODOLOGY

To examine students' responses to ethical dilemmas, we used students at a mid-size, primarily undergraduate public university in the mid-Atlantic region of the United States as our sample. The use of students as a valid sample in such research is confirmed in the related literature (McCabe, A. C. et al. 2006). The use of the study instrument, called "The MBA Jungle Ethics Survey," was approved by the university's Institutional Review Board (IRB). The survey was deployed on the Internet by MBA Jungle; thus, the researchers had no control over the survey instrument. The survey instrument included 13 questions. Those questions primarily consisted of short scenarios where the respondent was to select 1 of 3 possible options. The final question ask if the respondent answered honestly, tried to figure out what the most ethical choice was and choose it, regardless of what they'd actually do, or if they peeked ahead at the scoring. For respondents to our study, students' ethics scores on the MBA Jungle Ethics Survey ranged from 0 to 14. A lower ethics score reflects more ethical responses than a higher ethics score. Each student turned in a printout of their results page after completing the survey.

During the school years of 2006 and 2007, both undergraduate and graduate students were surveyed using the MBA Jungle Ethics Survey to determine the students' ethics scores. The students filled out the survey on their own time and in their own space. One hundred and sixty-two students were asked to participate and 15 decided not to participate; therefore, the response rate was 90.7%.

5. FINDINGS AND DISCUSSIONS

Several demographics were collected. Students were either full-time undergraduates or in the MBA program. The majority of the undergraduates were juniors (43%) and two-thirds of the total participants were males with almost one-third being male juniors. See Table 1 in the appendix for more demographics on
the participants.

In addition, current major information was collected. Over forty percent were Computer Information Systems (CIS) majors; one–third of the sample respondents were male CIS majors. The next largest group was the graduate students in the MBA program at 16 percent. All undergraduate students not in the CIS major were CIS minors at the time of the survey. See Table 2 in the appendix for more details on student majors.

As mentioned previously most of the survey's 13 questions were short scenarios; the scenarios pertained to situations typical of the university setting, the business world, or life in general. The following is an example of one of the scenarios. Bids come in from three vendors for a project that has a tight budget. Your employer has a policy

against accepting gifts from vendors. The high bidder has offered you a very nice gift. Respondents are asked to choose one of three options ranging from ethical to unethical actions.

The overall findings indicate that the mean ethics score of all respondents was 5 on a scale of 0 to 14 in which a low score represented ethical responses. Since the 13 scenarios were clearly unethical, a mean score of 5 indicates that many student respondents in this survey stated they would act unethically in numerous scenarios.

The mean ethics score was also determined by gender. The mean ethics score for females and males was 4.7 and 5.2 respectively. A Chi Square Test indicated that there was not enough evidence to conclude that there is a significant difference between gender and ethics scores. Figure 1, found in the appendix, shows percentage of females vs. percentage of males for each score.

Also collected was the final grade earned in the course in which the survey was administered. The professor linked the final course grade to each respondent's ethics score. Figure 2, located in the appendix, shows ethical scores 1-14 and the number of students earning grades A, B, C, D, or F for each specific ethics score. A Chi Square Test indicated that there was not enough evidence to conclude that there is a significant difference between course grades and ethics scores.

6. LIMITATIONS

As with any empirical study, there are limitations with the research that should be noted. First, the values obtained were student responses and no attempt was made to validate the accuracy of the responses. Second, the results obtained in this study of students' reactions to ethical dilemmas in the classroom and workplace should be considered exploratory in nature and should not be generalized to any group other than the respondents in this study. And finally, to draw any conclusion from the scores, such as someone who scores a 2 is twice as ethical as someone who scores a 4 or someone who scores a 10 is twice as unethical as someone who scores a 5 would be making assumptions that cannot be supported.

7. CONTRIBUTIONS

The data collected and reported will help inform business school administrators and faculty about student attitudes toward cheating and their attitudes toward unethical behavior in the workplace. Hopefully this insight into student behavior can help administrators and faculty gain more insight into the need for ethics education in the business school curriculum.

Information presented in this paper on the students' responses as to how they would react to ethical dilemmas in the workplace provides insight to all university stakeholders who are concerned about the ethical values of entry level employees. Employers in particular can use the findings to adjust workplace ethics training to address the failings uncovered.

The findings of our study reinforce the importance of the need for educators to work toward making academic integrity valued by all university graduates. Kathleen Deignan, Princeton's dean of undergraduate students issued a call to action for educators when she stated, "We need to pay more attention as students join our communities to explaining why [academic integrity] is such a core value—being honest in your academic work and why if you cheat that is a very big deal to us," (Rimer 2003 p. 3).

Business school administrators and faculty have an obligation to provide a curriculum that meets or exceeds the needs of the universities' many stakeholders. Business school administrators and faculty need to carefully examine their curriculum to see how well their school is fulfilling its obligation in providing employees who will be ready to lead and act ethically. The related literature provides evidence of the need to continually examine course content to keep the business school curriculum current (Jakobsen 2005; Kruck and Teer 2002; Teer et al. 2007). Those responsible for the business school curriculum have to foster the development of course content that continually evolves to meet the changing demands of society. Specifically needed today is a business school curriculum that effectively develops future employees who will act ethically and provide ethical leadership in today's complex ethical environment. The ethical development of tomorrow's business leaders should be an area of major concern for educators and corporate leaders. The authors recommend a mandatory ethics training for all college students regardless of major.

As mentioned in the findings and discussions, a means score of 5 for the respondents to this survey indicates that many student respondents in this survey stated they would act unethically in

numerous scenarios. Since over forty percent of the respondents were CIS majors, our study reinforces the need for CIS faculty to make certain that ethics training is a required part of the CIS curriculum.

With the extent of university student cheating reported in the literature and in our own research, it is clear that more insight into this problem would be helpful. Hopefully, our research findings will assist other researchers as they perform needed research in the area of student behavior regarding ethical issues. Future empirical research is needed to explore the extent to which business school administrators and faculty are responding to the AACSB call to provide business students with the ability to be ethical leaders in the work place. Also, empirical research on how faculty are teaching ethical understanding and reasoning to their students is needed to help faculty who are either currently teaching ethics or are considering adding the content into their classes.

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Appendix

Level	Total	% of Total	Number Female	Female % of Total	Number Male	Male % of Total
Freshman	2	1%	2	1%		0%
Sophomore	11	7%	8	5%	3	2%
Junior	70	43%	20	12%	50	31%
Senior	50	31%	17	10%	33	20%
Graduate	29	18%	9	6%	20	12%
Total	*162*	100%	*56*	35%	*106*	65%

Table 1 – Participants' Level by Gender

Major	Total	% of Total	Female	% of Total	Male	% of Total
Accounting	10	6%	5	3%	5	3%
Computer information systems	66	41%	13	8%	53	33%
Communication studies	1	1%	1	1%		0%
Computer science	1	1%		0%	1	1%
Economics	4	2%	1	1%	3	2%
Finance	9	6%	3	2%	6	4%
Geography	1	1%		0%	1	1%
Independent studies	1	1%		0%	1	1%
Integrated science and technology	1	1%		0%	1	1%
Kinesiology (1 graduate student)	3	2%	1	1%	2	1%
Math	1	1%	1	1%		0%
Master of business administration	28	16%	9	6%	17	10%
Media arts and design	5	3%	2	1%	3	2%
Management	9	6%	4	2%	5	3%
Marketing	6	4%	4	2%	2	1%
Nursing	1	1%	1	1%		0%
Political science	1	1%		0%	1	1%
Pre-optometry	1	1%	1	1%		0%
Psychology	3	2%	1	1%	2	1%
Technical and scientific communication	9	6%	8	5%	1	1%
Theatre and dance	1	1%	1	1%		0%
Total	162	100%	56	35%	106	65%

Table 2 – Participants' Major by Gender

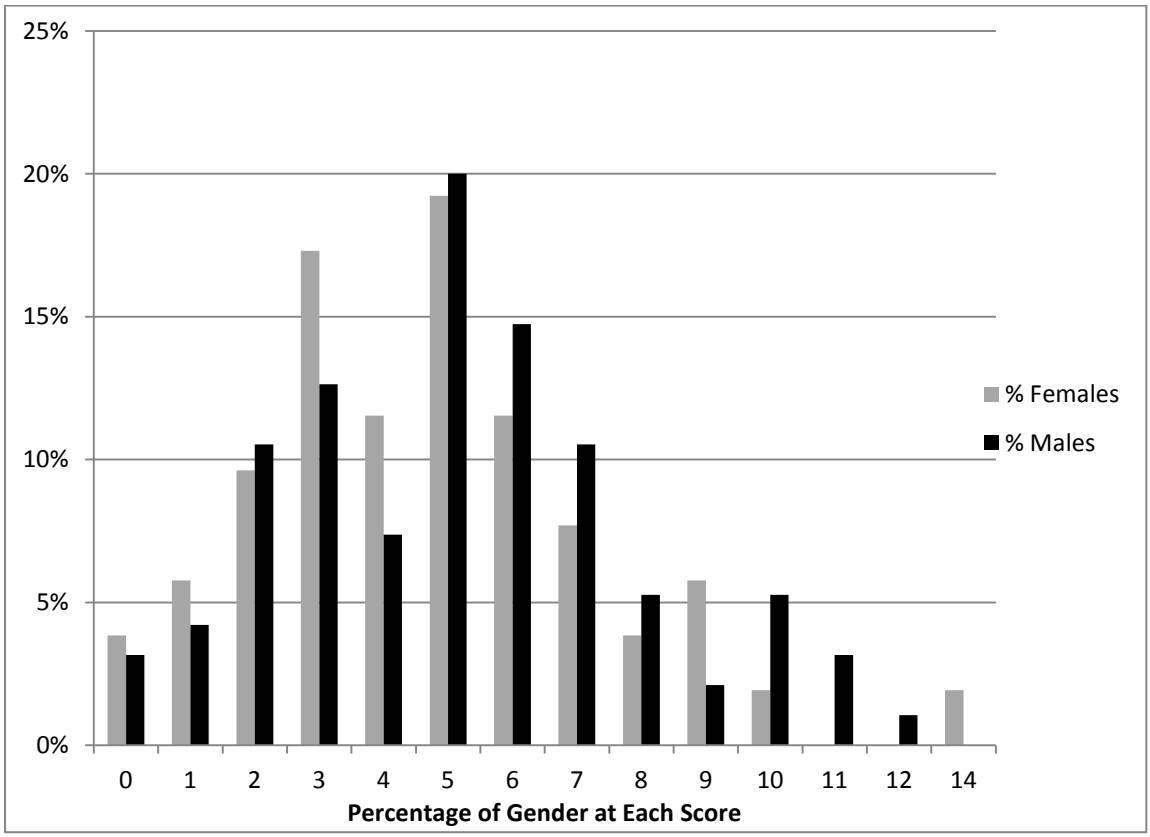

Figure 1 – Ethics Score by Gender

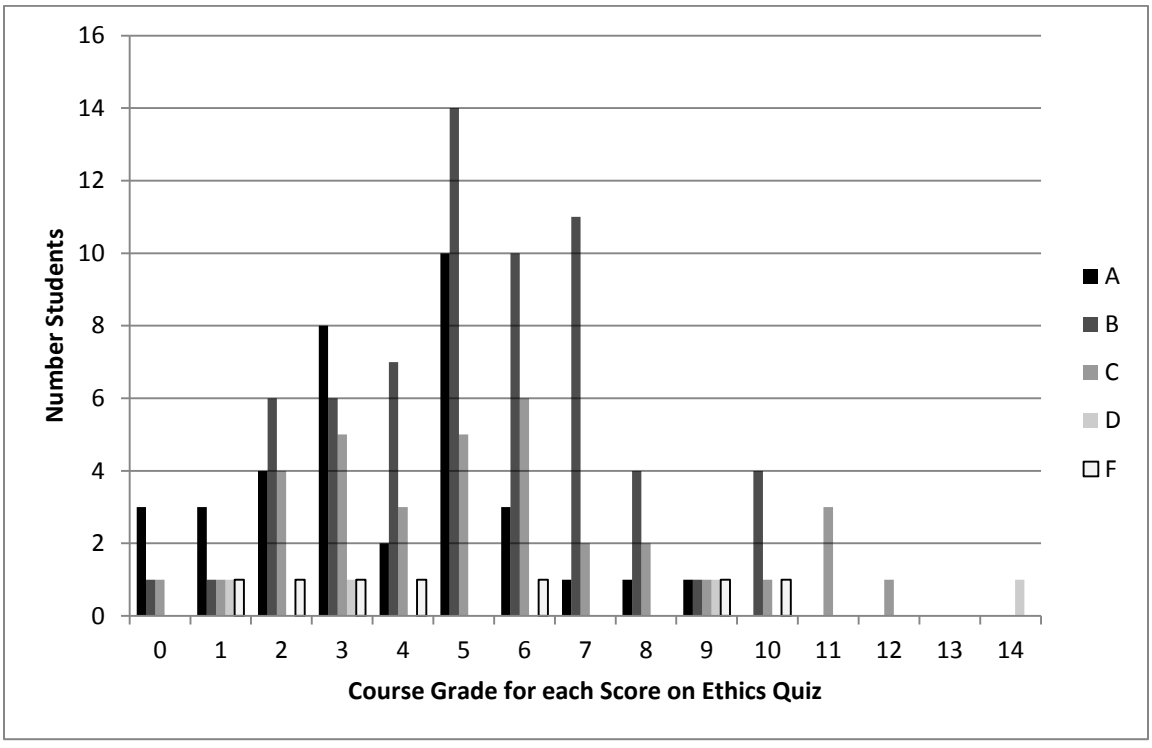

Figure 2 – Ethics Score by Course Grade

The Challenges of introducing a Generic Graduate Skills Unit into a Business Degree in Malaysia

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Abstract

The School of Management and Information Systems at Victoria University Australian resides within the Business Faculty and has a range of Management and Information Systems degrees. In 2008 all degree programs in the Business Faculty introduced a compulsory generic graduate skills unit that focussed on problem-solving, critical thinking, communication and teamwork. This paper presents a preliminary analysis of the challenges faced when delivering the generic graduate skills business unit into a Business degree at a Malaysian University College. Cultural, pedagogical, logistical, operational and student perceptions are some of the challenges that must be assuaged when introducing new units. This paper will present preliminary quantitative data to analyse and identify key classroom delivery challenges and facilitator/student qualitative data to provide context and a deeper understanding of the challenges. These challenges include; the need to customise programs into culturally different destinations, the need to find and train facilitators that could deliver the generic graduate skills-based activities, and the adoption of a team-based learning pedagogy with the commensurate difficulty this type of pedagogy engenders in a teaching culture that is heavily reliant upon the individual in its education system. Suggestions for improving learning outcomes are provided and include; the adoption of a team-based learning pedagogy; a focussed student assessment rationale and the development of a student lecturer trust relationship.

Keywords: business education, transnational education, graduate skills, implementation issues.

1. INTRODUCTION

This paper looks at the development and delivery of a generic graduate skills unit into a Malaysian University College. Whilst many Universities have incorporated elements of graduate skills into existing units the adoption of a series of units dedicated to these generic graduate skills is unique and the corresponding delivery into overseas destinations even more unique. The background to the development of the graduate skills units is presented as well as a preliminary analysis and discussion of the initial delivery into Malaysia. The main focus of the paper is the learning/teaching challenges that arise when a generic graduate skills unit is introduced into a Business degree as well as into a culturally diverse educational institution.

Australian Universities have followed the lead from England and the United States in pursuing business/educational partnerships with Universities from Asian regions. All of these programs are discipline based studies that have

eventuated in Australian qualifications being granted to students in overseas locations. While there is increasing demand for programs, the terminology describing the cross-border nature of delivery needs to be clarified. The term transnational Education (TNE) came into general usage about 1995 and Knight (1997) used the term Transnational Education (TNE) to distinguish international students studying overseas from those studying in their home country. Now trans-border education and cross-border education can almost be used interchangeably and these terms cover the whole range of models, policies, practices and programs that deliver higher education across borders. When programs are delivered cross-border many challenges are identified and need to be addressed.

This paper will look at the delivery of a new generic graduate skills based business unit and then present the challenges encountered when delivered into two Malaysian destinations.

2. DRIVERS AND MODELS OF TRANSNATIONAL EDUCATION

A British study (Doorbar, 2005) detailed the drivers encouraging students to take up TNE in their home country. The primary motivator being career enhancement, a common global theme, others include:

- Inability to gain entry into local universities, certainly for many undergraduates,
- Financial inability to travel overseas for education,
- Desire to continue to work while they study,
- Taking a unit in a remote location,
- Hard working, motivated, aggressive, eager to learn, and,
- Strong desire to improve English communications skills. (Doorbar, 2005)

A further driver is the strong pull of a foreign degree program with its associated kudos (Zimitat, 2008).

Just as there are many off-shore programs there are also many models that can be followed in developing a program. Several authors have described the various forms that transnational education can take in relation to the delivery of the program. The final delivery model can take one of several forms (Ziguras, 1999; Patrick, 1997) these include:

- Distance - learning with interaction by fax, phone or email (Ziguras, 1999),
- On-line - learning with heavy utilization of the Web, (Ziguras, 1999)
- Sandwich - where students commence a degree in home locale and finish in overseas destination, (Miliszewsk, 2008)
- Postgraduate - students do coursework overseas but return home to complete dissertation (Patrick, 1997),
- Off-shore - delivered all in local destination whether in local or English language, and, (Xu, 2004)
- Off-shore blended - both visiting and local lecturers deliver course content often supported by Web on-line learning (Stein, 2009).

Helms (2008), identifies 6 models for how educational relationships can be emulated in transnational education:

- Branch Campus-satellite campus developed issuing degrees,
- Independent Institution- developed stand-alone,
- Acquisition/Merger-Foreign provider purchases part/whole local institution,
- Study Centre-collaborative centre linked with local provider,
- Affiliation-plethora of public/private relationships between foreign and local institutions, and,
- Virtual-only distance education with no face-to-face contact.

The business program at Victoria University is delivered into several off-shore destinations; Kuala Lumpur, Johor Bahru, Hong Kong, Singapore, Beijing and Liaoning. The model that is followed by the University is based upon the affiliation model described above in Helms (2008). The relationship between the University and the different offshore locations differs between countries and even between institutions within countries. All units have different structures with the visiting lecturer delivering between 12 and 20 hours out of the total 36 hours. All course materials are in English as are assessments. A major section of the assessment is graded by the visiting lecturer but internal assessment is normally split between the visiting lecturer and the local lecturer, with

moderation done by the visiting lecturer. A teaching visit can last 3-7 days with the classes running mostly at night. On-line support is provided with Blackboard providing the online learning tool platform.

Graduate Skills Education in the Faculty of Business at VU

The question of teaching graduate skills at University and the role of Universities has been at the centre of debate in Australia (Kavanagh & Drennan, 2008). The growth in participation rates at University has shifted the role of the university (DEWR, 2006) from its more traditional historical role to a role that controversially encompasses vocation and internationalisation as espoused by Star and Hammer (2008). The increasing number of students attending universities also has placed an emphasis on the range of skills that universities are expected to deliver and the need to undertake enhanced graduate skills education (Green, Star & Hammer, 2009). These skills are discussed in many government and industry reports including one by the Business, Industry and Higher Education Collaboration Council (BIHECC, 2007; Freudenburg et al, 2009). The BIHECC (2007) report has called for critical thinking, teamwork, sustainability, ethical practice and life-long learning as expected outcomes from a university business education.

A 2009 ALTC report by Rigby (2009) presented four broad graduate skills as being important in the development of the graduates at modern Australian universities; critical thinking, teamwork, ethical practice and sustainability.

"The actual set and sub-sets of skills, values, and attributes identified as central to students' achievement by HECA (Higher Education Council of Australia), are consistently found across and within the various conceptualisations of generic skills. Although the terminology may shift from author to author, institution to institution, the content and substance of such is generally consistent and reflects contemporary concerns of a wide range of stakeholders in higher education, particularly in Australia. Of particular importance, to academic staff, industry representatives, employer's and government bodies, are critical thinking and teamwork skills, and sensitivity to sustainability and ethical practices." (Rigby, 2009, p 5)

The Faculty of Business at Victoria University undertook a comprehensive survey of stakeholders in 2007 (VU Business Review, 2008) and implemented a major change to the curriculum offerings that were introduced in 2008. Three core graduate skills units were introduced, one in first, second and third year. These units were termed Professional Development 1, 2 & 3. They replaced three discipline based business units and focussed on graduate skills, namely critical thinking, problem solving, teamwork and communications in the first year unit Professional Development 1 (PD1). These graduate skills units were seen as a way of bringing the incoming cohort through transition, and finally improving their "job readiness" as they graduated in the second and third year units. The graduate skills units also responded to the wide range of student ability that the Australian university system is experiencing as a result of the increased participation rates.

The debate about graduate skills is also evident in the countries where the off-shore partners of Victoria University operate. Quek (2005) and Mohd & Saifuddin (2009) pointed to the need for Malaysian graduates to have graduate skills including leadership, teamwork, innovative skills and well as problem–solving and oral and written communication skills. Quek (2005) further explores the difference in learning styles and the ability to transfer skills from university to the workplace;

"In the Malaysian context tertiary institutions probably need to consider the development of generic competencies in students so as to enable them when they graduate to transfer learning to the changing demands of the workplace". Quek (2005)

Teaching & Learning Issues

Pedagogy and student expectations was mentioned in almost all cases of TNE delivery (Stein, 2009; Knight, 1997; Kingston & Forland, 2008; Stier, 2006) as is team based delivery structure and lecturer/student trust issues (Michealson, 2004; Gurvinder & Sharan Kaur, 2008; Stein, 2009). Cultural customisation or intercultural competence are mentioned in both Australian and Malaysian literature as well as other sources (Ziguras, 2008; Quek, 2005; Cunningham et al, 2000; Freeman et al, 2009; Grey, 2002).

3. RESEARCH QUESTION

The research question of this paper is: What are the main learning/teaching challenges in the delivery of a graduate skills-based unit into an Business degree via TNE? Both qualitative student data and quantitative data will be used to analyse a number of challenges raised in the course delivery.

4. METHODOLOGY

A range of teaching/learning issues associated with TNE were identified from the literature (See Indicative References in Table 1) and then cross-matched with the unit evaluation questionnaire and is presented in Table 1. The cross-matching was guided by the teaching experience of the visiting lecturers and supported by local staff and this allowed modification to the unit evaluation survey to facilitate a quantitative analysis of possible learning /teaching challenges from the graduate skills unit rollout.

A total of 145 students enrolled into the graduate skills unit (PD1) in Sunway University College in semester 1 2009. When invited to complete the unit evaluation 135 completed the form. The qualitative data were analysed using Miles and Huberman's (1994) method of arraying data and developing themes. The quantitative data were used to generate simple tables. The modified unit evaluation survey items are in the Review Metrics column in Table 2. (See Appendix)

5. FINDINGS

Unit Effectiveness and Teaching and Learning Challenges

A review of the PD1 Unit in July 2009 yielded quantitative data on student perceptions of the validity and effectiveness of the unit. Table 2 presents the review metrics from the unit evaluation and the corresponding learning & teaching challenges.

The second column from the right gives the average rating for Australian student perceptions from semester 2 2009, this cohort is from the Melbourne campus and gives a comparison between a stable control cohort where the graduate skills unit has been delivered four times as compared to the first time rollout into Sunway. The last column presents the identified challenges. Looking at the mean value responses of the four learning/teaching challenges we can analyse the effectiveness of the Sunway rollout.

Challenge one (Cultural Customisation) relates to the clarity of the course material. Customisation becomes important here as understanding can be governed by the degree to which the material has been customised to suit local conditions. The results in Table 2 show that student perception in Malaysia of cultural customisation was neutral to good for review metrics 1,2,3 & 4 (μ=3.4, 3.4, 3.3).

Challenge two (Team Based Pedagogy) relates to content delivered and the degree that students perceive the team based delivery as being useful. Teamwork forms the major component of most content and as such any comment here must take team-based work and activities into account. The student perception of the team-based pedagogy was neutral to good for review metrics 4 & 5 (μ=3.5, 3.4).

Challenge three (Student/Facilitator Trust Relationship) relates to the degree the facilitator understands and can develop a trust relationship with the students. This includes the strong reliance that students assign to assessment and the need for facilitators to elevate the importance of the learning process over the assessment regime. This issue showed neutral to good acceptance by the co-hort for review metrics 6,7,8,9 & 10 (μ=3.4, 3.6, 3.5, 3.4, 3.6).

The last challenge (Facilitator Pedagogy) relates to the facilitator being able to adapt from the lecturer centred pedagogy to a more inclusive student centred facilitator model. This showed a high acceptance by the student respondents for review metric 11 (μ=3.8). Taking these four challenges we can use qualitative student data to further explore the extent they impact the student's experience.

6. DISCUSSION

Cultural Customisation Challenge (Guided by Cultural/Language issues)

The Faculty of Business programs as delivered in off-shore and Australian campuses are mandated to be equivalent in status but not necessarily identical in content or assessment.

This understanding allows for customisation of material for differing locations. The level of customisation in offshore locations is called into doubt by Davis, Olsen and Bohm (2000) when they found that only 28% of some 82 offshore programs had been customised. Apart from the mandating of equivalence at both Australian and offshore locations there is some question as to the level of customisation that occurs.

The dilemma facing Australian educational developers and lecturers is further displayed when we consider the Australian Vice-Chancellors' Commitee comment concerning a model of acculturation (Davis and Olsen 1999 p. 99).

"..international students, to maintain standards of academic excellence, need to adapt to the dominant culture, that is, promote the successful adjustment by international student to life and study at any Australian university, within Australia or overseas". (Davis & Olsen 1999 p. 99)

Against this backdrop of the need to customise but maintain equivalence in educational programs the first of three Graduate Skills units was customised for delivery at Sunway University College in Kuala Lumpur and Johor Bahru. In the case of the two Sunway locations exhaustive month-long reviews of material were carried out. An example of the comprehensive customisation process is given below;

"Suggested to a speech by Malaysia's former Prime Minister The Hon Tun Dr Mahathir Mohamad on Leadership and Management Demands in the 21st century, and the other is an article by Dr Phil McGraw on 'What Shaped You as A Person', which will be helpful in the learning in Week 1. Kindly find these articles attached" Local Lecturer - example of content customisation, December 2008.

A further example shows how the local facilitator participated in amending the content of the Graduate Skills unit;

Assessment 2A: A discrepancy in the duration of the activity. Since this is an initial exercise which might prove to be "Challenging" for students as it is going to move away from the way they have been taught in the past, it might require more time than less - the WebCT states ½ hour whilst the BFP outline indicates 45 minutes. May I suggest an initial 40 minutes and then a further extension of 5 mins by the visiting facilitator?" Local Facilitator, as an example of process customisation, December 2008

The unit's Blackboard site was modified and then this material was delivered to the co-hort. Some typical changes included replacing some readings with more culturally aware and localised readings as well as including some Malaysian specific business issues. It is important that the local lecturer is confident with the material and that an adequate timeframe is given for the local lecturer to familiarise themselves with the content of the unit prior to the first delivery. Whilst customisation occurs well before delivery, the local lecturer is additionally relied upon to add local context to the theory "on the go". The cultural difference in the operation of Asian to Western business (Ziguras, 2008) is an important consideration. Whilst much effort is made to facilitate the knowledge transfer from visiting lecturer to local lecturer knowledge this relationship still needs management.

Team-based Pedagogy Challenge

Of the four main graduate skills that make up many of the activities and indeed the whole premise for the Graduate Skills initiative at Victoria University teamwork presents the most complex set of problems for the curriculum designers as well as for delivering this unit into overseas destinations. The complexity comes about at many levels; non-familiarity with teamwork learning educational pedagogy by overseas students, uncertainty of teamwork assessment procedures, blurring of the edges between team and individual goals and finally necessity to form multi-disciplinary, multi-cultural teams. The teamwork challenge also raises the issue of student's confidence in being an active member of a good team:

"My English gradually improving; my team members ask, "What do you think?" and I become confident to give my opinion. It took 4 – 5 weeks to get confident in my team." International student commenting upon teamwork from a focus group study conducted December 3rd 2009.

The role of teamwork and critical thinking has been the centre of debate in education in China (Guo & Heijden 2008, Liu 2006) with the recent opening up of China as well as China entering the WTO driving the desire for more employability driven education. Teamwork is also high on the agenda of Malaysian corporations. The following comment from a student from the Malaysian campus on the role of teamwork in the graduate skills unit illustrates the importance of effort and commitment to successful teamwork;

"...Each of us managed our assigned task properly and did try hard to find relevant resources. Communication and team spirit are actually major components to achieve our goals. Absence of these two components may lead to destruction of the group and misunderstand will come across among the group members. I'm lucky to have members who contributed lot of their efforts and also asked for help if they are not sure about the information for their respective bottom lines. As for me, I will put more effort in this project because I know I play an important role as a team member in which to have clear mindset that this project is not only for myself but also involved others in the team to achieve completion of task." Student, PD1 Malaysia, June 2009.

Facilitator Pedagogy Challenge

Much of this paper reflects upon learning undertaken by the students, a major consideration is the teaching pedagogy that forms the underlying theme of the Graduate Skills units and the associated necessity for the facilitators to grasp and feel comfortable with this paradigm. Whilst this has proven to be an issue in delivering the Graduate Skills unit in Australian campuses it has become a major issue when taking the Graduate Skills unit into off-shore destinations. It became necessary to insist that the local facilitator was teacher trained. The facilitator was then given intensive in-service both before and during the teaching visit. Team teaching and video-recording both in Australian classes and overseas classes were additional measures undertaken to prepare the local facilitator for teaching 40, 18-22 years old students in 3 hour blocks. An underlying issue relates to the perceived role of a University lecturer. An intensive Graduate Skills based unit requires intensive class based activities and interaction with students. The role of the facilitator then becomes an enabler for learning to occur whilst making sure that students are driving the learning themselves in their teams. Not all university lecturers are comfortable with this requirement, indeed one academic commented;

"….no, I was not comfortable without slideshows nor complete control over what is happening, I get it but I cannot facilitate what goes on…" Anonymous Academic, Victoria University, 2008

A further comment from one of the overseas facilitators after two semesters of Graduate Skills teaching;

"Yes, I must agree PD is very taxing but enjoyable, nevertheless." Anonymous Academic, Partner University to Victoria University, 2009.

Student/Facilitator Trust Challenge

The students' trust issue is addressed by making certain that the normal two way communication in the lecture/seminar reaches all students (Stein, 2009). It is very easy for students to attend without ever engaging in the class. This becomes crucial for the Graduate Skills unit. This unit is an intensive 3 hr workshop/seminar where students work together in teams and are expected to produce outcomes in specified timeframes. An example of the intensive skills based activities of the Graduate Skills Unit is the main focus of the following student's reflective writing. The student is commenting on their fears of presenting in public:

"During the explanation, I feel nervous and lack of confident as I seldom give a speech or explanation in front of the classroom. I did not dare to look at the audience, I did not have eye contact to them I put all my attention to my lecturer only. However, if it is present in a team, I might have more confident as the poor performance of mine may result a bad impression to everyone. I realized I cannot continue to be like that. I must improve myself whether in confident as well as when giving a speech or explanation to people. …… Sooner or later, I will have a group presentation for my final report. I do not want to affect my group's performance due to my bad presentation skill.

In future, I believe when I step into community, society as well as working life, there are lots of presentations waiting for me. Therefore, I must well prepare before I mess up everything" Student, PD1 Malaysia, June 2009

The perception that Asian educational culture relies heavily on individual testing was evident, furthermore there was a need to introduce students to the concept that teamwork assessment is equally important as individual assessment. Importantly there was not a great difference between Malaysian and Australian students in the teamwork versus individual dialogue. Teamwork problems like "free riding" and the range of problems created by multi-cultural balanced teams could be the focus of further studies.

7. CONCLUSION

The Victoria University Business Faculty undertook a wide ranging review and introduced three new units that not only replaced discipline content based units that focussed on developing generic graduate skills and also introduced a new teaching/learning pedagogy. The two crucial themes that come out of the challenges presented above are relationship and trust building and the need for rapid adaption to the facilitator-led collaborative team-based pedagogy.

Firstly, relationship building is the crucial underpinning necessary to deliver effective units. Relationships need to be developed quickly by the visiting lecturer (3-7 days) with the local institution, the local administrative staff, with the local support staff, the local lecturer and of course with the students. These relationships then need to be nurtured and renewed for every visit. Trust forms an important component of this relationship building. It is difficult to monitor day to day class activities so far from home. Indeed it may be considered an intrusion to delve into the class once the local lecturer takes over, these are shared lectures taken by permanent lecturers not sessional or contract staff.

Secondly, the very nature of the Graduate Skills unit that is the subject of this paper requires an intensive facilitator/student interaction which is based on the learning process rather than learning content. The slideshows delivering accounting or economic theories are replaced by teams working on complex business problems that have a "real world" focus. Rolling out this pedagogy into a program that has focussed on the lecture/tutorial model requires considerable groundwork to be completed. It is just not possible to "run and gun" a complex unit without adequate infrastructure, both hardware, software and most importantly people. Much of the TNE impetus relies upon the visiting lecturer delivering complex process oriented units from a distance. Extensive relationship building skills are required to deliver the trust required to sustain joint educational partnerships between organizations emanating from disparate cultural and geographic locations.

8. LIMITATIONS AND FURTHER RESEARCH

A limitation is associated with the level of statistical analysis, further research could include more formal focus group qualitative data gathering and cross-tabulated analysis of the differing co-horts. The challenges that were identified could be further analysed and fine-tuned. An analysis of the graduate skills namely teamwork, problem solving, communications and academic skills and how the student perception of these skills differs in different cultural locations could be further investigated. Another area of research could be an analysis of teamwork problems like "free riding" and the intersection of problems created by gender balanced teams as well as cultural considerations.

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Appendix

Table 1. Unit Evaluation and Challenge Mapping

Modified Unit Evaluation	Mapped Challenge	Indicative Reference
Unit had Clear Objectives	Cultural Localisation	Ziguras, 2008; Quek, 2005; Cunningham et al, 2000, Grey 2002, Freeman et al, 2009
Learning Tasks are Clear	Cultural Localisation	As above
Student Understood Requirements	Cultural Localisation	As Above
Learning Activities are Useful	Team-based Pedagogy	Michealson, 2004; Gurvinder & Sharan Kaur 2008; Stein, 2009
Learning Activities Well Planned	Team-based Pedagogy	As Above
Learning Activities Well Managed	Student/facilitator Trust	Stein, 2009; Kingston & Forland 2008; Stier 2006
Content Up to Date	Student/facilitator Trust	As Above
Assessment Well Planned	Student/facilitator Trust	As Above
Assessment Linked to Outcomes	Student/facilitator Trust	As Above
Assessment Assisted Learning	Student/facilitator Trust	As Above
Satisfied with Teaching	Facilitator Pedagogy	Stein, 2009; Knight, 1997

Table 2. Student Perception of PD1 Unit semester 1 2009 Malaysian co-hort, N=135; Australian co-hort N=155

PD 1 Unit Review Metrics	Mean Sunway Cohort S109 α n=135	Mean Aust Cohort S209 α N=155	Learning/Teaching Challenge
1. Clear Objectives	3.4	4.2	Cultural Customisation
2. Tasks Clear	3.4	4.2	Cultural Customisation
3. Understood Requirements	3.3	4.1	Cultural Customisation
4. Learning Activities Useful	3.5	3.8	Team-based Pedagogy
5. Learning Activities Well Planned	3.4	4.0	Team-based Pedagogy
6. Learning Activities Well Managed	3.4	4.1	Student/facilitator Trust Rel
7. Content Up to Date	3.6	4.1	Student/facilitator Trust Rel
8. Assessment Well Planned	3.5	4.1	Student/facilitator Trust Rel
9. Assessment Linked to Outcomes	3.4	4.0	Student/facilitator Trust Rel
10. Assessment Assisted Learning	3.6	3.9	Student/facilitator Trust Rel
11. Satisfied with Teaching	3.8	4.4	Facilitaor Pedagogy

Whatever Happened to Richard Reid's List of First Programming Languages?

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Abstract

Throughout the 1990s, Richard Reid of Michigan State University maintained a list showing the first programming language used in introductory programming courses taken by computer science and information systems majors; it was updated for several years afterwards by Frances Van Scoy of West Virginia University. However, it has been 5 years since the last Reid List was released. An updated list was compiled revealing the most popular programming languages. The resultant correspondence with faculty members at many of the 410 Reid List colleges and universities indicates several trends, some of which are contradictory, as well as the reasons for the language choices of the participating schools. We present several conclusions from our findings.

Keywords: introductory programming, programming languages, objects early approach, Java, C++, Python

1. INTRODUCTION

The choice of programming language and pedagogic approach used in teaching an introductory programming course for computer science and information systems majors has been a subject of debate for the past forty years. Holt (1973) criticized the use of PL/I in beginning programming courses while Conway and Wilcox developed a PL/I compiler that was better suited to student use. Pascal was the dominant programming language in introductory courses after Wirth (1971) introduced it, but not even Pascal at the peak of its popularity was immune from criticism. Kernighan (1981) described it as "meant for learning" but he found it ill-suited for serious programming work; Habermann (1973) concurred with this assessment. Brilliant and Wiseman (1996) found that most of the faculty whom they surveyed favored Pascal but considered it too dated for continued use as an instructional language. Johnson (1995) considered C too complex a language for beginning programming students (the faculty surveyed by Brilliant and Wiseman agreed).

More recently, the Advanced Placement exams in Computer Science has moved from using Pascal to C++ and more recently to Java. While the move from Pascal to C++ reflected the growing popularity of object-oriented programming and the maturity of the C++ language, the shift to Java came about partly because of the belief that it was an easier language to learn (Hadjerroult 1998; Madden and Chambers 2002). However, Java presents its own challenges as a teaching language. King (1997) considered Java to have many advantages as an introductory language, although he recognized that it also had many disadvantages. This has led to a sort of dichotomy, where many computer science and information systems programs use Java because of its popularity, or its inherent advantages, while other schools choose not to use it as a first language because they consider it too difficult to teach to beginners.

The very fact that Java is an inherently object-oriented language has led to a debate on the approach that ought to be used in teaching programming, i.e., whether objects should be introduced early or somewhat later. Bruce (2004), Buck and Stucki (2000), and Decker and Hirschfeld (1994) all argue in favor of an object-early approach. However, Reges (2006) claimed that returning to an objects later approach helped improve retention in the introductory programming sequence at the University of Washington. McConnell and Burhans (2002) noted how much thicker introductory programming texts had become and the need to cover objects led to fewer pages on fundamental topics such as repetition and selection statements.

As a result, the question of the language and pedagogic approach to be used when teaching introductory programming courses remains a "hot button" topic within the computer science and information systems educational communities. The adoption of Java as the language of the Advanced Placement courses appears to make it the unofficial programming language of introductory programming; however, there are several other languages in common use, and many colleges that use Java as their programming language of instruction differ in their choice of approach, with some schools teaching objects early, others teaching objects later and some essentially teaching Java as an imperative language.

The purpose of this study was to see if there is any commonality among computer science and information systems programs in the way in which they teach introductory programming. It would be ideal to conduct a census similar to the ones conducted by deRaadt, Watson and Toleman (2004; 2002), where they surveyed university computing programs in Australia and New Zealand, to determine their language of instruction, programming paradigm and the reasons for these choices. Unfortunately, while it is possible to do this in Australia and New Zealand, where there are only 37 and 8 teaching universities respectively, it becomes much more difficult to do this in the United States where there are over 3000 colleges and universities, of which an estimated 1350 have a computing program (Davies, Polack-Wahl and Anewalt 2011). For this reason, we elected to use the Reid List of First Programming Languages as a representation of the population.

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2. WHAT IS THE REID LIST?

Richard Reid, who taught Computer Science at Michigan State University, began tracking colleges computing programs and the languages that they used in their introductory programming course in the early 1990s. To some extent, the sample was self-selecting; colleges were included on the list if they replied to Dr. Reid and provided him with reliable information about the language used in the computing program. The list was updated continuously and when 10% of the colleges on the list changed their language of instruction, a new list was released (Reid 1992). New lists appeared approximately twice per year until Reid's retirement in 1999. Subsequently, Frances Van Scoy, a former student of Dr. Reid, continued compiling the list, with the twenty-fifth Reid List in 2006 being the last one released (Van Scoy 2006).

The twenty-fifth Reid List included 410 colleges and universities, with 391 of the colleges representing the District of Columbia and 49 states (Wyoming is the only state without representation). A breakdown by region appears in Table 1. While there is reasonable geographic balance, there are some states that are far more heavily represented than others. Table 2 shows the states with 10 or more colleges in the Reid List. While New York, California and Pennsylvania are among the more populous states, their influence on the List may be overstated when compared to the number of

colleges in Texas and Florida. Additionally, Massachusetts and the New England states as a whole are significantly overrepresented in comparison to its college-age population. This is partially due to the presence of all eight Ivy League colleges and MIT, in addition to four of the five University of Massachusetts' campuses (the fifth is the Medical School). Both New York and California have decentralized public universities; all four of the main campuses of the State University of New York (SUNY) are included as well as five of the smaller SUNY colleges. Eight of the ten University of California campuses are included as well as eleven of the twenty-three California State University campuses.

Table 1. Geographic Breakdown of the US colleges in the Reid List

Region	Colleges
New England	41
MidAtlantic (incl. DC)	87
Southeast	72
Kentucky and W. Virginia	10
MidWest	95
SouthWest	68
Northwest	16
Alaska and Hawaii	2

Table 2. States with ten or more colleges in the Reid List.

States	Colleges
New York	34
California	32
Pennsylvania	29
Massachusetts	20
Ohio	17
Missouri	13
Texas	13
Virginia	13
Illinois	11
North Carolina	11
Florida	10
Indiana	10
Michigan	10
New Jersey	10

There were also nineteen universities from outside the United States. Fourteen of the schools were from English-speaking countries, with eight from the United Kingdom, five from Canada and one from Australia. The other five universities were European.

Table 3 shows the breakdown by the highest degree program offered in computing. There is an almost even breakdown between undergraduate, master's- and doctorate-granting departments; however, only nine of the programs were in community colleges, which are significantly underrepresented. There was one vocational/technical school on the list.

Table 3. Breakdown by Highest Degree Offered in Computing

Highest Degree Awarded in Computing	Colleges
Associate's	9
Bachelor's	128
Master's	109
Doctorate	157
No longer offering a computing program	7

A breakdown of the sample indicates that 250 of the colleges were public and the rest were private with the exception of the University of Delaware which is a state-supported private university. Of the 158 private colleges, seventy-four are affiliated with religious denominations, with the thirty-one Catholic colleges being the most heavily represented religious affiliation.

Finally, seven of the schools, including the only vocational/technical school, no longer offer a computing program. E-mail correspondence and telephone conversations confirmed that these programs were discontinued due to low enrollment.

3. METHODOLOGY

The colleges and universities included in this survey were taken from the twenty-fourth Reid List; many of the 410 schools listed on the twenty-fourth list did not appear on the twenty-fifth list, which only listed 153 schools. The requirements for the Bachelor's program in Computer Science were examined to determine what the first required programming course was. If the school offered both Bachelor of Arts and Bachelor of Science programs, the requirements for the BS were used. In the case of the community colleges, the requirements for an Associate's degree in Computer Science were examined. Finally, if the school did not have a

Computer Science program, the requirements for the Information Systems program were used.

After finding the first programming course, the course description was examined to see if it included the programming language of instruction; however, most did not specify the language. If a current syllabus for the course was available online, then an examination of its content was used to make a determination of the language used in the course. However, if there was no syllabus online, the bookstore's web site was checked for a textbook adoption; in some cases, the bookstore was called in an attempt to get this information. Lastly, if these steps did not provide the programming language in use, then members of the department were contacted to obtain this information.

4. THE TWENTY-SIXTH REID LIST

Table 4. The programming language(s) used and the frequency of occurrence

Language	Programs using it
Java	197
C++	82
Python	43
C	18
Scheme or Racket	11
Java with another language	9
Visual Basic	7
Ada	5
C/C++	4
Ada or Python	2
Alice and Java	2
Alice	1
C#	1
C or Matlab	1
C++ or Matlab	1
C++ and Resolve	1
Haskell	1
HTML/JavaScript	1
Processing	1
Processing / Java	1
Python/Java	1
Python or Java	1
Python or C#	1
Python or C# or Matlab	1
Scheme/Python	1
Visual Basic or C#	1

Of the 403 schools still offering computing programs, we were able to determine the first programming language for majors in 393 cases. The language (or languages) used in these courses and the number of occurrences appear in Table 4. It should not surprise anyone to see Java dominate the list, although it is interesting that it is the sole language of instruction or is used in conjunction with another language in just over half the colleges for which languages were determined. C++ remains fairly popular, with 88 colleges using it, 4 colleges teaching it after teaching C, and one using it in some sections of their first programming course. The Ohio State University uses C++ together with the Resolve programming framework. Additionally, 18 colleges use C in their first course without switching to C++.

Python has become much more popular in the past few years, with 47 schools currently using it in all or at least several of their course sections and a few others preparing to adopt it either this year or in 2012. The University of Minnesota begins their course in Scheme before switching over to Python. The remainder of the colleges used a variety of languages, including Visual Basic, Ada, C#, Haskell, and Processing. An examination of community colleges, undergraduate and graduate institutions showed that choice of language did not depend on highest degree offered by the department.

5. QUALITATIVE DISCUSSION

While most of the e-mail replies from faculty simply stated the programming language used in their introductory programming course for majors, there were many replies that provided more information about the decision to use a particular programming language, the previous language used in this course, the language used in subsequent courses and in some cases, the reasons for the choices that various departments had made. While the choices and the reasons behind them varied, there were some trends that could be discerned.

Many Programs Used Different Programming Languages after the Introductory Course

While many schools use the same language throughout much of their program, this is not always the case; many schools that taught their introductory course in Python taught the subsequent course in another language, most

likely Java or C++. But Python followed by Java was not the only sequence of languages that was used. Two schools started their students in C and then switched the following semester to Java; one school used Java followed by C. One program started their students in Haskell or Visual Basic (depending on the course and section) before switching over to Java. Another school began their students in C# before moving to Java while another went through a three semester sequence of Java to C and then to C++. In this last case, the sequence was dictated by the choice of language in later courses; C++ was used in Data Structures while the Operating Systems course used C (no clear reason was given for the use of Java in the introductory course.).

Movement Away From Java

Several instructors spoke of their department moving from Java to another language, most commonly Python, in their introductory course. Various reasons were given for this: Java was too difficult for beginners, "industrial" languages were not necessarily good as instructional languages; Java was too difficult for beginners. One professor said that "[it] seems now that many students feel that programming means searching the class library for a class that implements their program." Another faculty member said that his department "felt that the emphasis on objects was distracting students from fundamentals."

Movement To Java

Three instructors wrote how their departments are adopting Java. All three schools were using either C or C++. None of the replies included a reason for the transition at this point in time.

Different Themes and Language in the Introductory Course

A significant number of schools had different introductory courses or different sections of the same course where different approaches, different themes and/or different languages were used. This was done for several reasons: some departments were experimenting to see if one approach was more successful in attracting students than another approach; some programs designed different introductory courses to meet the needs of different programs. One school used different languages for introductory courses in computer science and information systems because the two programs had different goals for their graduates.

Several colleges used a different programming language in the programming course for non-majors than they used in the course for majors. Replies from two different schools spoke of courses for non-majors in Python and for majors in Java.

Language Should Not Matter

Two different instructors from different colleges spoke about the greater importance of teaching problem solving and algorithmic skills than language skills and how language is used as a tool in teaching the development of algorithms.

Reasons for Choosing a Particular Language

Given the number of complaints about the difficulties that students have with Java, C++, and C, one might wonder why anyone would choose to use any of these languages. Yet several faculty members articulated specific reasons for the choices.

Java's overall popularity was a significant reason for it being the most commonly used language. This very popularity led to its use in the AP Computer Science exams and the large number of textbooks covering introductory programming in Java; these, too, were cited as reasons for adopting Java. One instructor also appreciated the availability of IDEs available for neophyte Java programmers.

One correspondent wrote of his school's decision to use C++ because it facilitated the student's search for internships. While no one gave a similar reason for adopting Java, it is quite possible that it may have been the case, although someone did suggest that there is declining interest in Java in the private sector and that this may be responsible for switching away from Java.

The most common change in programming language that was reported was programs that were switching to Python. The reasons for the change all seemed related to Python's simplicity compared to Java and C++ and the fact that teaching students about objects could be easily postponed.

6. CONCLUSIONS

Because of the smaller number of schools included in the twenty-fifth Reid List, it is difficult to compare it to the current list, which has more than double the schools included. However, some trends were impossible to ignore.

While Java remains the most commonly used language in an introductory programming course, its popularity in the first course is waning. While Java was used by 60% of the schools on the twenty-fifth list, only 50% of colleges on the current list use it in their first course. While this may be somewhat misleading because of the inclusion of so many colleges left off the 2006 list, comments made by responding faculty suggest that the decline is real, even if it may not be as severe as indicated here.

C++ remains surprisingly popular, with no decline from the 2006 list. While the current list and the 2006 list may not offer a reasonable basis for comparison, the anecdotal evidence supplied by the responding faculty suggested that programs are as likely to switch to C++ as to switch from it.

The growth in Python's popularity is undeniable. Not only have more schools reported using it in their first programming course, but responding faculty talk about having adopted it, adopting it either last year or this coming year or how their programs are seriously considering the change.

These results corroborate the finding of Davies, Polack-Wahl and Anewalt (2011), who found that Java remained the most popular programming language in CS1 course, with C++ and Python in second and third place respectively. However, Python was nowhere near as popular in CS2 classes, with both Java and C++ being more popular for CS2 classes than CS1 classes. This suggests that many schools are starting their computing majors in Python and later switching to either Java or C++.

There seems to be many reasons why Python is replacing Java in many programs; complexity of the Java programming language and the difficulties of teaching objects early seem to make programs interested in considering alternative approaches. McIver (2001) points out that Java's modular structure and its requirement that every data item and method be part of a class mandate a certain minimum size for every program, no matter how simple it may be:

```
public class MyFirst {
  public static void main(String[] args)   {
    System.out.println
         ("This is my first Java program.");
  }
}
```

Writing a comparable program in C, C++, or Python will be significantly shorter and does not require teaching as much syntax to beginning programmers. And let's not forget the complexity that is added to this by introducing objects early. This can best be summed up by Elliot Koffman's (2005) comment on the SIGCSE mailing list, "I fear that we have reinvented the 'new math' syndrome and many of us are unaware of it." One faculty respondent said that many of his colleagues felt that the objects early approach was a major contributor to the confusion that their introductory students had. As a result, his department chose to adopt Ada.

It was also clear that there was no need to teach programming courses for non-majors using the same approach or language as in the introductory courses for majors. The survey of Davies et al. (2011) confirms this; the schools surveyed were more likely to use Alice, Python and Visual Basic than Java in courses for non - majors.

The language and approach used in an introductory programming course remains a controversial topic and many departments still have lengthy arguments over their approach to teaching introductory programming classes. Pears et al. published a review of the literature on this subject in 2007, citing one hundred and one papers and many others have been written since then. It is unlikely that there will clear consensus anytime soon.
Reid List 26 will be available at http://home.adelphi.edu/~siegfried/ReidList

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Designing an Introductory CIS Course to Attract and Retain Female (and Male) Students

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Abstract

In order to stem the decline of female majors and encourage the persistence of all students in the Computer Information Systems (CIS) Department at Cal Poly Pomona (CPP), the department faculty is instituting a new course to introduce incoming freshmen and transfer students into the major. This course will incorporate the career exploration that students previously conducted in a junior level class, as well as introduce students to best practices in the computing field. Students will start to build their professional/mentor networks in this class through interaction with alumni, student clubs, presentations by professional organizations, and a hands-on networking workshop. A university librarian, the career center, and a blind woman who will demonstrate the importance of accessibility will conduct other in-class workshops. Students will use social media, critique one another's work, and work in teams and small groups. The goal of the course is to show the value of studying computer information systems and the variety in potential CIS careers. The class design is based on research about attracting students to CIS (particularly members of under-represented groups such as females and minorities), retaining females in the profession, and the positive effects of pair programming.

Keywords: gender, postsecondary education, introductory course, social media, networking, alumni, information technology careers, pair programming, LinkedIn, social networking

1. INTRODUCTION

The Computer Information Systems (CIS) Department at Cal Poly Pomona (CPP) is part of the College of Business. CPP is one of 23 campuses in the California State University System, the largest public university system in the United States.

Since 1995, CIS majors take JAVA programming as their first course in the major. CIS majors must pass this introductory course with a grade of "C" or better, and can only repeat the course one time to earn that grade. The attrition rate from this course has been high (40-50%), partly because when it was introduced, it was used to weed out students in a major that was seriously overloaded. Since the dotcom bust, however, the number of CIS majors has dropped dramatically, and is now stabilized at around 500 students. There is speculation in the Computer Science field, that the switch to JAVA as the introductory programming course has reduced their numbers of majors as much as did the dotcom bust (Manaris, 2007)

Table 1. CIS Majors by Ethnicity and Gender, Fall 2010 (CPP, 2010)

Ethnicity	Male	Fe-male	Total	% Total
Asian Only	178	13	191	40.6%
Hispanic Latino	94	11	105	22.3%
White Only	71	7	78	16.6%
Unknown	37	4	41	8.7%
Non-Resident Alien	18	7	25	5.3%
Black/African American Only	15	4	19	4.0%
Two or More Races	9	0	9	1.9%
American Indian/Alaskan Native Only	2	0	2	0.0%
Total	424	46	470	100.0%

The numbers of women with careers in Information Technology (IT) also has been dropping steadily for the past 20 years. In 1991, 36% of the IT workforce was female; by 2008, only 25% were female (Ashcraft & Blithe, 2009). In the CIS major in Fall 2009, 16% of the 70 first-time majors were female: 51 new upper division transfers (8 of them female) and 19 first-time freshmen (3 of them female) entered the CIS major. While the numbers of CIS majors is relatively stable, the attrition rate for females seems to be higher. In Fall 2010, only 10 percent of the majors were female (Table 1). This trend is not unique to CPP. Table 1 shows the breakdown of CIS majors by self-reported ethnicity and gender in Fall 2010, retrieved from an internal CPP website.

Faculty members teaching the beginning JAVA course suspect that some females are discouraged and frustrated, because they develop the impression that once they finish college, they will end up as JAVA programmers. Females who take the JAVA course often have no programming experience, while many of the men do. Moving career exploration from a junior-level careers course to this introductory course should help persistence since especially females seem to be leaving the major before they learn about the wide range of careers they may choose, some of which provide the worklife balance or the challenges that they want. The intent of career exploration early in their academic studies is to show females and males both the wide variety of careers they might pursue. It also should give female students, and other less-confident male students, more confidence in their own skills. Research on pair programming indicates that less-skilled students engaged in pair programming courses are less likely to drop the class, and more likely to take another programming class (Braught, Wahls, & Eby, 2011; McDowell, Werner, Bullock & Fernald, 2006).

To combat this downward trend in female participation and to retain and help all students be more successful at choosing a career, the CIS faculty designed a new introductory course. In this new course, students will learn about the CIS field and its career opportunities, and participate in technical projects that are less frustrating than JAVA, and that teach the entire development lifecycle on a simple level. The course design emphasizes interactive activities, speakers, and pair programming. While this course will be female-friendly and benefit from lessons we have learned during our research on women in IT (Guthrie, Soe & Yakura, 2010; 2011; Yakura, Soe & Guthrie, 2012), it also should help males make better career decisions, and give them skills to begin working on their career success early in the CIS major.

This paper presents the plan for the course, which will be offered for the first time during Fall Quarter, 2011. The course design is based on suggestions from the research literature on factors encouraging the retention of female students (Cohoon & Aspray, 2006), the positive effects of pair programming in introductory courses (Braught et al., 2011; Salleh, Mendes, Grundy, 2011; McDowell et al., 2006), as well as our own research findings on the importance of networks of mentors in the successful careers of women in IT (Guthrie, et al., 2010).

We have designed a benchmarking survey that we will give to students the first and last weeks of class. The methodology section discusses its contents and purpose in more detail.

Background

What attracts and retains students, especially females, to a major such as CIS? In their review of the research on female participation in computing education at the postsecondary level, Cohoon and Aspray (2006) drew some assumptions.

- Gender stereotypes deter females.
- Female students have less self-confidence about computing, and low grades discourage them.
- Lack of knowledge about possible careers, and structural barriers to entry deter females from entering the field.
- Females are attracted to classes that have more relevance to the "real" world.
- Female role models, faculty instructional support, peer mentoring, and female peer support improve retention.
- Hands-on, student-centered instructional methods engage female students.

Pair programming originated in industry as part of extreme programming (XP), as a way to produce programs more efficiently and with fewer errors, since one of the pair is always available to do research and to check the work of the other. The two regularly switch roles. Instructors in Computer and Information Science have been experimenting with pair programming in order to facilitate student learning and interest (Braught et al., 2011). Students involved in pair programming projects work together to produce a single product. The students alternate between two roles: one types code (the "driver" role) and the other does research and reviews the code for errors (the "navigator" role). A meta-analysis of 74 research papers on pair programming versus individual programming in classrooms (Salleh, Mendes, Grundy, 2011) yielded several findings that are important to our course design:

- Pair programming was more satisfying for students, especially when they were paired with a partner who had similar actual or self-perceived computing skills
- Pairs usually produced a final product quicker, although the combined hours the two students spent on the project was greater than the time spent by individual students.
- The quality of the pairs' projects was usually higher than that of individual students, although individual final exam scores did not differ from students who worked alone.

Other factors, such as pairing with a student of the same gender or ethnicity, similar personality, or learning style did not matter. The results for students with a similar work ethic were mixed, and similar time management skills did not seem to matter. Because our female students in the first JAVA class have indicated that they are discouraged about working in our field because they want to "have a life," and because the current millennial generation--both male and female--shares these values (Eisner, 2005), we decided to try pair programming to see if higher levels of satisfaction and success encouraged persistence in the major for all students.

In other research comparing student success in introductory computer science classes that used pair and non-pair programming, students in paired programming classes who were less well prepared before they took the class were more likely to be successful (Braught et al., 2011) and were more likely to complete the course (McDowell, et al., 2006).

Our recent research on the successful careers of women in the IT professions (Guthrie, et al., 2010; Yakura et al., 2012) indicates that the careers of the 38 women we interviewed were enhanced by both their technical and their social or "soft" skills. Their technical skills are expressed in their ability to solve problems for their clients, which relies on their formal education and their ongoing professional training. The social skills included a political understanding of the workplace, their ability to

work on teams, their networking practices, and, if they were lucky, a boss or sponsor to support, mentor, and promote them.

However, only a few of the women in this study were fortunate enough to have a single, strong mentor (usually male and often their first boss). Most of the women had what amounted to a *network of mentors* (Guthrie, et al., 2010). These relationships were less structured in nature, with different mentors providing different types of support in different situations and at different times in their careers. Mentors were particularly important when the women were starting careers or were in transition from one position to another. The concept of building a network of mentors, rather than matching a single student to a single alumni mentor, was one we decided to attempt in this new course.

Based on the recommendations of other academics and on our own research results, we designed a course plan that should provide all students with more information about the field they are entering, help them to begin to build a professional mentor network with alumni and other professionals, with other CIS students, and with each other, and provide the types of activities that should be interesting and inform them about best practices in our field.

2. THE COURSE PLAN

The goals of the new introductory course to CIS are to help students be successful in their academic courses, to learn some of the best practices of the technological work we do in our field, and to jump-start their professional careers while they are in college. In order to make the CIS major appealing, and to reflect the motto of CPP—"Learn by doing"—and the project-based CIS curriculum, the class is designed to be highly interactive, and informative. In order to appeal to the millennial generation (Eisner, 2005), it also utilizes social networking technologies and team activities, including pair programming.

Table 2 (Appendix) shows the proposed schedule for the course, the topics for each week, and the activities and projects in which students will engage.

Academic Success Best Practices

The CIS student population is very diverse (see Table 1), and many of the students are the first in their families to attend college, so they not only need socialization into the IT field, but socialization into academia. Therefore, this introductory class includes activities and assignments to introduce them to concepts and to university and professional services that may help them succeed throughout their academic careers.

Student support resources available on campus to help with academic work include the University Library, the Writing Center, Learning Resource Center tutoring, CIS Department peer tutoring, and Disabled Student Resource Center support for disabled students.

The Librarian who specializes in CIS is providing a workshop on library research, including how to find reliable resources when doing research, what constitutes plagiarism, copyright law, etc. The Library offers workshops such as this one that it adapts for students in different majors, and makes available to classes throughout the university. Understanding these issues should help students avoid problems in later courses that can occur from ignorance.

The student assignment for this part of the course is a research paper on an emerging technology in the field. To help students develop critical thinking skills, each student will use the WordPress blog network installed on a department server to post paper drafts, critique other students' paper drafts, and post their final papers. This project should help them with critical thinking and writing projects in later course.

Introduction to Best IT Work Practices

One of the goals of the course is to socialize students into some of the best practices in the field. Student pairs will develop a small website by following the steps in a prototyping version of the systems development lifecycle. The students will design a website to fulfill the requirements of a small organization that performs community service. Pairs will use the pair programming process to design the website. Again this design work will be published on the WordPress blog. After an instructor critique of the design, the pair will implement and post their results on both of their CPP websites. Individual students will also develop an individual course home page and webmaster page and link it to this website.

Students will use a WSYWIG HTML editor (Dreamweaver) and, as part of the "best practices" goal, learn to develop to W3C HTML5, CSS3, and accessibility standards (using ARIA roles). They will learn how to test their work using browser-based tools, to debug their mistakes, and to correct them. All of these critical thinking skills and best practices are applicable in later classes they will take in the CIS major, and critical throughout their careers in IT.

As they work on this iterative web development project throughout the quarter, they will learn basic design skills, as well as principles of web usability and web accessibility. A blind woman, who works as a technology consultant to companies with visually impaired workers, has agreed to discuss accessibility with the classes, and demonstrate how she uses computers and the Internet. Students may ask her to review their own web sites. Her past class demonstrations to more advanced CIS classes have helped students understand not only about disabled users, but about users in general. Usually a website that is accessible to a blind person is also one that has a high degree of usability for the non-blind user.

The course will give students hands-on experience in the widely varied types of IT work and an opportunity to see how they fit together. Students need to document their design and development plans, best practices for IT development projects. They will develop critical thinking skills needed throughout their studies and careers as they test and critique the work of their peers using principles they learn in class. Students will need to practice communication and writing skills. By performing a mini-development project using many aspects of the software development life cycle, the course work that follows will be understood in the larger context of IT in organizations.

Class Technologies

This generation of students has grown up with technology and is very comfortable using it for personal reasons. One of the goals of the course is to introduce students to the usefulness of current and future information technologies in their professional careers.

The technologies for the class include the Blackboard course management system; on-line tutorials; Dreamweaver, a WYSIWYG HTML editor for building a website to W3C standards; testing tools available as browser extensions; a graphics program, a WordPress blog network; and the professional social networking site, LinkedIn.

Students in the class will build a small website on the CPP web servers. They will use Blackboard for on-line quiz taking covering concepts in the course, as well as for posting certain assignments, and receiving grades and feedback. They also will post assignments on the WordPress blog network, which allows them to provide comments on other students' assignments. A student team as part of their senior project course built the WordPress blog network. They will use LinkedIn to connect to alumni and start building their professional networks.

Students are free to work on group writing projects using file-sharing sites such as Google docs, Microsoft Office Web Apps, or Dropbox technologies. However, they need to post their assignments, including their critiques, on the WordPress Blog site in order to get credit for their work, since the instructor needs ready access to it.

The textbook (see Table 2) is a trade book that covers the systems development lifecycle. It also provides information about free applications that students can download and use to build and test their websites. This book is currently available to students through the CPP library subscription to *Safari Books-Online*. Since tuition fees in the CSU have risen sharply, the availability of on-line textbooks gives all students access to textbooks they cannot afford to buy.

Starting a Career early

One advantage that CIS students have is the strong CIS Department internship program that places them in industry-relevant internships while they are in the program. Our program has had a careers course that students have taken near graduation, in which they do career exploration. That career exploration has now been moved forward to this introductory-level course, so that students do not have to wait until the end of their classes to start planning what they will do after college. This early planning should also allow them to take courses that prepare them for their planned careers, which should speed their progress toward graduation.

Career exploration in this course will begin early and continue throughout the term. Since the value of professional networking is so important in our research study, the students will begin building their professional networks early in the class. Alumni have agreed to visit the class and discuss different career options with them, and introduce them to the professional organizations with which they can affiliate themselves as student members.

CIS and College of Business student clubs and local professional organizations will make presentations in class. One assignment will be to visit a student club and report on it.

The Career Center will provide a workshop on resume writing and on their services, so that students can take advantage of them when they are looking for internships.

Learning the Value of Networking

Networking runs throughout this class, because it is such an important factor in the success of the women we interviewed in our study. Networking activities include:

- A retired CIS lecturer, who continues to mentor CIS students and who is a master of networking, will talk to classes about the importance of building a professional network early in the quarter.
- About 50 alumni within Southern California, as well as in such distant places as Singapore and Beijing, have agreed to support the students in the class through networking, interviews (both face-to-face and virtual), and speaking in class.
- All of the students will join a professional social networking site (LinkedIn), and then begin connecting to CIS alumni who are contacts.
- An interactive networking workshop will show student how to network face-to-face in a "learn by doing" fashion.

Students will use LinkedIn to connect with alumni who are working in a field that interests them. Alumni have agreed to an interview either face-to-face, or via communication media, such as email, Skype, or FaceTime. Student reports on these interviews will be posted on the WordPress blog network that the class uses. Students will also comment on these peer reports.

4. COURSE ASSESSMENT

In order to assess whether the contents and activities of this class plan help students in understanding the value of networking in building their careers, the research team plans to give pre- and post-tests to the students so that the course can be revised to improve its value. The research team also wants to validate the practical findings of its earlier study to determine whether the continuation of female students in the major will improve if they discover the rich set off career possibilities available to CIS graduates.

The benchmarking pre-survey covers several areas:

- **Technology Experiences:** Questions will help the instructor form pair programming groups that have similar levels of expertise, since research shows that is the most effective for students. Students taking the course will include first-time freshmen, and transfer students, who may have more experience.
- **Demographic:** This information gives an overview of who is taking the course, for analyzing class success.
- **Technology use**: Questions help the instructor understand how students are using technology, and will help focus instruction at a level that suits the class makeup.
- **Information usage and knowledge**: This section provides a snapshot of how students view information sources, and understand issues such as copyright, and research using the Internet.
- **Careers:** This section takes a snapshot of the career knowledge and aspirations of each student.
- **Pair Programming:** Questions take a snapshot of experiences with the method.
- **Professional Networks**: Questions take a snapshot of students' understanding of the value of a professional network, as well as the nature of their professional networks.

The post-survey will be given the last week of class and will be used to ascertain how much students have learned and developed their understanding of concepts in the class. A comparison of the pre- and post-test answers will help the instructors revise the course content and practices. They should provide some

evidence of whether the assumptions underlying the course design are valid.

5. CONCLUSIONS

This paper describes a work-in-progress, a new introductory class that is designed to introduce students to our field of study and the possible careers they can build when the graduate. It also describes the assumptions we used in course design which are drawn from research, including our own.

It is our attempt to improve enrollments and persistence to graduation. Although we used the research on women in IT (by ourselves and others) to design the course, we believe that the conclusions will benefit all students, both male and female. It is too early to draw conclusions about whether it will work or not with this new millennial generation of students.

Our expectations are high. We are encouraged by the comments we received when we solicited the help of alumni for the students. Several of them commented on how much it would have helped to have a course like this early in their academic careers. Alumni are very eager to help these students as they move forward in their academic careers.

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Table 2. CIS 231 CLASS OUTLINE

Textbook: Mark Bell, 2010, Build a Website for Free, Second Edition, Que

Week #: Due?	TOPICS	ACTIVITIES
1, 9/26-9/28 Read: Ch. 1, 5, 6 ***DUE 9/28 12 noon*** **XTRA credit 1:** on-line survey or alternative short paper	Who are we? What do we do? • Introduction to class content, methods, norms, goals • Introduction of class members • Where do we belong in academic computing fields? • How to start building a professional network	• Course introduction (1.1) • **Ex. 1. Set up your CSU Pomona cis231 website:** file security; VPN; FTP (1.2) • **LinkedIn overview from CIS mentor** • 3 PM, 6 PM (1.2)
2, Oct 3-5 Read: Ch. 3, 4, 7 ***DUE 10/3, 12 noon*** BB QUIZZES **Exercise 1: Set up your CSU Pomona cis231 website** ***DUE 10/5, 12 noon*** **Exercise 2: Start your professional network**. Join LinkedIn & connect to instructor & Fred Gallegos; start building network by connecting to 5 alumni	How do we work? • How do we develop a project (SDLC)? • What questions do we have to answer in our analysis? • What do we have to consider when we design a solution? • How do we manage a project? • Introduction to Dreamweaver, a web authoring tool	• Instructor gives Pair assignments (2.1) • In-Class **Begin Project 1.** design work on pair programming website project, Pairs fill in an analysis / design form based on problem (2.1) • **Visits by student clubs:** & **CBA undergrad advisor (& CIS alumna)** (2.2)
3, Oct 10-12 Read: Ch. 10, 11, 13, 14 ***DUE 10/10, 12 noon:*** **Project 1** Post on Blackboard (3.1) BB QUIZZES ***DUE 10/10 AT END OF CLASS*** **Exercise 3:** in-class pair debugging exercise (3.1)	How do we develop our product solution? • What about developing to standards? • Developing for a specific audience • Testing with browser tools • Debugging errors	• Dreamweaver & browser testing tools (3.1) • **EXERCISE 3**. Pair testing / debugging exercise IN-CLASS (3.1) • Begin **Project 2**. PAIR WEBSITE design. Post on each student's CPP website (3.1) • Begin **Project 3:** Create simple individual website with 2 linked pages: home page & webmaster page. Connect to Project 2 pages (3.2)
4, Oct 17-19 Read Ch. 12 +online readings ***DUE 10/17 12 noon***: BB quizzes ***DUE 10/19, 12 NOON:*** **Exercise 4,** individual blog report on visit to student club **Projects 2 & 3:** Pair website design	How can we ensure that audience will be able to use our product? • Designing to appeal to intended audience • Trust building with customers • Usability issues	• Class Usability exercise – Krug Trunk Test (4.1) • Pairs work on websites (4.1) • **EXERCISE 5:** Pairs Accessibility testing exercise – evaluate another Pairs' Project 2 & identify any accessibility issues; written

& 2-page individual website with photo posted on CPP website of each student ***DUE AT END OF CLASS 10/19*** **EXERCISE 5,** Pair's accessibility testing exercise of another pair's website, posted on blog site	• Accessibility issues	feedback (4.2) • Begin **Project 4**, fix issues with Projects 2 & 3, develop content
5, Oct 24-26 Accessibility demonstration (5.1) Midterm (5.2)	Accessibility demonstration & midterm exam • Accessibility demonstration (5.1) • Midterm (5.2)	• **Demonstration of how a blind person** uses technology (5.1) • Some students have Andrea review their websites for accessibility (5.1) • Midterm (5.2)
6, Oct 31-Nov 2 ***DUE 10/31 12 NOON:*** BB QUIZZES **Exercise 6.1:** Preparation of draft resume. Post on blog	What are the careers of the future that you might consider? • What are your interests? • What qualities / values do you have?	• **Career Center Workshop** --in-class or at Career Center (6.1) • Critiques of resumes • **Group Exercise 7.1:** Career exploration by groups of students interested in similar careers. Generate questions to ask alumni speakers (6.2)
7, Nov 7-9 Online readings ***DUE 11/7, 12 NOON*** **Exercise 6.2. Critique of partner's draft resume** **Exercise 7.1:** group reports about careers & proposed questions for alumni speakers, POSTED ON GROUP BLOG	• Social media • Security & forensics • Web development: Web services, cloud computing • Games, animation, digital media • Mobile devices	• **Speaker from the library on how to conduct library / web-based research** 2PM Monday, 6PM Wednesday • **Interactive Networking Virtual Workshop** 6PM Monday, 2 PM Wednesday • Begin **Project 5.1**, research paper draft
8, Nov 14-16 BB quizzes Online readings **Ex. 6.3** revised resume ***DUE 11/14, 12 NOON*** **Project 4:** 2nd iteration of website with revised layout, design improvements, & additional pages (8.1)	What are the professional groups to which we belong? • Professional ethics to which we subscribe? • Power & politics in IT work	• **Alumni speakers (8.1. & 8.2)** • Group interviews of alumni whose careers are of interest to group • **Exercise 7.2** group blog report on alumni answers to questions • Professional Organizations
9, Nov 21-23 ***DUE 11/21, 12 NOON*** **Project 5.1**: draft of research paper on emerging media, posted on pair blog site BB quiz Ch. 8, 15, 19 ***DUE 11/23, 12 NOON*** • **Exercise 8:** critique partner's research paper in a blog • **Exercise 7.2** group blog report	Integrating social media for business use • Facebook, blogs, twitter • Search Engine Optimization • Google Analytics	• How can Facebook be used for business? • **Group exercise 9**: Social media: Prepare a Facebook page, a Twitter site, and WordPress Blog site. Connect them to your individual websites • Blog, tweet, read the same message everywhere

on alumni answers to questions • **Exercise 7.3.** Answers to career questions from at least one person in your LinkedIn network, posted on individual blog		
<u>10, Nov 28-30</u> Ch. 16, 17, 18 ***DUE 11/28, 12 NOON*** BB quizzes ***DUE 11/30, 12 NOON*** **XTRA credit 2:** on-line survey **DUE 12/2 12 midnight.** **Project 6:** Entire updated web portfolio, including • Updates to website • **Group exercise 9**: Social media: Prepare a Facebook page, a Twitter site, and WordPress Blog site. Connect them to your individual websites • **Exercise 6.3. Final resume** • **Project 5.2:** Final version of research paper	Final roundup • Training, testing, documentation, implementation tactics • Finalizing digital student portfolios • Open Labs to work on final project	• Consult with instructor and peers for help with final project • Test partner's project for errors and help partner correct the errors
<u>Finals, December 5</u>	• 2 PM class: Monday, 1:40-3:40 • 6 PM class, Monday, 6-8 PM	• Final exam

A Case Study: Applying Critical Thinking Skills to Computer Science and Technology

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Abstract

A majority of incoming college freshmen and sophomores have not applied their critical thinking skills as part of their learning process. This paper investigates how students acquire their critical thinking skills while facing the copyright, fair use, and internet security challenges in this contemporary digital society. The findings show that 90 percent of students were not able to apply their critical thinking skills with valid reasoning when they made a decision based on the case scenarios.

Keywords: Copyright, Fair Use, Critical Thinking Skills, Computing Education, Higher Education

1. Introduction

Where have all the computer science educators in K-12 education gone? According to the executive summary, Running on Empty: The Failure to Teach K-12 Computer Science in the Digital Age, "computer science education is being pushed out of the K-12 education system in the U.S. In the past five years there has been a marked decline in the number of introductory and Advanced Placement computer science courses being taught in secondary schools. (ACM, 2011, P. 1)" Not only are they being pushed out, but in Texas they are non-existent. Looking at the Official State Board of Education Administrative Rules Regarding Graduation Requirements, Chapter 74. Curriculum Requirements, Subchapter F. Graduation Requirements, Beginning with School Year 2007-2008, there are absolutely no requirements for any computer science courses in the core curriculum required to graduate. The Recommended High School Program requires at least 26 credits. The Core Courses consist of 4 English credits, 4 Mathematics credits, 4 Science Credits (Biology, Chemistry, Physics only), 3 ½ credits for Social Studies, Economics ½ credit, 2 credits for Languages other than English, 1 credit for Physical education, Speech ½ credit, 1 credit of Fine arts, 5 ½ credits of Electives (TEA, 2011).

All of this is good with one blatant exception. They are not being taught anything about the one medium that drives our economy and world - Computers! Most of them are quick to tell you that they know how to do e-mail, write on Facebook, etc. Try to find one that knows the

difference between a microprocessor and a motherboard. They don't know how computers came to be such an integral part of our everyday lives. Students are not schooled in the history of computers, computer languages, hardware, software, databases, networks, algorithms, graphics, information retrieval, network security, etc. When they get to college and are faced with having to take a computer course, some panic and actually tell the instructor that they are "computer illiterate" and don't understand anything about computers. The colleges and universities are then stuck with the ominous task of doing what the high schools should have done, teach beginning computer classes that cover not only the basics of computing, but also cover such topics as copyright, ethics, and internet security. As far as the students are concerned, if it is on the web, it's free and they should be able to do what they want with the information. Who ever heard of copyright laws or fair use? Then the concern arises, how do the student apply their critical thinking skills to make a decision of to download or not to download while facing seemingly free and safe resources on the screen?

2. Literature Review

The following subsequences define the terminologies used in this paper including copyright, fair use, critical thinking skills, and internet security.

Copyright

In Title 17 of the United Stated Code, the ownership of copyright is defined as "copyright in a work protected under this title vests initially in the author or authors of the work (Copyright, 2011, p.2)." In other words, copyright law is meant to give a particular work's creator control over its copying and distribution for an extended period of time (Berti, 2009). Campidoglio, Frattolillo, and Landolfi (2009) stated that "copyright protection is usually considered as a basic requirement by authors and web content vendors, whereas it is perceived as a use restriction by web users (p. 522)." Sadly to say, Berti (2009) observed that most copyright infringement today is committed by young adults and teenagers who seem to be unaware that they are violating author rights. A common thought from the copyright infringement cases was "If I can get it for free, why I should pay for it?"

Yang and Zheng (2004) stated that copyright protection depends largely on communicative technological innovations which should urge the traditional copyright protection to be upgraded with technological progress, because of failing to protect digital copyrights. In order to reward author creativity and stimulate innovation while safeguarding web users' interests, Campidoglio, Frattolillo, and Landolfi (2009) suggested that some forms of prevention measurements might need to be addressed to deter illegal sharing or reproduction of standards. Berti (2009) agrees that the current copyright laws are outdates which were written for an analog world instead of the digital one in which we live today. In this paper, we will summarize our suggestions based on our findings and reinforce the needs of copyright laws awareness in this digital society.

Fair Use

Fair use is defined as "the right to reproduce or to authorize others to reproduce the work in copies or phonorecords (P.1)." Section 107 of the United States Code lists the various purposes of a particular work which may be considered fair, such as "criticism, comment, news reporting, teaching, scholarship, and research (P. 1)." However, the doctrine of fair use in the US is not very clear which simply provides the factors to let the users consider whether fair use of an original work exists (Berti, 2009; Campidoglio, Frattolillo, & Landolfi, 2009). Campidoglio, Frattolillo, and Landolfi (2009) stated that fair use "has been repeatedly invoked to prevent copyright owners from misusing their copyrights in order to stifle legitimate marketplace competition (p. 524)." Therefore, fair use can be considered a limitation upon a copyright holder's exclusive rights which permits the public to use a copyrighted work for limited purposes.

Internet Security

From the educational perspective, information security and safety in our digital society has become a main concern; especially, how university students' computing behaviors enhance or depreciate the safety and security of information in their domain (Lomo-David & Shannon, 2009). Crowley (2003) stated that a growing awareness that society is increasingly dependent upon information systems which have proven vulnerable. Thereafter, the corporation and educational digital communication infrastructure to the Internet should be the

frontline of the protection. Brodie, Karat, and Feng (2005) indicated that institutions understand the challenges that privacy poses but they do not employ new technology for privacy enforcement. Thereafter, the awareness program should be enforced with the privacy policies combined with password, forms of authentication, and/or biometric techniques for data protection.

Critical Thinking Skills

Ennis (1985) defined critical thinking as "reasonable, reflective thinking that is focused on deciding what to believe or do (p.46)." Ennis stated that the educators must go beyond Bloom's taxonomy to consider specific dispositions and abilities characteristic of critical thinkers who will decide on what to believe or do as the most practical higher-order thinking activity.

Woo & Wang (2009) suggested that the meaning of critical thinking often depends on values and culture which may be interpreted as "argumentative" or "being critical of others". Thus, from a pedagogic perspective, critical thinking skills can be learned by a given situation which is influenced by the level of questions asked (King, 1990). Jalongo, Twiest, and Gerlach (1999) observed that the critical thinking evolves with the following stages:

- Apply: The students use knowledge and understanding to complete a practical task.
- Analyze: While working on a practical task, the students break things down into their component parts.
- Synthesize: The students then will be able to combine and integrate various sources of information.
- Evaluate: At the end of the task completion, the students will be able to assess the value, merit, or worth of something.

For the context of this research, the case study was applied to implement the stages of critical thinking skills. The following section will detail the methodology and instrument design.

3. Methodology

Populations

The students who took the Introduction to Computers' courses were invited to participate in this research at the beginning of the fall semester in 2010. A total of 117 students participated in the survey, but eight of the collected samples were not completed. Therefore, 109 were valid for further analysis. Gall, Gall, and Borg (2003) suggested that the minimal total sample sizes for different hypothesis tests, a total of 42 samples are needed to provide a medium effect size at the .05 level of significance for the correlation coefficient tests. With 109 valid samples for this research, it fulfilled the minimum requirement for conducting the reliability analysis tests. The SPSS version 17.0 was utilized for testing the descriptive analysis and correlation tests.

Instrument

This research adopted the format from the National Science Foundation, Critical Thinking Assessment Test design (CAT). The CAT assessment (2011) was designed to investigate the students' critical thinking and reasoning skills by giving them the case studies scenarios. The CAT instrument provided by the National Science Foundation's CCLI (Course, Curriculum, and Laboratory Improvement) Program assesses the following critical thinking skills: (a) Evaluating Information, (b) Creative Thinking, (c) Learning and Problem Solving, and (d) Communication.

The context of this study will focus on two of the measuring groups which including (a) Evaluating Information and (B) Learning and Problem Solving.

There were two parts of the case studies designed to investigate the levels of our students' knowledge and critical thinking skills in copyright laws, fair use, and internet security. Part One of the survey given to the class prior to the discussion on copyright consisted of a scenario and questions analyzing the scenario. The scenario consisted of a technology specialist working for a school district that allowed teachers to use online collections for their multimedia projects in his lab. However, many wanted it on the network and the question became "Should he put it on the school districts network?" The Copyright statement and the Permitted Use statements are examples from one free download website and one commercial company. A Copyright statement presented stating that the website furnishing the media owned almost none of the content but it could be freely used. No warranty regarding the

copyright status was given. The Permitted Use statement granted the user a non-exclusive, non-transferable, non-sub licensable, limited and revocable right to access, use and display the site on any computer or electronic display device. The site could not be used for any other purpose and all copyrights, trademarks and other proprietary notice will be retained as the same as the original.

The students were given four questions to answer concerning the scenario in Part One. The first question consisted of whether or not the information should be uploaded to the district's network. The options were Yes, No, and Not Sure. The second question was to clarify their reasoning of why they chose the certain option. The third question sought to test their understanding of the fair use concept. The third question was "Is it fair use?" The options were Yes, No, and Not Sure. The fourth question was to provide reasoning for their decision in question 3.

Part Two of the test was about Internet Crime and Internet Security. An e-mail was used that one of the authors received in an attempt to gather private information. Most people have received them in the past. The e-mail consisted of a warning code to Webmail Account Users stating that your e-mail account will expire in 3 days. In order to keep your Inbox, you must reply to this e-mail with username and password along with some other information.

The first question asked if the e-mail was legitimate. The possible answers were Yes, No, and Not Sure. The second question was to provide reasons as to why the e-mail was legitimate or not. The last question was to consider the fact that the e-mail was a scam. The students were to identify the main item(s) that led them to believe that it could be a scam.

Grading

Each sample was graded by at least two graders. If the score was not identical, the third grader will review the answer and assign an appropriate score to seek for an average score from those three graders.

The scores were weighted with certain points based on the students' responses. Table 1 listed the suggested answers for each point. If the student answered Yes for question 1 and 3, the graders were to skip question 2 and 4. Those that answered Yes to question 1 and 3 were considered to not have any valid reasons for their decision. Only those that answered in the negative were considered as having valid reasons.

Table 1. Scoring Guide

Question	Point/s
(Part One) 1	0: Yes/Not Sure 1: No
2	Maximum of 3 points **Copyright** (Up to 2 points: 1 point for each line provided) Line 4: owns almost none of the content Line 5: almost all may be Line 8: probably do not need to Line 10: is believed to be accurate…. Line 10: does not provide any warranty Line 12: should make your own determination **Permitted Use** (1 point) Line 3: Which you are a user… Line 4: No other use of the Site and the information … is authorized
3	0: Yes/Not Sure 1: No
4	Maximum of 3 points **Copyright** (Up to 1 points: any line provided below) Line 4: owns almost none of the content Line 5: almost all may be Line 8: probably do not need to Line 10: is believed to be accurate Line 10: does not provide any warranty Line 12: should make your own determination **Permitted Use** (2 points: one point for each line) Line 3: Which you are a user Line 4: No other use of the Site and the information … is authorized
(Part Two) 5	0: Yes/Not Sure 1: No
6	Maximum of 2 points (one point for each line) Line 1: email address Incorrect grammars Line 10-13: message limitation (20 GB) Line 18 -22: Requesting personal information Line 30: .. activate your account
7	Maximum of 2 points (one point for each line) Line 1: email address Line 10-13: message limitation (20 GB) Line 18 -22: Requesting personal information Line 30: activate your account

4. Findings

Descriptive Results

Part One. For copyright issue, 67.9% of the students rated that this is a legitimate way to handle the data to have the copyrighted materials posted on the school network. This makes one wonder if they actually read the scenario or just skimmed it not completely understanding the question (see Figure 1).

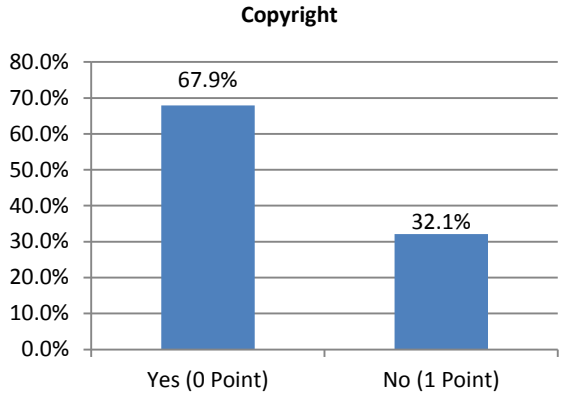

Figure 1. Copyright – Download Files

Less than 1% (.9%) could come up with valid reasons and 11% could provide only partial reasons as to why they felt that the technician should not put the information on the school's network (see Figure 2). Sadly to say, 88.1% of students could not provide valid reason/s to support their decision.

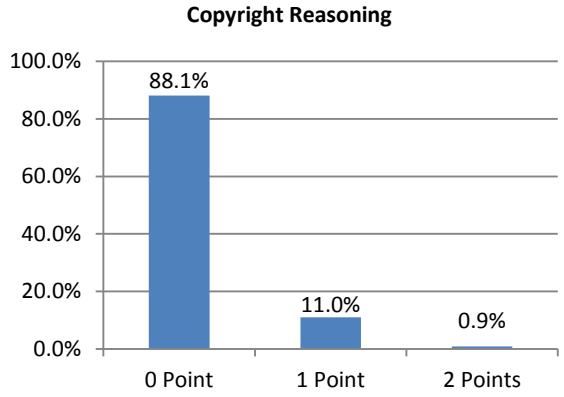

Figure 2. Copyright – Reasoning

For the fair use issue, 83.5% thought that this case met the definition of fair use (see Figure 3). It makes one wonder if students think that because something is available that they can do anything with it they desire. Intellectual property considerations seem to be beyond their comprehension. There were only 6.4% of students who could provide partial reasons of why the Fair use does not apply to this case (see Figure 4).

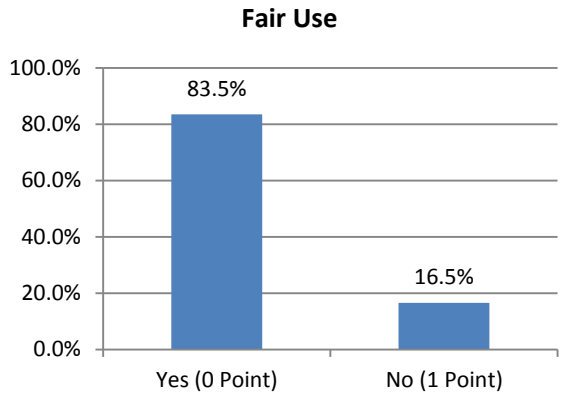

Figure 3. Fair Use – Download Files

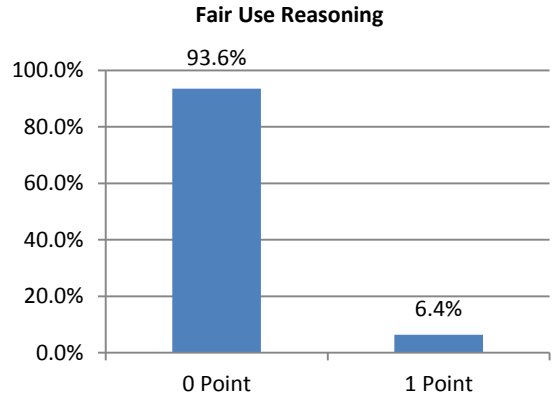

Figure 4. Fair Use – Download Files

Part Two. The email scam case was answered overwhelmingly with an 84.4% of students that believed the email was not legitimate (see Figure 5). However, only 9.2% could come up with valid reasons of how the email was not legitimate (see Figure 6). Out of 109 samples, 17 students (15.6%) felt that it was legitimate and it was ok to provide the personal information through the similar email. That means 17 more people scammed into giving out personal information. How do we stop our students from falling victim to this type of scam and making the e-mail scams be non-profitable? If 100% of the people that receive these types of e-mails would not respond, surely they would just go away? Probably a "pie in the sky" wishful thinking. It will never happen, although it should be our job to try to assure that those

types of scams will become a thing of the past. 66.1% identified such items as the e-mail address flag the legitimate issue (System Administrator [webteam.dept@w.cn]). The majority of the students caught this particular item. 9.2% identified at least 1 other item that made them suspicious.

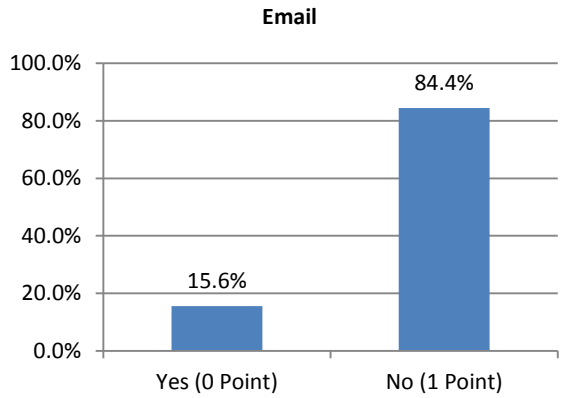

Figure 5. Email – Legitimate

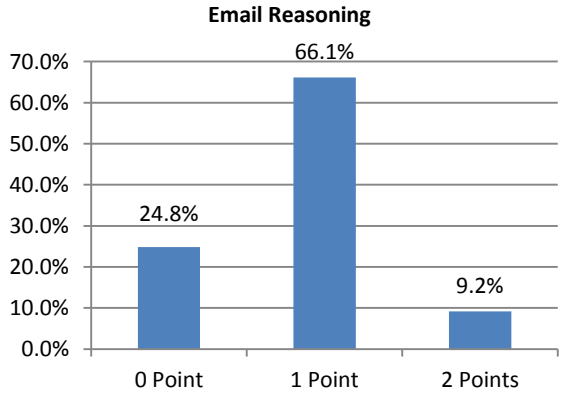

Figure 6. Email Legitimate Reasoning

As to whether the e-mail was a scam, 80.7% identified at least 1 item and 7.3% identified at least 2 things that made them suspicious (see Figure 7). This ranged from e-mail address to message limitation, requesting personal information and the fact that they were to "activate your account". The rest just "thought it sounded fishy".

Correlation with Critical Thinking Skills

From the correlation test results, the findings showed a significant correlation between the decision the students made and the reasons they provided. In other words, the students provided a better reasoning skill while they were making a right decision related to copyright, Fair use, and Internet security issues. Table 2 showed that the Spearman's rho varied from .387 to .474. Field (2003) stated that the Spearman's correlation coefficient is a non-parametric statistic which works by first ranking the data and then applying Pearson's equation to those ranks. The only item did not show the correlation was between the decision they made and believe that whether the email was a scam or not (Spearman's rho = .146.). This item revealed that the students were not protected by the common knowledge of internet security and cybercrime incidents. The results revealed that the students were not able to perform properly in the following areas: (a) evaluating information and (B) learning and problem solving.

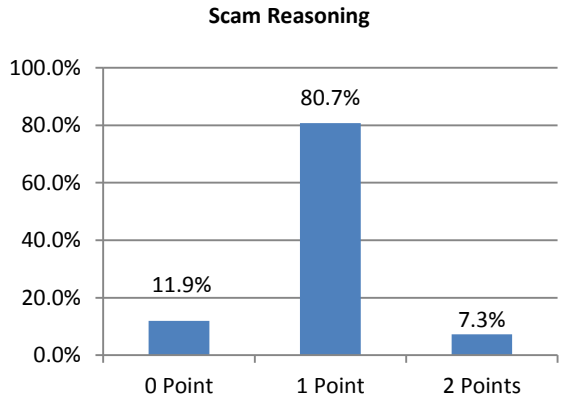

Figure 7. Email Scam Reasoning

Table 2. Critical Thinking Correlations
Note. N=109, ** Significant level: P<.01

Decision	Reasoning	Spearman's rho	Sig. (2-tailed)
Yes/No/ Not Sure	Copyright	.474	.000 **
Yes/No/ Not Sure	Fair Use	.387	.000 **
Yes/No/ Not Sure	Email Legitimate	.414	.000 **
Yes/No/ Not Sure	Email Scam	.146	.132

5. CONCLUSIONS

Reviewing the low scores we received, we wonder how we are failing in our responsibilities to offer the guidance. We haven't provided the students the tools they need to avoid being a

victim to some unscrupulous scammer or ending up in court or jail because of a copyright violation. As usual, the answer probably lies somewhere in the middle. With the thinking of our State Board of Education requirements for graduation from our high schools, we had completely ignored the responsibility of making sure our future business leaders are knowledgeable in the technology available today. Therefore, we will continue to have people falling victim to scammers, ignoring copyright and fair use laws as well as ethics and other subjects so vital today. As Crowley (2003) suggested that this growing awareness should lead to a demand for Information Systems Security training and education. Applying the same hope to resolve in copyright and fair use issues, the practitioners might need to emphasize on the importance of increasing education and awareness, justifying the pricing for distribution, improving digital watermarking, and digital right management technologies (Bertis,2009; Campidoglio, Frattolillo, & Landolfi, 2009).

We are entering the 21st century with 18th century thinking. Granted, budgets have been slashed and everyone has to do more with less. We all know the scenario. However scarce funds happen to be, doing less does not mean doing nothing! That seems to be the approach that the Texas Education Agency has taken in striking all computer science courses from the core curriculum. They have made a decision based on the quality of computer science courses in the high schools. At the present time, most are either non-existent or very poor because of the lack of qualified/certified computer science teachers. It's no wonder that they opted to cut that out of the curriculum. That has to change.

We need state certification programs for computer science teachers just as we have state certification programs for math teachers or reading teachers. Computer science is such an important part of our culture and life that it must be recognized as being as important to a students' education as math, English, history or Social studies. It's no wonder that the United States lags behind many other countries on students' performance in math and science. If we plan on catching up or pulling ahead of the rest of the developed countries in our education system, we need to take a hard look at what is deemed important in the education of our children. Certification programs and requirements for computer science teachers must be designed and implemented in the very near future to ensure that students are being taught computing science concepts and skills to better enable them to compete in the marketplace in the 21st century.

Our state legislatures need to be lobbied to make changes to the educational requirements for graduation if the State Board of Education fails to see the importance of computer science and computer technology education for high school students. It is no longer a luxury as the consequences of inaction on their part are delegating future generations to failure. Scams are increasing daily and many students do not have the resources, knowledge or critical thinking skills to combat this growing threat. Neither do they have the knowledge to differentiate between good websites and fraudulent ones or to be able to discern if something is free or copyrighted. The State Board of Education and our legislature are failing in their duty to provide for the education and welfare of our students.

Certification programs need to be implemented by the universities to guarantee that high school curriculums can include computer science and computer technology requirements for graduation. As it stands now, the requirements cannot be implemented due to the lack of certified teachers to teach computer science and computer technology. This has to change immediately! This is not something that can be put off any longer. Time is of the essence in this situation.

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Strategies for Ensuring Computer Literacy Among Undergraduate Business Students: A Marketing Survey of AACSB-Accredited Schools

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ABSTRACT

There is broad agreement that college students need computer and information literacy for their studies and to be competitive as graduates in an environment that increasingly relies on information technology. However, as information technology changes, what constitutes computer literacy changes. Colleges have traditionally used the freshman- or sophomore-level course in microcomputer applications/introduction to computers to assure basic literacy. There has been much discussion in schools of business about whether today's entering students have enough experience in computer applications from high school and work experience to omit the course. There is also ongoing debate about the appropriate balance of theory and application, as well as the appropriate format for the course. This research used a questionnaire administered electronically via www.SurveyMonkey.com to poll individuals nominated by the deans of schools of business accredited by the Association to Advance Collegiate Schools of Business (AACSB) as being the most appropriate for completing a survey on their school's computer literacy requirements. The instrument requests information in the following areas: (1) demographic data about the respondents and the institutions they represent, (2)

the structure and content of their computer literacy programs, (3) whether students are allowed to test out of courses, and if permitted, how many try to test out, how many succeed, and what are the standards to test out, (4) the contents of their computer literacy programs with percentages of time devoted to various aspects of computer literacy, and finally (5) the respondents' views of major influences on computer literacy programs.

Keywords: IS research toward educators, pedagogy, IS undergraduate curriculum, teaching computer literacy, Association to Advance Collegiate Schools of Business, AACSB, survey

1. INTRODUCTION

There is broad agreement college students need computer and information literacy for their studies and to compete as graduates in an environment that increasingly relies on information technology. The challenge for universities is to ensure students meet a minimum level of competency when using constantly changing technology. However, with the ever-increasing change in information technology, what constitutes computer literacy and fluency changes and universal definitions do not exist (McDonald, 2004).

Colleges of business have traditionally used the freshman- or sophomore-level course in microcomputer applications/introduction to computers to accomplish basic literacy. Yet, schools of business continue to discuss whether today's entering students have enough experience in computer applications from high school and work experience to omit the course. The business community agrees students need less computer theory and more application in Windows, Word, Access, Excel and PowerPoint (Spinuzzi, 2006; Wilkinson, 2006). The academic community continues to debate the appropriate balance of theory and application, as well as the appropriate format for the course and whether it should be continued (Stephens, 2006; McDonald, 2004). Computer literacy too can take a variety of forms, including software literacy (or the ability to use systems and software to search the Internet for information, use e-mail, and personal productivity tools), technical literacy (concepts and definitions of various information technologies), and information literacy (the ability to use IT efficiently and effectively to accomplish tasks). Dickson, Astani, Eriksson, Lee-Partridge, & Adelakun (2000) agreed what most call "computer literacy" is really "software literacy."

2. BACKGROUND

Robinson and Thoms (2001) agreed the literature on computer literacy is extensive and covers populations from K-12 students, to college students, to business executives, and to the general public. Their longitudinal study of computer knowledge suggested varied definitions of computer literacy and a variety of tests and measures for the constructs.

Most computer literacy studies have focused on students' skill and success in the introduction to computers course, examining a variety of experience variables, demographic variables, and students' self-reported skill levels on a variety of microcomputer applications (for a summary, see Baxter, Hungerford, & Helms, 2011).

Studies assessing students' perceptions of their abilities to excel in computer courses have considered a number of variables, including gender (Busch, 1995; Qutami & Abu-Jaber, 1997; Messineo & DeOllos, 2005), gender of a student's mentor (Goh, Ogan, Ahuja, Herring, & Robinson, 2007), ethnic minority status (Wilkinson, 2006), age (Reed, Doty, & May, 2005), cognitive learning style (Shiue, 2003), computer access and past experience (Albion, 2001; Cassidy & Eachus, 2002; Webster, 2004), use of e-mail (Divaris, Polychronopoulou, & Mattheos, 2007), prior computer training (Creighton, Kilcoyne, Tarver, & Wright, 2006), software knowledge (Tien & Fu, 2008), blue-collar and/or unemployed parents (Tien & Fu, 2008), ACT scores (Creighton et al., 2006), and GPA (Baxter et al., 2011).

Relevance of the Computer Literacy Course

McGowan and Cornwell (1999) found students entering business programs are competent in the traditional computer literacy areas and may not need a computer literacy course, but will need an introduction to their institution's unique computer environment. They suggested

scheduling proficiency exams and seminars in proficiency areas instead of offering a course.
Jones and Healing (2010) made a case for today's new generation of young learners who are often described as the "Net Generation" or "Digital Natives." They linked young people's attitudes and orientations to their lifelong exposure to digital, networked technologies.

The Joint IS 2010 Curriculum Task Force (2010) recommended "dropping the course focusing on personal productivity tools from IS programs." While the Task Force found most colleges require basic computer literacy, it believed "[m]ost high schools are preparing students in this area before they reach a higher education environment." (p. 28)

Despite these findings, other studies of students' abilities have indicated the computer literacy course is still needed. For example, when testing a sample of students, Robinson and Thoms (2001) found students did not know any more about computer technology in entering their first college of business computer course at the time of their study than they had in the past.

Oblinger and Hawkins (2006) suggested that when faculty, staff, and administrators see how easily students use technology, they may mistakenly assume students have more than adequate IT competency. They questioned whether students are competent or just overly confident and cautioned having no fear is not the same as having knowledge or skill.

Hawkins and Oblinger (2006) found technology to be nearly ubiquitous on campus and, although conversations about the digital divide were relatively uncommon, it remained incorrect to assume all students own a computer or have an Internet connection.

In their research, Creighton, Kilcoyne, Tarver, and Wright (2006) asked two related questions: Is a freshman-level microcomputer applications/ introduction to technology course obsolete? Are students, especially new freshmen, enrolling in the course already computer literate? Their research found students enrolling in such courses were not literate in general computer technology and spreadsheet applications, but were computer literate in the more familiar and often used word processing, e-mail, and Internet applications.
Rondeau and Li (2009) agreed many colleges of business assume incoming students possess high levels of computer abilities and are allowed to pass a computer proficiency exam (CPE) in lieu of the introductory information technology (IT) course. Yet, their study found students who actually completed the information technology course scored better in subsequent IT courses, and that the pass rate on the CPE was lower than that of the course, creating a backlog of students not ready to move on to more advanced courses. The authors suggested a hybrid approach to ensure students have the IT skills they need to progress.

Others have validated tests for monitoring technology literacy, matching skills important to organizations with the technology skills students need, like the Student Tool for Technology Literacy (see Hohlfeld, Ritzhaupt, & Barron, 2010). Determining students' computer literacy needs is important, particularly as universities have limited computer training dollars to spend in today's economy, yet must continuously provide quality education for their students.

Jones, Windsor, and Visinescu (2011) found that, while current students are more comfortable with various information technologies, it would be a mistake to assume that they have the IT skills necessary for the business world or that they will be able to pick these skills up on their own.

Course Design

The computer literacy course has undergone significant change over time. For example, at one state college the authors are familiar with, prior to 1984 the course was primarily lecture-based and covered general computer hardware and software principles, as well as data processing organization and procedures. There was also some hands-on interaction with a mini-computer running programs written in the BASIC programming language. From 1984 through 1988 the course emphasized programming in BASIC. This approach was based on the idea that to really understand a computer, a student needed to understand the logic behind its programming. As more application software for microcomputers became available, it became clear most general business problems were actually being solved with productivity software running on microcomputers using the Microsoft operating system (MS-DOS and later MS Windows). This led to changing the course after 1988 from a programming course to a course emphasizing productivity software. Though

small adjustments have occurred over subsequent years as versions of Windows and Microsoft Office have changed, the course has maintained that emphasis to the present.

Since required computer literacy competencies continue to change at the high school level, it is important that universities monitor the design and content of the computer literacy curriculum to provide an adequate computer literacy background for students (Hindi, Miller, & Wenger, 2002).

Stephens (2005) developed a decision support system built around a self-efficacy scale that can be implemented to perform training needs assessment. The system can determine who requires training and which training mode is most appropriate. This proposed system would eliminate redundant services.

Sharkey (2006), in her study of information fluency and computer literacy, found universities are responding with a more rapid integration and adoption of technology and are emphasizing information use and retrieval.

Grant, Malloy, & Murphy (2009) studied student perceptions of their abilities as opposed to their actual abilities. The researchers redesigned the introductory computer course to concentrate on skill deficiencies in spreadsheets, while letting students show their proficiency in word processing and presentation software. To do this, the researchers required students to take more training to improve their deficient skills.

Hollister and Koppell (2008) studied the information technology course in an assurance of learning program in an undergraduate program at an AACSB-accredited business school to redesign the content and pedagogy of the computer literacy course. Mykytyn (2007) agreed that, while colleges of business have dealt with teaching computer literacy and computer application concepts for many years, teaching tool-related features in a lecture format in a computer lab may not be the best instructional mode. He suggested problem-based learning as an alternative for teaching computer application concepts, operationally defined as Microsoft Excel and Access. Ballou and Huguenard (2008) studied an introduction to computer course with both a lab and lecture component and found higher levels of perceived computer experience positively affected lecture and lab homework and exam scores.

Interestingly, students' skills seem to be changing with the pervasiveness of technology, with students preferring texting and the use of social media while college classes emphasize a variety of computer skills. Given the debate over the computer skills and abilities of today's students and on-going changes in computer literacy course design, it is necessary to first consider the state of the introduction to computers course in schools of business today.

3. METHODOLOGY

The primary research question for this project is simply this: What are AACSB-accredited business programs doing to ensure their students have the basic computer skills they need for further study and for the workplace?

Data Collection

We collected data for this project using a two-step process. First, we contacted the deans of AACSB-accredited undergraduate business programs in the United States. We asked them to identify the faculty member in their program who could best complete a survey on their computer literacy requirements. Second, we sent emails to the potential faculty respondents who were identified by their deans. The emails referred the potential respondents to a questionnaire on SurveyMonkey.com.

We initially emailed 416 business deans from the then list of 453 AACSB-accredited schools in the U.S. with an undergraduate business program. Of those, 32.0 percent identified a potential respondent. We emailed each of those contacts, receiving 92 responses for an effective response rate of 20.3% against the original sample of all AACSB-accredited undergraduate business programs in the U.S. Not all respondents answered all questions.

Survey Instrument

Based on the review of the literature and an expert panel of four faculty members, the questionnaire was designed, pre-tested with faculty not used in the final sample, and modified based on minor changes in wording, format, and order.

We begin answering the research question with demographic data about the respondents and the institutions they represented. We then

describe the structure and content of their computer literacy programs. We also look at whether students are allowed to test out of courses, how many tried to test out, how many succeeded, and what standards they must meet to test out. We follow that with our analysis of the contents of computer literacy programs and the amount of time devoted to each aspect of computer literacy. Finally, we discuss the respondents' views of major influences on computer literacy programs. The complete survey is presented in Appendix B.

Survey Population and Sample Demographics

We describe the academic background, age, gender and experience of the respondents in this section. Table 1 in Appendix A shows the academic positions, age ranges, gender, highest degrees, Academically Qualified (AQ) or Professionally Qualified (PQ) status, and academic fields of the respondents. Two things stand out in Table 1. First, the fields for the highest degree vary widely among the respondents. While many respondents have their highest degrees in MIS, they are far from the majority. The others have a wide variety of academic backgrounds. Secondly, a higher proportion of women responded than expected. Of the women, only ten had doctorates, but nine of those ten had doctorates in MIS.

Table 2. Characteristics of the Respondents' Institutions

Number of Business Students	#	Number of Total Students	#
<100	0	501-1000	0
101-200	2	1001-2000	3
201-300	3	2001-3000	3
301-400	3	3001-5000	8
401-500	2	5001-7500	13
501-750	9	7501-10,000	6
751-1000	14	10,001-15,000	10
>1000	41	>15,000	31

Table 2 shows few surprises. Since the survey was sent to faculty at AACSB-accredited institutions, the responses are biased toward larger business programs and larger institutions. Most respondents were at institutions having in excess of 1,000 business students and more than 10,000 total students. This suggests that the respondents reflect the population of AACSB-accredited business schools.

4. FINDINGS

The Structure of Computer Literacy Programs

We define the structure of computer literacy programs based on whether students are required to take specific classes, how many credit hours they take in those classes, and whether the school is on the quarter or semester system.

Table 3. Structure of Computer Literacy Programs

Please choose the answer that best describes the computer literacy requirements for your undergraduate business students.	#	%
They MUST take the same computer literacy course or courses as most other students, regardless of major.	23	28%
They MUST take a business computer literacy course or courses designed specifically for our business programs	49	60%
They MAY take courses from other areas (outside business) to meet the computer literacy requirements, but only if those courses are on a list approved by the business program	8	10%
They MAY take the same course as most other students, plus a computer course or courses designed for business.	1	1%
Other	10	

Table 3 shows how schools coordinate with their own courses and courses taught by other parts of their institutions. A substantial number of schools require business students to take the same computer literacy course as most other students, but the majority require them to take

a class designed specifically for business. Eight programs allow students to take courses outside business, but only if they are on an approved list. Only one respondent allows students to take the same courses as other students plus a course designed for business. The "Other" category produced responses in three conditions: (1) no computer literacy requirement, (2) computer literacy requirement covered by an on-line, no credit training program, and (3) computer literacy is integrated into other classes.

Table 4 shows the number of credit hours required by the responding schools. The majority of respondents, 43, indicated they require three credit hours in computer literacy courses. The next largest group, 14, required six hours (or two courses). A total of 14 respondents required less than three hours. Only four required more than six credit hours. The schools with many credit hours or very few credit hours tended to be very large or very small. The schools in the middle of our spectrum on size also tended to require the most common number of credit hours, three.

Table 4. Structure of Computer Literacy Programs—Credit Hours

How many credit hours do your undergraduate business students take to meet your computer literacy requirement? (Including business and non-business computing courses.)	#	%
1	9	11%
2	5	6%
3	43	52%
4	6	7%
5	2	2%
6	14	17%
7	1	1%
8	1	1%
9	2	2%

Eighty-one respondents were on the semester system and only ten on the quarter system. The number of hours required did not vary based on semesters versus quarters. Put another way, schools on the quarter system did not necessarily require more hours than those on the semester system. One of the ten schools on the quarter system indicated they were in the process of converting to semesters.

As Table 5 shows, most respondents, 47, do not allow students to test out of computer literacy requirements. Of those that do allow testing out, most, 25, allow students to test out of all the courses, while a few, 13, allow testing out of only part of the computer literacy requirement. The issue of testing seems to challenge how programs deal with computer literacy in an age when many students arrive on campus at least believing that they have considerable computer skills. The testing determines whether they have the right skills.

Table 5. Structure of Computer Literacy Programs—Testing Out Allowed

Please check the box beside the choice that best describes your computer literacy program.	#	%
Our business undergraduate students may test out of all our computer literacy courses.	25	29%
Our business undergraduate students may test out of some of their computer literacy courses.	13	15%
Our business undergraduate students are not allowed to test out of computer literacy courses.	47	55%

Table 6 shows that most students do not try to test out of computer literacy courses even though their business programs allow it. Only two respondents reported that more than half of their students tried to pass the computer literacy tests. At one of these schools, less than 25% of the students who tried the test, passed it; at the other, over 75% who tried the test, passed it. Both schools allowed unlimited attempts at the test (See Tables 6 and 7). If a high percentage of students attempt the test, then the school needs to have clear processes for such testing, especially at larger schools. The data suggest that even at schools where testing out of the course(s) is allowed, it is not encouraged.

Table 6. Structure of Computer Literacy Programs—Percent of students who try to test out.

Percentage ranges	#
0-10%	25
11-20%	7
21-30%	3
31-40%	0
41-50%	1
>50%	2

Table 7 suggests that students at some schools have a good chance of passing the test; but at other schools, a poor chance. Schools with more extensive coverage of operating systems and databases tended to have lower pass rates than those with less coverage of those topics.

Table 7. Structure of Computer Literacy Programs— The percentage of students who try to test out who passed the test.

Percentage ranges	#
0-25%	15
26-50%	10
51-75%	4
>75%	9

Most schools that allow students to test out required a 70% score to pass. A few required 80%; only one allowed students to pass with 60%. This is shown in Table 8.

Table 8. Structure of Computer Literacy Programs— Percentage score required to pass the computer literacy test.

Percentage score	#
60%+	1
70%+	27
80%+	13

Coverage: What AACSB Programs Teach in Computer Literacy Programs

As businesses use more and different software packages, programs, and systems, computer literacy requirements need to change. But first we need a benchmark for what computer literacy programs are doing now. This section examines what is being covered in computer literacy courses and what percentage of class time is being used for each topic, program, or package.

First, we look at what is being covered: We ask about operating systems, word processing packages, presentation packages, spreadsheets, databases, drawing programs, collaboration programs, email, Internet search, and more. Table 9 in Appendix A shows what percentage of class time is used for each of these topics. Some get little attention from any of the respondents; others get a great deal from nearly everyone, reflecting what most consider the core of computer literacy for business.

Spreadsheets dominate the percentages. Table 9 shows a rating score that simply assigns a ranking score to each percentage category in the choices: 1 for 1-5% and 6 for >50%. Using this scale, spreadsheets lead the rest in taking course time, followed by databases, presentation software, and word processing. Hardware concepts, software concepts, computer ethics, and operating systems take up a middling amount of time, while email, wikis, and drawing programs get little time.

Two topics that fell near the bottom deserve special comment: Internet search and social media. Both have significant business application at this point, but most programs spend little time on them, at least as part of computer literacy. They may cover them to a greater extent in classes that come later in the curriculum, but they get little attention as areas of computer literacy at most schools.

The "other" category got the second highest score on this rating system. The comments mentioned only one additional topic more than once: security was mentioned five times. Other commentators mentioned HTML, networking, data mining, supply chain management, and website design, but these were all single mentions.

Second, we look more specifically at what software is covered in the key, common areas. Table 10 in Appendix A shows the dominance of Microsoft. For operating systems, we found 18 different combinations of the operating systems shown. By far the most common was Windows 7 by itself, with either Vista or XP or both. But few schools spent a substantial portion of class time on operating systems; those that spent more time, covered more systems. One school covered every operating system listed; that school also spent 36-50% of its class time on operating systems. Word, Excel, and PowerPoint dominated their categories, as did Access, although a few schools also covered FilePro, SQL Server, or MySQL. Social media, Internet search, and collaboration tools, when covered, were focused mostly on the dominant packages: Facebook, Twitter, LinkedIn, Google, and Google Docs. Email, wikis, and drawing packages received little or no attention at most schools. Again, when they were covered, the coverage was primarily focused on the better known names: Visio, Gmail, Outlook, Google Sites, and Wikispaces.

Influences on Computer Literacy Programs

Our questions on these items used a five point Likert-type scale ranging from strongly agree to strongly disagree. In this section of the survey questionnaire, we asked for the respondents' degree of agreement with items related to students' computer skills and the influence of a list of factors on computer literacy programs: technology, student computer skills, budgets, state laws, and accreditation.

The first two items asked about the computer skills of traditional students (23 years old or younger) versus those of non-traditional students (24 and older). (This classification follows Justice, 2001.) More respondents thought non-traditional students had better skills than traditional students, but a substantial number were not sure about that choice. Most respondents thought that students come in with better computer skills now than five years ago. Most believe that the skill sets for computer literacy have changed in the last five years. Also, most respondents believe that the changes in student skills have driven changes in computer literacy courses.

Technology was the strongest driver of changes in computer literacy courses according to these respondents, followed by student skills, and amount of time available to teach the classes. A few saw state budgets and accreditation as restrictive, but most did not. Many state university systems enforce fairly strict limits on the number of hours required for degrees, which we believed might be more of an issue than it proved to be. Of course, these responses included private as well as public institutions, so that may influence this score. As a group, the respondents were uncertain whether they would add more computer literacy courses in the future. See Table 11 in Appendix A.

5. DISCUSSION & CONCLUSIONS

This research shows that computer literacy programs paid little attention to social media; and even when it is covered, only a limited range of applications is covered. There are dozens of applications, many receiving widespread use, especially in large businesses and multi-national corporations. Should these media be included in computer literacy or are these subjects of study in courses later in the curriculum (e.g., marketing, advertising, management, strategy, or MIS)? It is clear that students will need to know how to use social media for business purposes. But where do they fit into the curriculum? This question needs an answer.

This research is primarily descriptive. It profiles what AACSB-accredited business schools currently offer for computer literacy. It does not measure the success of the computer literacy course from the perspectives of students, of professors further along in the curriculum, or of employers who hire the products of these programs. These open issues suggest key directions for future research.

6. AREAS FOR FUTURE RESEARCH

More research is needed to assess the skills of incoming students as well. These skills still vary greatly, so business schools need processes for ensuring students have a specific set of skills appropriate for further study and for the workplace. This research also raises an even broader question: Are business schools teaching the correct topics and applications for computer literacy?

These programs have changed little since 1988, yet technology, students' computer skills, and

the needs of business have changed dramatically.

Suggested methodologies for this research would include a survey of one or more "expert" panels including employers and business and/or computer applications faculty. Similarly, research is needed to determine what skills students have prior to taking the course. If students are now more computer savvy and already have the needed skills, it is a waste of time and resources to require them to take computer literacy course(s). Is there an expert system or similar approach that can reliably assign students to groups that best match their computer skills? It may be that the course(s) should be broken into modules and a pre-test used to determine which (if any) modules the student should take.

While the AACSB is generally considered to be the most prestigious of the accreditation bodies for schools of business, there are two other Council for Higher Education Accreditation (CHEA) recognized business accreditation groups in the U.S.: (1) the Association of Collegiate Business Schools and Programs (ACBSP) and (2) the International Assembly for Collegiate Business Education (IACBE). More technical programs, such as those in Computer Information Systems, may be accredited by ABET, formerly the Accreditation Board for Engineering and Technology. Examination and comparison of the strategies used by these groups to ensure computer literacy among their undergraduate students might be illuminating.

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APPENDIX A

Table 1. Academic and Personal Demographics of Respondents

Academic Position	#	Highest Degree	#	Field of Highest Degree	#	Age	#	Years at School	#
Academic Staff	12	Doctorate	51	Computer Science	1	<25	0	<3 years	2
Instructor	14	Masters	23	Management Information Systems	26	26-35	3	3-5 years	7
Assistant Professor	3	**Gender**		Accounting	1	36-45	14	6-10 years	14
Associate Professor	11	Male	47	Quantitative Methods	3	46-55	22	>10 years	51
Full Professor	25	Female	26	Engineering	4	>55	33		
Adjunct	0	**AQ or PQ**		Education	12	**Tenure**			
Other (please specify)	10	AQ	45	MBA	10	Tenured	33		
		PQ	16	Information systems	3	Tenure track	12		
		Neither	3	Other	14	Non-tenure track	20		

Table 9. Topics in computer literacy classes and the percentage of class time devoted to each topic.

Please show which areas of computer literacy you cover and the percentage of class time devoted to each area.

Answer Options	1-5 %	6-10 %	11-20 %	21-35 %	36-50 %	>50 %	N/A	Rating Average	Response Count
Operating systems	26	20	4	0	1	0	11	1.63	62
Word processing	18	17	12	6	1	0	14	2.17	68
Spreadsheets	4	10	22	16	7	14	2	3.74	75
Presentation packages	16	22	7	9	2	0	13	2.27	69
Databases	5	16	23	11	3	2	9	2.95	69
Drawing packages	15	0	1	0	0	0	39	1.13	55
email	25	5	0	0	0	0	27	1.17	57
Social media	22	12	1	0	0	0	23	1.40	58
Internet search	26	12	3	0	0	0	20	1.44	61
Wikis	22	3	0	0	0	0	31	1.12	56
Collaboration tools	18	12	3	0	1	0	22	1.65	56
Hardware concepts	20	18	6	3	0	0	14	1.83	61
Software concepts	19	22	8	1	1	0	12	1.88	63
Computer ethics	20	20	5	0	0	0	14	1.67	59
Others	4	5	6	4	1	1	18	2.81	39
Other (please specify)									20
								answered question	**76**
								skipped question	**16**

Table 10. Specific programs and packages used in covering each topic.

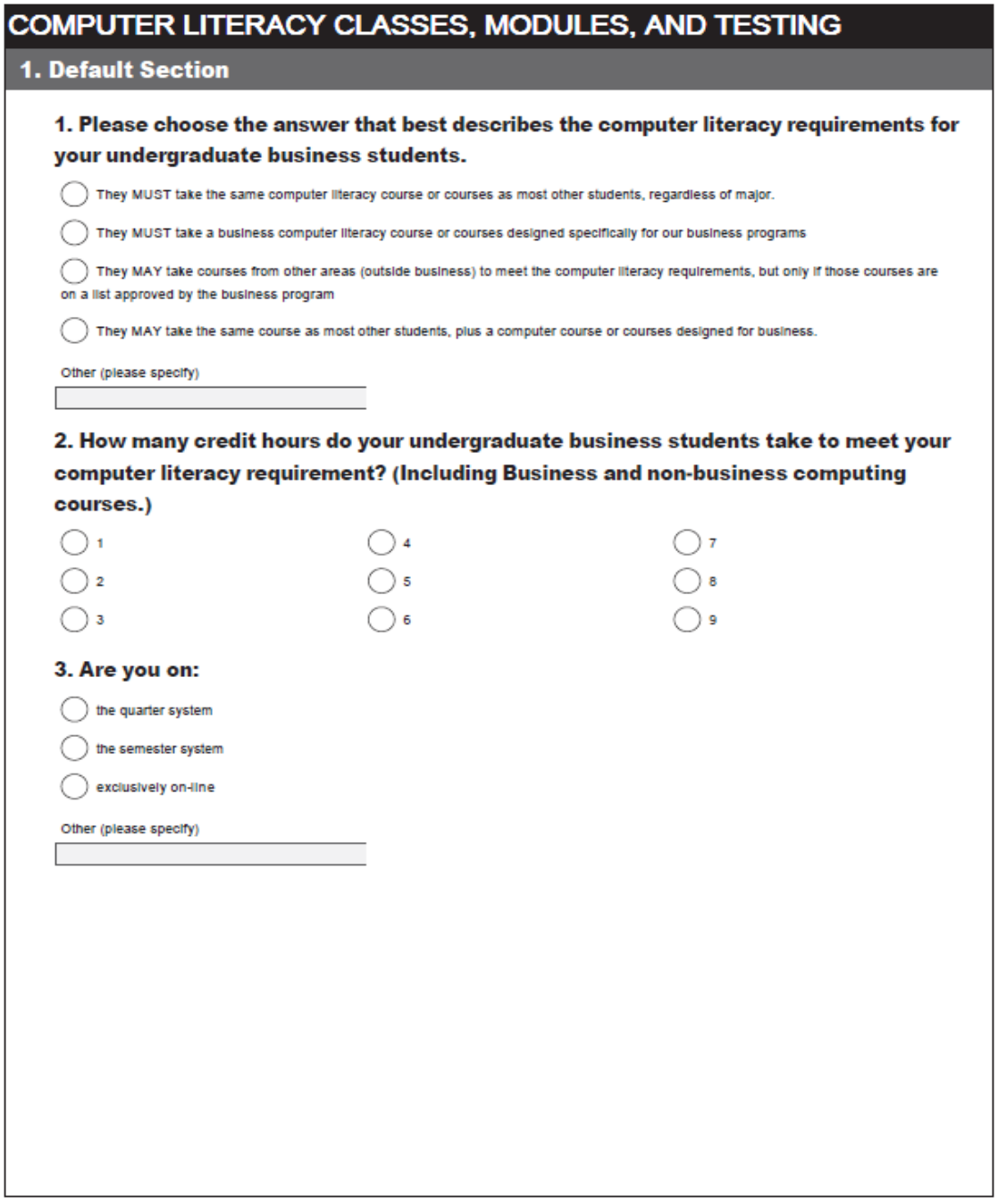
Which packages do you use when you cover each topic?

Answer Options	Software packages (Number of Respondents Using)
Operating systems	Windows 7 (49), Vista (15), XP(23), Mac OS(8), Unix (5), Linux (13), None (18)
Word processing	Word 2010 (42), Word 2007 (28), None (19)
Spreadsheets	Excel 2010 (55), Excel 2007(36), Excel for Mac 2008(2), None (1)
Presentation packages	PowerPoint 2010 (41), PowerPoint 2007 (29), PowerPoint for Mac 2008 (2), None (19)
Databases	Access 2010(43), Access 2007(30), FilePro (2), SQL Server(3), MySQL(2), None (15)
Drawing packages	Visio (3), Draw(1), None (62)
email	Gmail (9), Hotmail(1), Yahoo!Mail(1), Outlook(9), None (48)
Social media	Facebook (26), MySpace(6), Twitter(17), LinkedIn(17), None(46)
Internet search	Google (31), Yahoo!(5), Bing(12), Ask.com(3), About.com(2), Dogpile(3), None(38)
Wikis	MediaWiki(2), Wikispaces(3), Google Sites(3), None(59)
Collaboration tools	Google Docs(24), Sharepoint(6), Dropbox(5), None(43)

Table 11. Influences on Computer Literacy Courses

Please indicate your agreement or disagreement with the following statements						
Questionnaire Items	**Strongly Agree**	**Agree**	**Not sure**	**Disagree**	**Strongly Disagree**	**Rating Average**
Students with work experience have better computer skills than students without work experience.	13	34	19	8	0	2.30
Traditional age students (23 years old or younger) have better computer skills than non-traditional (24 and older) students.	4	22	24	19	5	2.99
Most of our students enter our program with better computer skills now than five years ago.	19	25	11	14	4	2.44
Changes in student skills have driven changes in our computer literacy courses in the last five years.	21	25	14	13	1	2.30
Changes in technology have driven changes in our computer literacy courses in the last five years.	26	35	4	9	0	1.95
The skill sets needed for computer literacy have changed dramatically in the last five years.	11	32	11	17	3	2.58
Our computer literacy courses have changed dramatically in the last five years.	15	28	8	19	3	2.55
We do not have enough time in our courses to cover everything needed for computer literacy.	15	36	8	13	1	2.30
Our budget limits what we can teach in our computer literacy courses.	9	15	14	29	6	3.11
We will require more courses for computer literacy in the future than we require now.	4	5	19	34	12	3.61
State law limits what we can do in computer literacy.	2	1	19	23	29	4.03
Accreditation limits what we can do in computer literacy.	1	6	13	33	19	3.88

APPENDIX B: SURVEY INSTRUMENT



COMPUTER LITERACY CLASSES, MODULES, AND TESTING

1. Default Section

1. Please choose the answer that best describes the computer literacy requirements for your undergraduate business students.

- ◯ They MUST take the same computer literacy course or courses as most other students, regardless of major.
- ◯ They MUST take a business computer literacy course or courses designed specifically for our business programs
- ◯ They MAY take courses from other areas (outside business) to meet the computer literacy requirements, but only if those courses are on a list approved by the business program
- ◯ They MAY take the same course as most other students, plus a computer course or courses designed for business.

Other (please specify)

2. How many credit hours do your undergraduate business students take to meet your computer literacy requirement? (Including Business and non-business computing courses.)

◯ 1	◯ 4	◯ 7
◯ 2	◯ 5	◯ 8
◯ 3	◯ 6	◯ 9

3. Are you on:

- ◯ the quarter system
- ◯ the semester system
- ◯ exclusively on-line

Other (please specify)

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COMPUTER LITERACY CLASSES, MODULES, AND TESTING

2. Testing out of computer literacy courses

This section is about testing out of computer literacy courses. If your students are not allowed to test out of computer literacy courses, checking the appropriate box should automatically take you to the next section of the survey questionnaire. If they are allowed to test out of computer literacy courses, please answer the other questions in this section.

1. Please check the box beside the choice that best describes your computer literacy program.

◯ Our business undergraduate students may test out of all our computer literacy courses.

◯ Our business undergraduate students are not allowed to test out of computer literacy courses.

◯ Our business undergraduates students may test out of some of their computer literacy courses.

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COMPUTER LITERACY CLASSES, MODULES, AND TESTING

3.

1. What percentage of your undergraduate business students TRY to test out of computer literacy courses?

- ◯ 0-10%
- ◯ 11-20%
- ◯ 21-30%
- ◯ 31-40%
- ◯ 41-50%
- ◯ >50%

2. Of the students who try to test out of the computer literacy courses, what percentage pass the test?

- ◯ 0-25%
- ◯ 26-50%
- ◯ 51-75%
- ◯ >75%

3. To test out of a computer literacy course, what score must students make on the test?

- ◯ 50%+
- ◯ 60%+
- ◯ 70%+
- ◯ 80%+
- ◯ 90%+

4. How many times may a student attempt to test out of a class?

- ◯ only 1
- ◯ 2
- ◯ 3
- ◯ no limit

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COMPUTER LITERACY CLASSES, MODULES, AND TESTING

4. Computer Literacy Coverage

Please let us know which areas you cover and what percentage of coursework is dedicated to each area. For example, if your students take one three hour course for computer literacy, then show what percentage of that course is devoted to each area. If your students take more than one course, what percentage of the total computer literacy program (i.e. percentage of all courses) is devoted to each area.

1. Please show which areas of computer literacy you cover and the percentage of class time devoted to each area.

	1-5%	6-10%	11-20%	21-35%	36-50%	>50%	N/A
Operating systems	◯	◯	◯	◯	◯	◯	◯
Word processing	◯	◯	◯	◯	◯	◯	◯
Spreadsheets	◯	◯	◯	◯	◯	◯	◯
Presentation packages	◯	◯	◯	◯	◯	◯	◯
Databases	◯	◯	◯	◯	◯	◯	◯
Drawing packages	◯	◯	◯	◯	◯	◯	◯
email	◯	◯	◯	◯	◯	◯	◯
Social media	◯	◯	◯	◯	◯	◯	◯
Internet search	◯	◯	◯	◯	◯	◯	◯
Wikis	◯	◯	◯	◯	◯	◯	◯
Collaboration tools	◯	◯	◯	◯	◯	◯	◯
Hardware concepts	◯	◯	◯	◯	◯	◯	◯
Software concepts	◯	◯	◯	◯	◯	◯	◯
Computer ethics	◯	◯	◯	◯	◯	◯	◯
Others	◯	◯	◯	◯	◯	◯	◯

Other (please specify) _____

2. Which operating systems do you cover in your computer literacy courses? Please check all that apply.

☐ Windows 7 ☐ Linux ☐ None

☐ Windows Vista ☐ Unix

☐ Windows XP ☐ Mac OS X

Other (please specify)

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COMPUTER LITERACY CLASSES, MODULES, AND TESTING

3. Which word processing programs do you cover in your computer literacy courses? Please check all that apply.

- ☐ Word 2010
- ☐ Word 2008 for Mac
- ☐ Word 2007
- ☐ Word 2003
- ☐ WordPerfect
- ☐ Pages for Mac
- ☐ Writer (Open Office)
- ☐ None

Other (please specify)

4. Which spread sheet packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ Excel 2010
- ☐ Excel 2008 for Mac
- ☐ Excel 2007
- ☐ Excel 2003
- ☐ Quattro Pro
- ☐ Numbers for Mac
- ☐ Calc (Open Office)
- ☐ None

Other (please specify)

5. Which presentation packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ PowerPoint 2010
- ☐ PowerPoint 2008 for Mac
- ☐ PowerPoint 2007
- ☐ PowerPoint 2003
- ☐ Presentations (WordPerfect)
- ☐ Keynote for Mac
- ☐ Impress (OpenOffice)
- ☐ None

Other (please specify)

6. Which database packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ Access 2010
- ☐ Access 2007
- ☐ Access 2003
- ☐ FilePro
- ☐ SQL Server
- ☐ MySQL
- ☐ Base (OpenOffice)
- ☐ None

Other (please specify)

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COMPUTER LITERACY CLASSES, MODULES, AND TESTING

7. Which email packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ Gmail
- ☐ Yahoo! Mail
- ☐ Mail for Mac
- ☐ Hotmail
- ☐ Thunderbird (Firefox)
- ☐ None

Other (please specify)

8. Which social networks do you cover in your computer literacy courses? Please check all that apply.

- ☐ Facebook
- ☐ Twitter
- ☐ None
- ☐ MySpace
- ☐ LinkedIn

Other (please specify)

9. Which drawing packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ Visio
- ☐ Scribus
- ☐ Draw(OpenOffice)
- ☐ CorelDraw
- ☐ OmniGraffle
- ☐ None

Other (please specify)

10. Which Internet search packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ Google
- ☐ Ask.com
- ☐ None
- ☐ Yahoo!
- ☐ About.com
- ☐ Bing
- ☐ Dogpile

Other (please specify)

11. Which wiki packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ MediaWiki
- ☐ Wikispaces
- ☐ None
- ☐ Wetpaint
- ☐ Google Sites

Other (please specify)

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COMPUTER LITERACY CLASSES, MODULES, AND TESTING

12. Which collaboration packages do you cover in your computer literacy courses? Please check all that apply.

- ☐ Google Docs
- ☐ MS Sharepoint
- ☐ Dropbox
- ☐ MS Groove
- ☐ Zoho
- ☐ None

Other (please specify)

13. Please rank the top three areas computer literacy that need more coverage in your program.

	1	2	3
Operating systems	◯	◯	◯
Word processing	◯	◯	◯
Spreadsheets	◯	◯	◯
Presentation packages	◯	◯	◯
Databases	◯	◯	◯
Drawing packages	◯	◯	◯
email	◯	◯	◯
Social media	◯	◯	◯
Internet search	◯	◯	◯
Wikis	◯	◯	◯
Collaboration tools	◯	◯	◯
Hardware concepts	◯	◯	◯
Software concepts	◯	◯	◯
Computer ethics	◯	◯	◯

Other (please specify)

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COMPUTER LITERACY CLASSES, MODULES, AND TESTING

5. Influences and Change in Computer Literacy

The items on this page address the changes in computer literacy and computer literacy courses over the last five years.

1. Please indicate your agreement or disagreement with the following statements

	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
Students with work experience have better computer skills than students without work experience.	◯	◯	◯	◯	◯
Traditional age students (23 years old or younger) have better computer skills than non-traditional (24 and older) students.	◯	◯	◯	◯	◯
Most of our students enter our program with better computer skills now than five years ago.	◯	◯	◯	◯	◯
Changes in student skills have driven changes in our computer literacy courses in the last five years.	◯	◯	◯	◯	◯
Changes in technology have driven changes in our computer literacy courses in the last five years.	◯	◯	◯	◯	◯
The skill sets needed for computer literacy have changed dramatically in the last five years.	◯	◯	◯	◯	◯
Our computer literacy courses have changed dramatically in the last five years.	◯	◯	◯	◯	◯
We do not have enough time in our courses to cover everything needed for computer literacy.	◯	◯	◯	◯	◯
Our budget limits what we can teach in our computer literacy courses.	◯	◯	◯	◯	◯
We will require more courses for computer literacy in the future than we require now.	◯	◯	◯	◯	◯
State law limits what we can do in computer literacy.	◯	◯	◯	◯	◯
Accreditation limits what we can do in computer literacy.	◯	◯	◯	◯	◯

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6. Demographics and Background

This section is meant to help us understand more about your institution and your personal background.

1. How many undergraduate business students do you have at your institution?

- ◯ <100
- ◯ 101-200
- ◯ 201-300
- ◯ 301-400
- ◯ 401-500
- ◯ 501-750
- ◯ 751-1000
- ◯ >1000

2. What is the total enrollment at your institution?

- ◯ <500
- ◯ 501-1000
- ◯ 1001-2000
- ◯ 2001-3000
- ◯ 3001-5000
- ◯ 5001-7500
- ◯ 7501-10,000
- ◯ 10,001-15,000
- ◯ >15,000

3. What is your academic position?

- ◯ Academic Staff
- ◯ Instructor
- ◯ Assistant Professor
- ◯ Associate Professor
- ◯ Full Professor
- ◯ Adjunct

Other (please specify)

4. How old are you?

- ◯ <25
- ◯ 26-35
- ◯ 36-45
- ◯ 46-55
- ◯ >55

5. What is your highest degree?

- ◯ Undergraduate Degree
- ◯ Master's Degree
- ◯ Doctoral Degree

Other (please specify)

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6. My highest degree is in:

- ◯ Computer Science
- ◯ Accounting
- ◯ Engineering
- ◯ Management Information Systems
- ◯ Quantitative Methods
- ◯ Education

Other (please specify)

7. As a faculty member, are you considered professional qualified (PQ), academically qualified (AQ), or neither:

- ◯ AQ
- ◯ PQ
- ◯ Neither AQ nor PQ

Other (please specify)

8. Are you:

- ◯ tenure-track
- ◯ tenured
- ◯ non-tenure track

Other (please specify)

9. How long have you been at your school?

- ◯ <3 years
- ◯ 6-10 years
- ◯ 3-5 years
- ◯ >10 years

10. What is your gender?

- ◯ Male
- ◯ Female

11. What questions should we have asked about your computer literacy program, and what are your answers to those questions?

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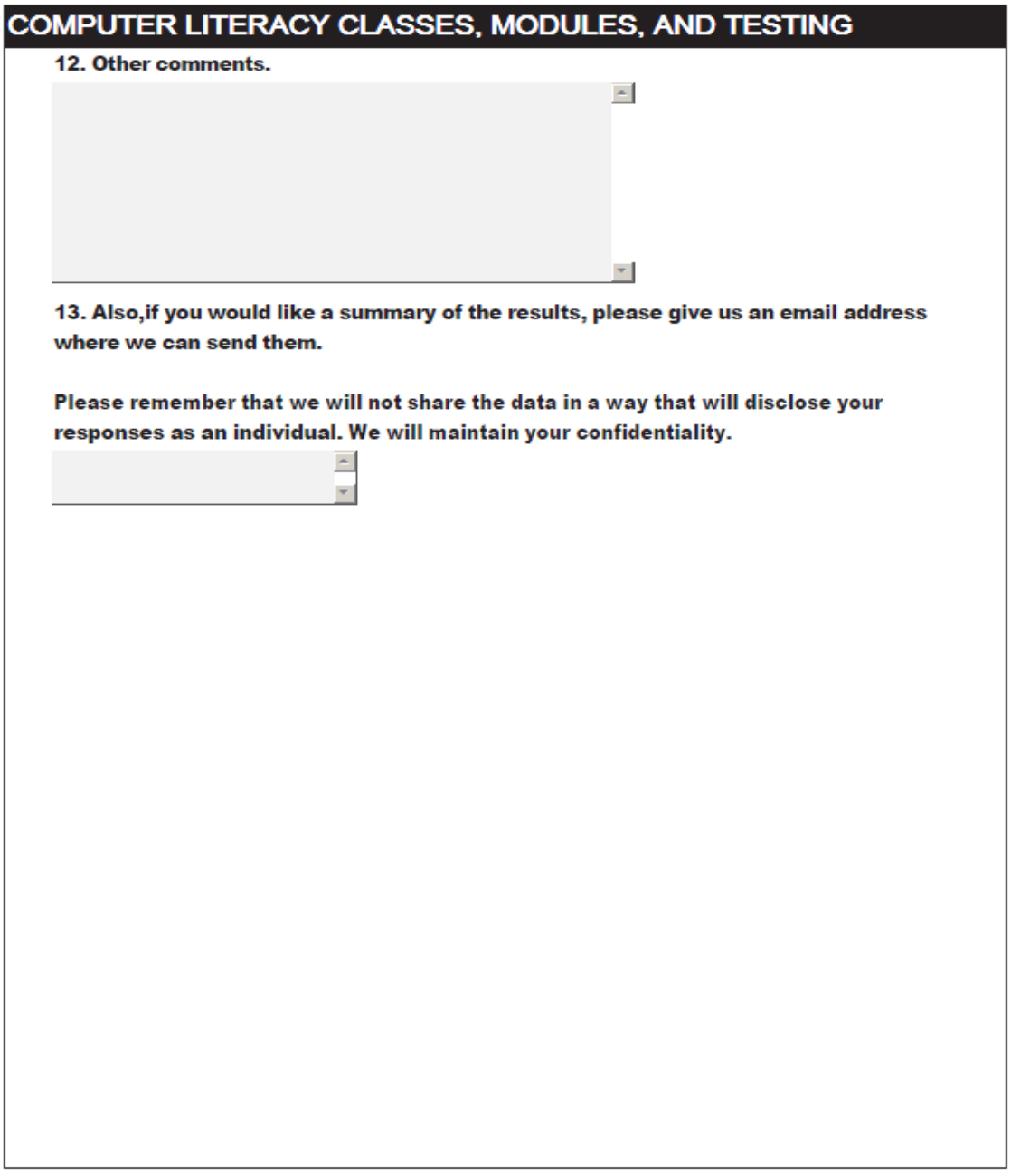
COMPUTER LITERACY CLASSES, MODULES, AND TESTING
12. Other comments.
13. Also,if you would like a summary of the results, please give us an email address where we can send them.
Please remember that we will not share the data in a way that will disclose your responses as an individual. We will maintain your confidentiality.
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Visual Basic Programming Impact on Cognitive Style of College Students: Need for Prerequisites

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Abstract

This research investigated the impact learning a visual programming language, Visual Basic, has on hemispheric cognitive style, as measured by the Hemispheric Mode Indicator (HMI). The question to be answered is: will a computer programming course help students improve their cognitive abilities in order to perform well?

The cognitive styles for the right hemisphere involve concrete experiences and creativity while the left hemisphere involves abstract and logic thinking. Prior research has shown procedural programming involved a left brain hemispheric style thinking. Object-oriented programming has been found to require neither left nor right hemispheric cognitive style. Even though Visual Basic contains object-oriented components, left brain thinking was found to be required for success in Visual Basic. Prior researches were relational studies, and no cause/effect was established. This study found hemispheric cognitive style remained the same after a semester course in Visual Basic. College age students' cognitive style was not impacted. This may be due to maturation of the brain.

Since left hemispheric cognitive style is required to be successful in Visual Basic and Visual Basic does not create such cognitive style, this research, as well as other research, supports the need for prerequisites for Visual Basic to ensure students' success.

Keywords: cognitive style, cognitive skills, prerequisites, visual programming, curriculum, Visual Basic.

1. INTRODUCTION

Overview

In 1984, computer programming was being taught because the belief was that learning skills would be impacted (Pea & Kurland, 1984). What are the cognitive consequences of learning computer programming? Will learning a programming language impact cognitive style? Or has maturation occurred? A prior study by van Merrienboer (1990) was unable to force a change in thinking style to improve learning outcomes. The approach frustrated the subjects.

Must one have the cognitive style before taking programming? There is a need to understand how people learn as well as the impact of learning. Such understanding may influence productivity in computer programming languages (Myers, J. P. & Brita, M., 1996).

Research has shown cognitive styles (how one learns) based on hemispheric brain dominance are factors in the learning of procedural and

object oriented programming languages (Losh, 1984; Monfort et al, 1990; Ott, 1989; White, 2002; White & Ploeger, 2004; White & Sivitanides, 2005). However, most studies focused on relationships between learning style and learning outcomes (Ford & Chen, 2001; Lau & Yuen, 2009; Petty & Holtzman, 1991) instead of cause and effect.

Learning style consists of several related elements, of which, hemispheric brain dominance (cognitive style) is one. Dunn (2000) developed a Learning-Style Model of related elements. These elements composed of 1) Environmental; i.e. lighting, temperature, 2) Emotional; i.e. motivation, persistence, 3) Sociological; i.e. prefer alone or group, authoritative or collegial, 4) Physiological; i.e. auditory, visual, time-of-day, and 5) Psychological; i.e. hemispheric, analytic. Learning style is broader and encompasses both the person and the environment.

Because learning style encompasses the environment, it is easy to see why learning styles are related to geographic locations and cultural values (McPherson & Willis, 2010; Holbrugge & Mohr, 2010). Such elements of learning style can be impacted by the environment. However, cognitive style (hemispheric sides of the brain) is restricted to the physical characteristics of the brain. Cognitive style is defined as how people perceive and process information and experiences (Witkin et al., 1977; Tennant, 1988). Chen (2010) found different cognitive styles had differed in processing the learning. The question is whether computer programming can change cognitive style (how one learns).

As compared to cognitive style (how one learns), cognitive development is what can be learned. Cognitive development is fixed in adulthood (Schwebel, 1972), and not all adults reach the highest level of cognitive development (Bastain, et al. 1973; Griffiths, 1973; Schwebel, 1975). Research has shown visual and procedural programming courses do not improve/change cognitive development (Ignatuk, 1986; Mains, 1997; Owens & Seiler, 1996; Priebe, 1997; White, 2007). Maturation may have occurred. This suggests that cognitive style may also be fixed in adulthood. One college programming course may be too late to alter cognitive style. The belief that curriculum can impact cognitive characteristics maybe misleading.

There has been no research dealing with the impact on the cognitive style (how one learns) of new languages, such as Visual Basic. Visual Basic requires a left brain thinking style (White & Ploeger, 2004). This research investigated the impact learning a visual programming language, such as Visual Basic, has on cognitive hemispheric thinking style, as measured by the Hemispheric Mode Indicator (HMI).

Scope and Importance of Study

How do people learn? "There is a need to understand how people learn, not just aptitude. Such understanding may influence productivity in various programming languages" (Myers & Brita, 1996). Understanding the impact of cognitive style leads to better cause/effect research, teaching treatment research, curriculum adjustment, teaching methods, and advising of students. Research is needed to improve such understanding of the learning process and identify students' difficulties with programming methods (Myers & Brita, 1996; White, 2002).

Corman, Guynes, and Vanecek (1994-1995) stated that a better understanding of cognitive style and cerebral dominance provide for greater productive information systems. Hudak and Anderson (1990) study regarding computer science courses, emphasized "the need to examine students' cognitive maturity and learning style -- factors often ignored in research aimed at ascertaining the reasons for academic success at the college level." The study "highlighted the need to examine both cognitive maturity and learning style in the studies of academic success at the college level" (Hudak & Anderson, 1990). Such research enhances industry training and academic teaching (Rosson et al, 1990; Scholtz et al., 1993; Sheetz et al., 1997).

Prior cognitive research has been with procedural and object-oriented languages, such as Basic, Pascal, C++, and Java. This research will focus on the cognitive style that is involved with the programming aspects of Visual Basic. The findings and conclusions from this study establish a foundation in the research of programming languages influences on cognitive style.

2. LITERATURE REVIEW

Visual Basic Programming

Visual Basic (VB) is an enhancement of BASIC, a regular procedural language (Pietromonaco, 2002; Shelly, et al, 2003). VB has the added features of visual object-oriented components and the code for the procedural structures of sequence, iteration, and selection. An example of a visual object is a button. It has encapsulated properties and event procedures (Nelson, 1993; Schneider, 1999). VB has "public" and "private" procedures like object-oriented programming languages' public and private methods. Procedural languages lack such characteristics. The literature supports the idea that VB is different from procedural programming. (Buchner, 1999; Grehan, 1996a; Grehan, 1996b; Llewellyn et al, 2002; Spain, 1996). O'Brian (2004) describes VB as an object-oriented programming language, rather than a language like BASIC, C, or COBOL. Kai & McKim (1998) described how object-oriented programming can be performed in VB. Because of its object-oriented methods and procedures, VB requires a different mindset from other programming languages (Shirer, 2000).

Although VB contains object-oriented components, it is not hemispheric independent like other object-oriented languages, like Java and C++ (White, 2001, 2002). Left brain thinking is required for success in VB (White & Ploeger, 2004). Like other studies addressing cognitive development (what can be learned) and programming languages, a semester course of VB does nothing to cognitive development (White, 2007). Is this also true for cognitive style (how one learns)?

Hemispheric Cognitive Style Component

There is a relationship between cognitive style and brain hemisphere dominance (Diehl, 1986; Petty & Holzman, 1991). The right brain functions differently from the left brain (Bryden, 1990; Herrmann, 1982; McCluskey, 1997; Saleh & Iran-Nejad, 1995; Supprian & Hofmann, 1997). This is known as hemisphericity (Andrew, 1999; Losh, 1984).

The right side of the brain seems to handle concrete experiences and the left side of the brain seems to process abstract conceptions (Diehl, 1986). Another study showed the left brain is the logical cognitive side and the right brain is the creative cognitive side (Herrmann, 1981). Other studies have shown that the left side of the brain also deals with logical cognition (Dumas & Morgan, 1975; Lawson & Wollman, 1975), and logical cognition has been found to be related to procedural programming (Folk, 1973; Galton, 1992; Sperschneider & Antoniou, 1991; Myers, 1990; Gibbs & Tucker, 1986).

As expected, procedural programming students are left hemispheric brain dominant (Losh, 1984). A study by Monfort, Martin, & Frederisckson (1990) found music, art, oral communication and journalism students to be right brain dominant while computer science and mathematics students were found to be left brain dominant. Armstrong and Hird (2009) found entrepreneurs tended to be right brain (intuitive and less analytic).

Ott (1988) supports the above findings: left brain dominance in high school students correlated with the procedural programming grades. However, math scores of the Scholastic Aptitude Test (SAT-M) correlated much higher with procedural programming grades. Math is a left brain characteristic (Rotenberg & Arshavsky, 1997).

It is easy to see why left hemispheric brain thinkers make good computer programmers. As the above research findings indicated, procedural programming involves logical thinking and logical thinking is a function of the left hemispheric brain. There is a relationship between hemispheric styles and computer programming.

However, unlike procedural programming and VB, object-oriented languages are hemispheric independent (White, 2001, 2002). There is no relation between object-oriented languages and cognitive style based on hemisphericity.

3. METHODOLOGY

Null Hypotheses

Based on the literature review and prior research, the following hypotheses were established.

H1: A Visual Basic programming course does not change cognitive style, as measured by Pre- and Post-HMI scores. This is the main focus of this study.

H2: Those that did not take the post-Hemispheric Mode Indicator (HMI) had Pre- HMI scores equal to the Pre-HMI scores of those that took the post-HMI. This was to resolve the question that those who dropped out did so independent of cognitive style.

Instruments

The **Hemispheric Mode Indicator (HMI)** deals with the cognitive aspects of hemispheric dominance. The HMI has been used to study academic performance and learning styles in business and accounting courses (Carthey, 1993).

The 1999 HMI from EXCEL, Inc. defines left hemispheric dominate as tending to be analytic readers, preferring multiple choice tests, seeing cause and effect. Such thinking style tends to organize information. Right hemispheric dominant cognitive style tends to synthesize, prefer open-ended questions, are analogical, and draw on unbounded qualitative patterns. Characteristics for Left/Right Hemispheric cognitive styles include: rational vs. intuitive, logical vs. hunches, differences vs. similarities, and objective vs. subjective judgments (Lieberman, 1986; Learning, Inc. 2000; White, 2002).

The time to administer the HMI is 15 minutes. The subject is able to evaluate his/her responses to determine hemispheric characteristics and cognitive style (Learning, Inc. 2000; White, 2002) through 32 self-reporting questions in the HMI. A score, between +60 to -60, is calculated. This determines if the subject is right (> +8), left (< -8), or whole brain (between +8 and -8) dominant (Lieberman, 1986). Carthey (1993) cited Lieberman's (1986) study that showed the HMI has validity (Carthey, 1993). The content validity from Lieberman (1986) was based on a review of the literature themes in the area of brain hemisphere dominance (Lieberman, 1986).

A Cronbach's Alpha, which measures the internal consistency reliability, is 0.90, and a test-retest reliability had a Pearson Product Moment Correlation coefficient of 0.904 (Lieberman, 1986). Content validity was based on correlations with the Torrance measure, "Your Style of Learning and Thinking," Form C. The Spearman rank correlation coefficient was 0.819. The Pearson Product-moment correlation was 0.659 (Lieberman, 1986).

Hartman and Hylton (1997) showed HMI's validity and reliability. Correlations for two groups of subjects (r = .61 and r= .69) were found with the Human Information Processing Survey (Hartman & Hyton, 1997). Acceptable concurrent validity was established. A reliability coefficient correlation of r = .74 came from test-retests methods. All correlations were statistically significant.

Subjects

HMI forms and release/survey forms were provided to 87 college students in two sections of a first programming course in Visual Basic v6 at a central Texas university. The course covered visual objects, controls, events, data types, and procedures. Procedures included logical operations, repetition, and arrays. Six programming assignments were required. The prerequisite for this Visual Basic v6 course was a computer literacy course dealing with word processing, spreadsheets, and web browsers. Participation was voluntary and anonymous. Course content, instructor, and test were kept constant in an effort to reduce statistical error variance. The data collected were Pre and Post HMI scores ranging from -60 to +60.

Data collection and recording

Release and HMI forms were distributed at the beginning of the semester to two course sections of Visual Basic. Data was obtained only from those in class who signed the release. At the end of the semester, post-treatment scores were obtained. Of the 87 subjects who signed the release forms, 51 completed both the Pre-HMI forms and the Post-HMI forms.

4. DATA ANALYSIS

The SPSS package was used for data analysis. Means, standard deviations, a t-Test, and a paired samples correlations were performed on the Pre- and Post-HMI scores.

Because of the possibility that the 36 students, who took the Pre-HMI and not the Post-HMI, may have had different Pre-HMI scores with those who did both Pre- & Post-HMI, a t-test on the Pre-HMI scores was performed. The purpose was to determine if the 36 were significantly different in cognitive style.

5. RESULTS

Table 1 indicates no significant difference between the 51 pairs of Pre and Post-HMI scores. Table 2 shows the responses were consistent between the administrations of the HMI. The first null hypothesis (H1) is tenable. A one semester VB programming course does not change cognitive style, as measured by Pre- and Post-HMI scores. Since there was no effect, a control group is unnecessary to confirm an effect.

Students, who did not complete the treatment, may have dropped because the course did not fit their cognitive style. When van Merrienboer (1990) tried to change thinking style to improve learning outcomes, subjects were frustrated. Table 3 shows the group statistics of those who completed HMI forms and those who did not. There was a wide range of scores for each group, as indicated by the standard deviation. To see if there was a difference between groups, a variance assumed t-Test on the Pre-HMI inventory was performed. It showed no significant difference between the two groups ($t= 1.009$, $df = 85$, $p< .366$ two-tail). The second null hypothesis (H2) is tenable. Those that did not take the post-Hemispheric Mode Indicator (HMI) had Pre- HMI scores equal to the Pre-HMI scores of those that took the post-HMI.

6. DISCUSSION

Matching cognitive styles affects learning outcomes (Ford & Chen, 2001). Students placed in classes that best fit their cognitive characteristics (style and level) have a higher probability of success (White, 2002). Research has shown cognitive development/abilities (what can be learned), cognitive styles (how one learns) based on hemispheric brain dominance, and prior experiences are factors in the learning of procedural programming languages (Cafolla, 1987; Evans & Simkin, 1989; Fletcher, 1984; Gibbons, 1995; Ignatuk, 1986; Little, 1984; Losh, 1984; Monfort et al, 1990; Ott, 1989; Wu, 1993). White (2002) showed VB as left hemispheric thinking style even though the language contains object-oriented components. Left hemispheric dominance style is an important indicator of success for VB (White & Ploeger, 2004). However, can learning impact students' cognitive style?

Like cognitive development (what can be learned), cognitive style (how one learns) is also most likely fixed in adulthood. van Merrienboer (1990) study was unable to force a change in thinking style to improve learning outcomes. Like cognitive development, cognitive style in adulthood may have reached maturation or such non-impact was possibility due to a short treatment period.

Limitations:

A presumption is that if the course did have a positive impact on cognitive style, the students would most likely complete the Post-HMI forms. However, 31 subjects did not complete the Post-HMI forms. The reasons could have dropping out as a result to frustration due to thinking style conflict, poor time management, poor study habits, absent on the day Post-HMI was given, and/or a lack of motivation. Since there was no statistical significance difference between Pre-HMI scores of those that completed the post-HMI forms and those that did not, the presumption of frustration due to thinking style conflict is not supported. The second null hypothesis (H2) addressing this issue was found to be tenable.

The length of treatment was only a one semester course. Improvement may occur after years of constant treatment. Such a possibility could be hidden from the results due to sample size. A larger sample size may indicate such an effect, although small. However, if full maturation occurred, there will be no improvement or change. Most students, who were over the age of 18, in this study may have reached maturation while a few may not have.

7. CONCLUSION

This study indicates students need to have the correct cognitive style in order to succeed in a VB programming course. Such a course does not change cognition to the correct thinking style. To argue that allowing any student into programming, because they will develop the cognitive style needed, is a mistake. Students must already have the needed cognitive style to succeed in programming. Students placed in classes that best fit their cognitive style have a higher probability of success (White, 2002). As stated in White (2007), "the implication is that programming courses need prerequisites."

8. FUTURE RESEARCH

Based on prior research over the decades and this research, it is clear that certain cognitive abilities are needed to learn programming. Future research needs to look at what prerequisites are needed to ensure success in computer programming.

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Editor's Note:

This paper was selected for inclusion in the journal as a ISECON 2011 Meritorious Paper. The acceptance rate is typically 15% for this category of paper based on blind reviews from six or more peers including three or more former best papers authors who did not submit a paper in 2011.

Appendix

Tables

Table 1. Score means, Standard Deviations, Paired Sample t-Test N = 51

	Pre		Post				
	Mean	SD	Mean	SD	t	df	Sig. (2-tail)
HMI	-3.6275	12.0083	-1.8627	12.2148	-1.060	50	.294

Table 2. Paired Samples Correlations N = 51

Pairs	Correlation	Sig
Pre & Post HMI	.518	.000

Table 3. Group Statistics for Pre-HMI scores

		N	Mean	Std. Deviation	Std. Error Mean
Pre-HMI scores	Not Completed	36	-.8889	13.09913	2.18319
	Completed	51	-3.6275	12.00827	1.68149

A Study of the Perceptions of College Students on Cyberbullying

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Abstract

Cyberbullying is a concern for all citizens. Harassment and hostility continue to be evident on digital media in society. In this study, the authors evaluate the perceptions of college students on cyberbullying at Pace University. The findings from a research survey disclose a higher level of knowledge of the perceived prevalence of cyberbullying and of the perceived perpetration of cyberbullying towards distinct populations of students. The findings from the study concurrently disclosed a lower level of knowledge of perceptions of institutional pro-action on problems of cyberbullying at the university. This study will benefit administrators, counselors and instructors, and especially information systems instructors, considering an improved process to respond to the sensitivity of students confronting cyberbullying in both society and university.

Keywords: cyberbullying, electronic media, harassment, hostility, internet, mobile computing, privacy, sexting, social networking, victimization

1. BACKGROUND AND DEFINITION

"*I am devastated by the death of 18-year old Tyler Clementi … My heart is breaking … for a society that continues to let this happen. These kids needed us. We have an obligation to change this … We have to make it stop.*" (Degeneres, in Shelton, 2010)

Bullying is defined as "a form of aggression in which one [college] student or a group of [college] students physically or psychologically harasses [another college student] over a long period of time" (Hazler, Hoover and Oliver, 1992). Bullying is differentiated in intent to cause distress or harm, in repetition over time, and in a relationship in which imbalance of power is a feature (Rigby, 2004). Peer abuse (Olweus, 1993, Sage Publications), peer harassment (Juvonen, Nishina and Graham, 2000) and peer victimization (Juvonen and Graham, 2001) are further indicated in the literature of bullying – 75% of children before they are college students have experienced bullying (Greenya, 2005, p. 2). Literature currently indicates bullying as a method of improving social status (Parker-Pope, 2011). Bullying may be indicative of future problems in performance and psycho-sociality (Kim, Leventhal, Koh, Hubbard and Boyce, 2006 and Storch, Masia-Warner, Crisp and Klein, 2005) for both perpetrators and victims. Bullying is a

common concern and a frequent experience for students in schools in the United States and has been cited by President Barack Obama (Shepherd, 2011).

Cyberbullying is essentially an extension of bullying. Cyberbullying is "any behavior performed through digital or electronic media by [college students or groups of college students] that repeatedly [over time] communicates aggressive or hostile messages intended to inflict discomfort or harm on [other students] (Tokunaga, 2010, p. 278). Behavior of cyberbullies may be in the form of cellular or digital imaging messages; chat and discussion room messages; e-mail, instant messaging, pictures and photographs, and unauthorized video; messaging on profiles on social gaming and networking sites, such as ChatRoulett, Formspring, Facebook and MySpace, and on systems, such as Twitter and YouTube; and Web blogs, pages or polling sites targeting victims (Smith, Mahdavi, Carvalho and Tippett, 2006 and Li, 2007). Behavior of college students, especially teenagers, may be in sexting in "the sending or receiving of sexually-explicit or sexually- suggestive [messaging or photographs]" through the cellular telephone or the social networking Web sites (Hinduja and Patchin, 2010). Victims may be repeatedly victimized by perpetrators through cyberstalking.

Cyberbullying is a devastating form of behavior because the goal of the perpetrator may not be clear to the victim. The perpetrator may cover her or his identity in anonymous e-mail addresses or pseudonymous names and harass the victim without detection 24/7 (Phillips, 2010). This form of bullying may be done from a location in schools or from locations not in schools through electronic media, and the material may be extended to a large number of students and non-students on the Internet. Cyberbullying is heightened in schools by increased mobile and social networking – 30% of teenagers with profiles on social networking sites have experienced harassment on the sites (Janviere, 2010). Frustration is evident in the lack of privacy (Paul, 2011). Cyberbullying as a form of bullying is a concern cited in the literature.

Cuberbullying may contribute far greater problems of performance and sociality for student victims (College Degrees, 2011) than the earlier form of non-electronic bullying. Cyberbullying may constrain learning performance in schools. High school incidents of cyberbullying or bullying may contribute to problems of social unhappiness (Luster, Small and Lower, 2002) and withdrawal (Baldry, 2004) of victims. Peer harassment of high school students might be a factor in suicides of victims (Cleary, 2000). School incidents of cyberbullying contributing to suicides are highlighted by Cyberbullying News (Cyberbullying News, 2010) in Table 1 of the Appendix. Such incidents are important inasmuch as literature indicates that incidents of cyberbullying as a culture of high school students contributes to further incidents of this form of bullying in the culture of college students (Laster, 2010).

Estimates of incidents of cyberbullying in colleges differ because of the diverse focus of authors in the literature (Cyberbullying Research Center, 2011). However, 20% - 40% of children and teenagers have experienced cyberbullying (Tokunaga, 2010, p, 277). Literature indicates in the past six months 34% of college students have experienced cyberbullying as victims; 64% of students have observed cyberbullying of other student victims; and 19% have been perpetrators of cyberbullying victimization. Further literature indicates increased homophobic incidents and sexting of student victims, 39% as female victims and 25% as male victims – Tyler Clementi of Rutgers University in New Jersey was a male suicide victim of cyberbullying (Swearer, 2010). Incidents of cyberbullying may be increased in the culture of college students because of the closed community of a university, especially of a suburban university, in which potential student victims may be easy to find by perpetrator students (Bostonia, 2009, p. 5). This college culture of cyberbullying may argue for better education and enforcement about the problems of cyberbullying if college students perceive cyberbullying as a concern.

2. INTRODUCTION TO STUDY

"*In '1984," the abolition of personal space was part of an overarching government policy, but nowadays it [is] often nothing more than a side effect of wired high spirits. The era of the 'viral video,' when footage of some absorbing slice of life can spread overnight around the globe, is bringing out the anarchist in all of us*." (Kim, 2010)

The authors' study attempts to evaluate the perceptions of college students on cyberbullying. Though literature indicates problems of cyberbullying, the perceptions of higher-aged college students on bullying may indicate that cyberbullying is a basic condition of college culture if not human nature (Greenya, 2005, p. 6). Perceptions may indicate that cyberbullying is a condition of experience for college students that do not have negative impact (Rigby, 1999) – perhaps in the perceptions of some students Tyler Clementi was not courageous at Rutgers University? Might not sexting be defended by the First Amendment of the Constitution (Sullivan, 2011)? Might sexting be a status symbol (Henderson, 2011)? Indifference of observer students to cyberbullying victims is indicated in the literature. Perpetrators portrayed in the culture of society may be more popular than victims, as in the "Simpsons", in which Bart is victimized by Nelson (Greenya, 2005, p. 3). The power of perpetrators is recognized by students. The importance of cyberbullying as a concern in a college setting of students may not be clear in the literature, but the evident and frequent problems in the literature may indicate that cyberbullying is not a benign issue.

Given the continuance of problems of cyberbullying, colleges may have to consider further etiquette (Mason, 2008) or guidelines for helping students (Edwards, 2010). Guidelines may be hindered however in the perceptions of administrators and instructors in schools that bullying, if not indirect cyberbullying, is an experience in the growth of students (Smith and Brain, 2000) – pranks - and is not an important problem. The perceptions of observer students and students victimized by cyberbullying may be that administrators, instructors and staff may not respond enough to the victimization – 30% of students may not even report the victimization to an adult person (Gomez, 2010). Observer students who do not report cyberbullying fuel perpetration of victimization (Greenya, 2005, p. 4). Current perceptions may be that guidelines of schools may not helpful in intervening in the bullying of perpetrators or in the prevention of cyberbullying. The impact of the perceptions may be that guidelines for intervention may constrain incidents of cyberbullying in colleges, but they may not be effective in constraining cyberbullying as an example of cultural problems (Wong, 2009), absent laws.

Bullying laws are already defined by almost all governments in the United States and are highlighted and identified by the Cyberbullying Research Center (Hinduja & Patchin, 2010) in Table 2 in the Appendix. However, these laws may not be helpful to students because of differing definitions for bullying and cyberbullying, in sanctions diverse for perpetrators and schools with few incidents higher than misdemeanors (Cruz-Griffith, 2010), and in lack of policies required for schools, and furthermore, laws may not be helpful to students because of the lack of recent reflection of technology. School staff may not be helpful to the students because of their lack of skills – 25% of staff may not even be skilled in the cyberbullying laws of the states (Hinduja and Patchin, 2010). The Department of Education has had to inform colleges and high schools of the need for staff to be skilled in the laws (Dillon, 2010). Laws defined by the federal government are limited nevertheless in the United States, as in the Education Amendments of 1972 anti-discrimination laws (Title IX), though the Megan Meier Cyberbullying Preventation Act by Representative Sanchez (Kravets, 2009) and the Cyberbullying as a Form of Harassment Act by Senator Lautenberg (Lister, 2010) are pending in Congress. Perceptions of these proposals are often that they are impulsive and intrusive, as there are already state cyberbullying laws. The impact of these perceptions and problems and perceptions of "underprosecution" (*The Economist*, 2011) may be that colleges and schools may have to be more involved in the prevention of cyberbullying, in order to lessen negative perceptions of students.

Schools might consider a cyberbullying guideline policy or process designed by the authors of the study from the literature and highlighted in Table 3 of the Appendix. Such a process might be engaged in cyberethics (Kraft and Carlisle, 2010) at college, instructors and other levels in a university. The process is interdisciplinary, so students might learn the context of cyberethics as a desired experience integrated and internalized into the norms of a university. In fact, the process is of internalizing new norms of sociality of the university involving observer students that might be helpful in the prevention of cyberbullying. This process is an institutional program for the prevention of perpetration and victimization in the university and for the providing of safety strategies for student non-victims and victims (Bryce and Klang, 2009).

Importantly this process is a program for providing an investigative structure (Bostonia, 2009, p. 8) and software tools (Tozzi, 2011). The impact of this college cyberbullying guideline policy process or other social media networking processes, in providing a presumable prevention and safety structure, may have to be decided by positive perceptions of the structure by the students.

Therefore, this study explores the perceptions of college students on cyberbullying and a cyberbullying guideline process. Might the perceptions of the students be that cyberbullying is not an important issue and instead is a norm of society? Might the perceptions of students be that cyberbullying guideline policies or processes for instructors and administrators and for students are a formality in a university? Might there be perceptions that students having a disability, or ethnic, gender, homophobic, racial or religious inclinations could be inevitably victimized by perpetrator students even with prevention processes? Might there be perceptions that students may not even be knowledgeable of proactive processes and resolution sources in the event of victimization? This study evaluates the perceptions of college students as to the seriousness or non-seriousness of cyberbullying and cyberbullying policy and process solutions in a university.

3. FOCUS OF STUDY

The focus of the study is to empirically evaluate college cyberbullying by exploration of the knowledge of students at a major metropolitan institution. Exploration of the perceptions of students as to the prevalence and prevention of cyberbullying may contribute input into a process resolution and safety strategy that may limit cyberbullying, if not bullying, in a college setting. Findings furnish a not frequently found model program for potential prevention of cyberbullying that might be leveraged by administrators, instructors and staff and students, subject to the perceptions of the scope of seriousness or non-seriousness of cyberbullying in an institution. In light of an increased anti-bullying movement (Morgan, 2010) against non-civility in the culture of society (Agress, 2010), the findings of this study on the culture of a university might even be leveraged for optimum sociality of society. Finally, this study might be leveraged by instructors in information systems as they evaluate the impact of cyberbullying on the profession and on society (Stoodley, Bruce and Edwards, 2010).

4. RESEARCH METHODOLOGY OF STUDY

The research methodology of this study was focused on college students at Pace University, a metropolitan institution with a diverse ethnic, gender, international, racial and religious population of students. In the March – May 2011 period, approximately 400 undergraduate students who were enrolled in a required computing course were asked to participate in an electronic perception survey on cyberbullying, to which responses were anonymous**.** Of the 400 students, there were 121 valid responses. In the May – June period, the authors of the study, who are instructors at the university, evaluated the responses using Qualtrics and SPSS (McClave and Sincich, 2006).

The survey included a definition of cyberbullying (Tokunaga, 2010, p. 278) followed by 60 questions: 4 demographic questions; 9 fundamental knowledge of cyberbullying questions; 7 perceptions of cyberbullying institutional policy questions; 8 perceptions of cyberbullying problems and seriousness at the university questions; 13 questions on perpetration and victimization internal and external to the university; and 19 population questions on perpetration and victimization. (The survey instrument is included in Figure 1 of the Appendix.)

The questions in the survey were reviewed for integrity in research design, privacy, and sensitivity of inquiry by an Institutional Review Board (IRB) of a committee of faculty of the university, prior to the survey.

5. ANALYSIS AND DISCUSSION OF FINDINGS OF STUDY

Demographic Data

The average age of the respondents was 19.5 years. Most respondents were female (58%), which reflects the general student population at the university. Most of the respondents were first-year students (63%) because the course in which they were enrolled, a university core course, is generally taken by first-year students. Also corresponding to the general student population at the university, 54% of the respondents were liberal arts students, 33%

business students and the remainder distributed among the three other schools of the university.

Student Awareness of Cyberbullying

Three awareness questions were asked. Responses were on a five-point Likert scale. Most students (79%) Agree or Strongly Agree that they are aware of cyberbullying on the Internet. Also, 81% of respondents Agree or Stronly Agree that they are aware of cyberbullying at other universities. However, only 11% Agree or Strongly agree that cyberbullying is a serious issue at the university.

Students were asked if they are aware of cyberbullying incidents at the university, with 9% answering "Yes". Of those answering "Yes", the number of incidents reported ranged from one to three. The number of perpetrators of these incidents ranged from one to three, and the number of victims ranged from one to three.

Students Being Cyberbullied

Respondents were asked if they were ever cyberbullied at the university, with 7% responding "Yes". Of those answering "Yes", the number of times victimized ranged from 1 to "a few". The number of perpetrators ranged from one to two. Students who admitted being cyberbullied were asked which method was used to cyberbully them. Table 4 in the Appendix shows the responses.

Respondents were asked if they are aware of cyberbullying of certain groups of people at the university. Table 5 in the Appendix shows the results. Note that the largest groups being cyberbullied are gay and lesbian students, followed by females.

Students were also asked if they were victims of cyberbullying outside the university, with 20% responding "Yes". Of those answering "Yes", the number of times victimized ranged from one to "countless." The number of perpetrators ranged from one to, unfortunately, "my whole junior high." Students who admitted being cyberbullied were asked which method was used to cyberbully them. Table 6 in the Appendix shows the responses. Note that the most prevalent method of cyberbullying is through posting messages on social networking sites.

Cyberbullying and the University

In the following, unless otherwise noted, the questions were asked on a 5-point Likert scale. The survey asked if the university, as an institution, was sensitive to the problems of cyberbullying. The results were almost a perfect bell-curve as shown in Table 7 in the Appendix.

The survey also asked if the respondents believed that the university is knowledgeable of cyberbullying as an activity harmful to students. Table 8 in the Appendix shows the results.

Note that from Tables 7 and 8, one might conclude that although a good percentage of students believe the university is knowledgeable of cyberbullying (45% Strongly Agree or Agree), only 21% believe (Strongly Agree or Agree) that university is sensitive to the issues of cyberbullying.

The survey asked if professors were knowledgeable about cyberbullying. Table 9 in the Appendix shows the results. Note that the results in this table are very close to that of Table 8 that asked the same question about the university. This indicates that students closely identify "the university" with their professors.

There are two courses that all students in the university are required to take and where it might be appropriate for professors to discuss issues of cyberbullying. One such course is CIS 101, the university core computing course in which the respondents were students; the second is UNIV 101, a non-credit bearing course required of all first-year students that introduces them to university life. 74% of the respondents believed that cyberbullying should be discussed in CIS 101 and 73% believed that cyberbullying should be discussed in UNIV 101. The survey asked if cyberbullying had ever been discussed in *any* university course, with 29% responding "Yes". The number of professors discussing cyberbullying ranged from 1 to 5, with 50% responding that 2 professors had discussed cyberbullying and 38% responding that 1 professor discussed cyberbullying.

Interestingly, there are statistically significant differences (at the p=0.05 level) in gender in those believing that cyberbullying should be discussed in CIS 101 and UNIV 101. Nearly 80% of females want cyberbullying discussed while only 60% of males want it discussed.

Respondents were asked a series of questions on what they think the university should do to educate students and professors on cyberbullying. Table 10 in the Appendix summarizes he results. As is evident from the table, the university needs to raise the awareness of its cyberbullying policy and of the consequences of cyberbullying generally.

Student Awareness of Cyberbullying Policies

Students were asked if they were aware of the university's policy and cyberbullying laws in the U.S. Only 21% either Strongly Agreed or Agreed that they were aware of the university's cyberbullying policy, while 34% Strongly Agreed or Agreed that they were knowledgeable of U.S. cyberbullying laws.

Ethical Evaluation and Response

The survey asked if cyberbullying is a serious issue for the respondent. See Table 11 in the Appendix. The results indicate that cyberbullying is a serious issue for about 34% of the respondents. This agrees with the previously stated result that about 7% of the respondents had been cyberbullied at the university and 20% outside the university.

The survey asked if the respondent had ever consciously been a perpetrator of cyberbullying. Surprisingly, 10% admitted to doing so. Also asked was the question "Might it be acceptable for freshman or sophomore students to be cyberbullied by junior or senior students?" Surprisingly, 8% responded "Yes".

Respondents were also asked to make value judgments on the privacy and ethics of cyberbullying. Table 12 in the Appendix summarizes the results. Note that 84% either Agree or Strongly Agree that cyberbullying is wrong, but 73% believe that it is a violation of privacy. This shows a possible misunderstanding of the full consequences of cyberbullying.

The survey asked what should be the consequences of cyberbullying. The respondents were given a list of penalties and were asked to choose as many as they thought appropriate. See Table 13 in the Appendix. Note that the majority, 63%, would want just a warning to the perpetrator while only 20% would suggest expelling the perpetrator. Does this indicate a view that cyberbullying is not that serious an issue for students? There is a statistically significant difference between males and females (at the p=0.05 level) on suspension with 42% of males choosing suspension, while 64% of females chose suspension.

The survey also asked whom the respondents would contact in the event they were a victim of cyberbullying. The respondents were presented with a list of possibilities and were asked to choose as many as they deemed appropriate. Table 14 in the Appendix summarizes the responses. Note that the most popular response is "Your best friend" even over "Your parents", which is perhaps not surprising for college-age students. There was a statistically significant difference (at the p=0.05 level) between male and female respondents in choosing "The Counseling Center" with 32% of males and 50% of females making that choice. There was also a high statistical difference in gender (p=.004) between males and females in choosing "Parents", with 38% of males and 64% of females making that choice.

6. FINAL IMPLICATIONS OF STUDY

"*It is not technology as such, which affects* society *for good or bad, but its uses, which are … shaped by the values of society … We must remember that we are not trapped helplessly in front of an unstoppable technological steamroller. Our control is how we use our knowledge that we will be required to live with the results of our decisions on the use of this new technology*." (Solomon, 1985)

The study shows that cyberbullying is a serious issue for the respondents. A vast majority also believe that cyberbullying is wrong and a violation of one's privacy. This belief is confirmed (see Table 13) by the fact that a majority of students want a moderate to severe penalty for perpetrators of cyberbullying.

The study shows that although the respondents are very aware of cyberbullying on the Internet, only a small number (11%) think that it is a serious issue at their university and an even smaller number (9%) are aware of cyberbullying incidents at their university. Of the 7% of respondents who admitted being cyberbullied at the university, the study shows that the primary vector of cyberbullying is the posting of harassing messages on a social networking site, which is in accord with the findings of Janviere (2010).

A much greater percentage of respondents (20%) were cyberbullied outside the university, presumably for most in high school, (80% of respondents were first- or second-year students) where again the primary cyberbullying vector was a social networking site.

The study also revealed some information that might be useful to a university's administration. As noted, only 21% of respondents believe that the university is sensitive to cyberbullying issues. A very large majority of respondents also believe that cyberbullying should be formally discussed in required university courses and that the university should do more to educate students, faculty, and staff on cyberbullying issues. Table 14 in the appendix also shows that students are not comfortable contacting university officials if they are cyberbullied. These results show that the university is in need of increasing student trust and awareness of university support for cyberbullying victims, and should take a more active role in facing cyberbullying issues.

7. LIMITATIONS OF STUDY AND OPPORTUNITIES FOR FURTHER RESEARCH STUDY

The findings from a sample of students in a study of cyberbullying and cyberbullying policy processes at Pace University may not be generalized to other urban and suburban universities in the United States without caution. Though the responses of the students were largely through an anonymous survey, the sensitivity of responding to a cyberbullying survey may have underreported the perpetration and victimization of the students (Cole, Cornell and Sheras, 2006). Also, the findings of the survey were limited to the perceptions of students and lacked the perceptions of administrators, instructors and staff who are key players in policy processes of a university.

The larger limitation of the definition of cyberbullying that may be consistent or non-consistent with the definitions, focuses and the methodologies of other research studies (Cyberbullying Research Center, 2011 and Tokunaga, 2010, p. 283) may favor an opportunity for a new research study. Such a study might integrate with domestic practitioner specialists, as the Cyberbullying Research Center at Florida Atlantic University and the University of Wisconsin – Eau Claire and the forthcoming Tyler Clementi Foundation (Foderaro, 2011), or international specialists, as the Olweus Bullying Preventation Program (Olweus, 1993, Research Center for Health Promotion), so that a study by one university might match definitions and methodologies to the specialists. Research study might be further pursued by the authors of this study as to which cyberbullying policy processes were successful and not successful at the university, inasmuch as the seriousness of cyberbullying at the university was a clear finding of this study.

8. CONCLUSION OF STUDY

This study confirmed that in the perceptions of college students at Pace University cyberbullying was a concern for the students. Higher level knowledge of the perpetration of cyberbullying towards distinct gender and homophobic populations of students and of the prevalence of cyberbullying at the university were in the study. Lower level knowledge of the students of the proactive processes for safety steps with the institutional problems of perpetration and victimization were disclosed in the study. The study furnished a model program that might be engaged by administrators, instructors and staff and also students in responding to the sensitivity and seriousness of cyberbullying in the cultural like norms of a university. This study will be further pursued in 2012 with a research survey by the university together with practitioner specialists in the topic.

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Appendix

Figure 1: Cyberbullying Instrument of Survey

What is your age?

Gender?

Male Female

What is your status?

Freshman Sophomore Junior Senior

To which school of the University do you belong?

Liberal Arts Education Nursing Business Computing

Definition of Cyber-bullying

Cyber-bullying is any behavior performed through electronic or digital media by individuals or groups that repeatedly communicates hostile or aggressive messages intended to inflict harm or discomfort on others. In cyber-bullying experiences, the identity of the bully may or may not be known. Cyber-bullying can occur through electronically-mediated communication at school; however, cyber-bullying behaviors commonly occur outside school as well.

You are aware of cyber-bullying as an activity on the Internet

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

Cyber-bullying is a serious issue for you.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

You are aware of cyber-bullying activities at other schools (for example the Rutgers student who committed suicide as a result of cyber-bullying)?

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

Might it be acceptable for freshman or sophomore students to be cyber-bullied by junior or senior students>

Yes No

Have you discussed issues of cyber-bullying in your fraternity or sorority at the University?

Yes No

Should cyber-bullying be discussed in UNIV 101?

Yes No

Should cyber-bullying be discussed in CIS 101?

Yes No

Have professors in your courses at the University discussed incidents or issues of cyber-bullying?

Yes No

How many professors have done so?

Should the University do any of the following? Please respond to all.
Publicize more its policy on cyber-bullying.

Yes No

Publicize more the problems of cyber-bullying as an activity harmful to students.

Yes No

Sponsor seminars for students on the problems of cyber-bullying as an activity harmful to students.

Yes No

Sponsor sensitivity seminars for professors on the problems of cyber-bullying as an activity harmful to students.

Yes No

Sponsor sensitivity seminars for staff on the problems of cyber-bullying as an activity harmful to students.

Yes No

Cyberbullying penalty and contacts
What should be the penalty for perpetrators of cyber-bullying? Choose as many as appropriate.

- No penalty by the University
- Warning sent to the student by the University
- University informs police of the incident
- Student is suspended by the University
- University immediately expels the student

If you were a victim of cyber-bullying, whom would you contact. Choose as many as appropriate.

- The President of the
- The Dean of Students
- The Dean of your school
- The Chair of your department
- The Counseling Center
- The Security Department
- Your local Police Department
- Your fraternity or sorority
- Your best friend
- Your parents
- No one

The administration of the University is knowledgeable of cyber-bullying as a activity that is harmful to students.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

Cyber-bullying is a serious issue at the University.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

Professors at the University are knowledgeable on cyber-bullying as an activity that is harmful to students.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

You are aware of the official policies of the University on cyber-bullying.

Strongly Disagree	Disagree	Neither Agree nor	Agree	Strongly Agree

		Disagree		
○	○	○	○	○

The University, as an institution, is sensitive to the problems of cyber-bullying.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

You are knowledgeable of the laws on cyber-bullying in the United States.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Cyber-bullying is a violation of privacy, regardless of the intent of the perpetrator.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Cyber-bullying, pure and simple, is wrong.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Are you aware of incidents of cyber-bullying at the University?

○ Yes ○ No

Of how many incidents are you aware?

[ ]

How many perpetrators were involved?

[ ]

How many victims were involved?

[ ]

Perpetrator?

Have you ever consciously or unconsciously been a perpetrator of cyber-bullying?

○ Yes ○ No

Have you ever been a victim of cyber-bullying at the University?

○ Yes ○ No

How many times were you victimized?

[ ]

How many perpetrators were there?

[ ]

What method was used to cyber-bully you. Choose as many as appropriate.

- ☐ Looking in to your cell phone
- ☐ Looking in to your email
- ☐ Sending you harassing emails
- ☐ Sending you harassing pictures
- ☐ Posting harassing messages on a social networking site
- ☐ Posting harassing pictures on a social networking site
- ☐ Preventing a friend from contacting others on a social networking site
- ☐ Sexting

☐ Sending you pornographic images ☐ Other

Bullying outside the University
Have you ever been a victim of cyber-bullying outside the - at another university, in high school, or at work?

○ Yes ○ No

How many times were you victimized?

How many perpetrators were there?

What method was used to cyber-bully you. Choose as many as appropriate.

☐ Looking in to your cell phone
☐ Looking in to your email
☐ Sending you harassing emails
☐ Sending you harassing pictures
☐ Sending you pornographic images
☐ Posting harassing messages on a social networking site
☐ Posting harassing pictures on a social networking site
☐ preventing a friend from contacting others on a social networking site
☐ Sexting
☐ Other

Are you aware of cyber-bullying of any of the following groups at the University? Choose as many as appropriate.

☐ Male students
☐ Female students
☐ Asian students
☐ Gay students
☐ Lesbian students
☐ Physically disabled students
☐ African-American students
☐ Hispanic students
☐ Muslim students
☐ African students
☐ Developmentally disabled
☐ Other

For each of the following pairs, choose the one you think is more likely to be a VICTIM of cyber-bullying at the University.

Male Female
○ ○

Foreign Non-foreign
○ ○

Gay Straight
○ ○

Lesbian Straight
○ ○

Disabled Non-disabled
○ ○

African-American White
○ ○

Hispanic White
○ ○

Muslim White
○ ○

Asian White

For each of the following pairs, choose the one you think is more likely to be a PERPETRATOR of cyber-bullying at the University.

Male Female

Foreign Non-foreign

Gay Straight

Lesbian Straight

Disabled Non-disabled

African-American White

Hispanic White

Muslim White

Asian White

Table 1: Cyberbullying Incidents Contributing to Suicides in United States

Date	Incident	Location	Student
3/21/10	Harassment - Messaging on Web Site	New York	Alexis Pilkington
1/14/10	Harassment - Cellular Messaging	Massachusetts	Phoebe Prince
9/12/09	Harassment - Cellular Messaging of Picture/Sexting	Florida	Hope Witsell
7/1/09	Harassment - Cellular Messaging of Picture/Sexting	Ohio	Jesse Logan
10/16/06	Harassment Impersonation - e-Mailing	Missouri	Megan Meir
10/9/06	Harassment-e-Mailing Messaging	Kentucky	Rachael Neblett
6/29/05	Harassment-e-Mailing Messaging	Florida	Jeffrey Johnson
10/7/03	Harassment-e-Mailing Messaging	Vermont	Ryan Patrick Halligan

Source: _____ (2010). List of cyberbullying related suicides. *Cyberbullying News*, May 10, 2-3 [Adapted].

Table 2: Cyberbullying Laws in Governments in United States

State	Bullying Law	Cyberbullying Law	Policy Required for Schools	Sanction for Criminals	Sanction for Schools
Alabama	Yes	No	Yes	No	No
Alaska	Yes	No	Yes	No	Yes
Arizona	Yes	No	Yes	No	No
Arkansas	Yes	Yes	Yes	No	Yes
California	Yes	No	Yes	No	Yes
Colorado	No	No	Yes	Proposed	Yes
Connecticut	Yes	No	Yes	No	Yes
Delaware	Yes	No	Yes	No	Yes
District of Columbia	Yes	No	Yes	No	No
Florida	Yes	No	Yes	No	Yes
Georgia	Yes	No	Yes	No	Yes
Hawaii	No	No	No	Proposed	No
Idaho	Yes	No	Yes	Yes	Yes
Illinois	Yes	No	Yes	No	Yes
Indiana	No	No	Yes	No	No
Iowa	Yes	No	Yes	No	Yes
Kansas	Yes	Yes	Yes	No	Yes
Kentucky	Yes	No	Yes	Yes	Yes
Louisiana	Yes	No	Yes	No	Yes
Maine	Yes	No	Yes	No	Yes
Maryland	Yes	No	No	No	Yes
Massachusetts	Yes	Yes	Yes	No	Yes
Michigan	No	No	Yes	No	Yes
Minnesota	Yes	No	Yes	No	Yes
Mississippi	Yes	No	Yes	No	Yes
Missouri	Yes	No	Yes	Yes	Yes
Montana	No	No	No	No	No
Nebraska	Yes	No	Yes	No	Yes
Nevada	Yes	Yes	Yes	Yes	No
New Hampshire	Yes	Yes	Yes	No	No

New Jersey	Yes	No	Yes	No	Yes
New Mexico	Yes	No	Yes	No	Yes
New York	Yes	No	Yes	No	Yes
North Carolina	Yes	No	Yes	Yes	Yes
North Dakota	No	No	No	Proposed	No
Ohio	Yes	No	Yes	No	Yes
Oklahoma	Yes	No	Yes	No	No
Oregon	Yes	Yes	Yes	No	Yes
Pennsylvania	Yes	No	Yes	No	Yes
Rhode Island	Yes	No	Yes	No	No
South Carolina	Yes	No	Yes	No	Yes
South Dakota	No	No	No	No	No
Tennessee	Yes	No	Yes	Yes	Yes
Texas	Yes	No	No	No	Yes
Utah	Yes	No	Yes	No	Yes
Vermont	Yes	No	Yes	No	Yes
Washington	Yes	No	Yes	No	Yes
West Virginia	Yes	No	Yes	No	Yes
Wisconsin	Yes	No	Yes	Yes	Yes
Wyoming	Yes	No	Yes	No	Yes

Source: Hinduja, S., & Patchin, J.W. (2010). State cyberbullying laws: A brief review of state cyberbullying laws and policies. *Cyberbullying Research Center*, July [Adapted]

Table 3: Cyberbullying Guideline Process – Model Program

	Guideline for Implementation	**Administrators**	**Instructors**	**Staff***	**Students**
College Level					
Bullying Laws	Mandatory	X	X	X	X
Cyberbullying Laws	Mandatory	X	X	X	X
Title IX Laws	Mandatory	X	X	X	X
Definition of Bullying	Mandatory	X	X	X	X
Definition of Cyberbullying -Sexting	Mandatory	X	X	X	X
Cyberethics in Mission Statement of University	Mandatory	X			
Code of Cyberethics for Administrators, Faculty and Staff	Mandatory	X	X	X	
Code of Cyberethics for Students	Mandatory				X
On Campus and Off	Mandatory				X

Campus Incident Policy					

Office of CyberEthics	Optional	X			

Introduction to Cyberethics as a Course for Freshman and Transfer Students: Cyberbullying Issues and Prevention Safety Strategies	Mandatory		X		X

Cyberbullying School Policy for Observer Students	Mandatory	X			X
Cyberbullying School Policy for Professor Victims	Mandatory	X	X		
Cyberbullying School Policy for Student Victims	Mandatory	X			X
Potential Zero Tolerance	Optional	X			X

Annual Faculty Retreats and Sensitivity Workshops	Optional		X		
Bi-Annual Faculty Inter-Collegiate Regional Workshops	Optional		X		

Process for Reporting Cyberbullying Perpetration and Victimization for Observer Students and Student Victims	Mandatory	X			X
Process for Investigation of Cyberbullying Perpetration	Mandatory	X	X	X	

and Victimization by Internal Security and Reporting of Results					
Sanctions for Perpetrator Students - Formal Graduated Negative Sanctions (No Penalty, Parent Notification and Reprimand Sanctions to Sanctions of Suspension and Expulsion from University and of Police Prosecution) - Informal Negative Sanctions	Mandatory	X			X
Internal Psychiatric Referral Services for Perpetrator Students and Student Victims	Mandatory	X			X
Internal Referral Services for At-Risk Students	Optional	X			X
Annual Report on Cyberbullying Incidents and Cyberbullying Safety Strategies to President of University	Optional	X			

Guideline for Implementation	**Administrators**	**Instructors**	**Staff***	**Students**

Instructor Level

Cyberbully in Cyberethics Course for All Freshman and Transfer Students -Etiquette on Internet ("Netiquette")	Mandatory		X		X
Cyberbully Modules in Interdisciplinary and Occupational Courses in All Schools of University	Mandatory		X		X
Faculty Handbook on Reporting Perpetration and Victimization	Mandatory		X		
On-Line Privacy Protection Steps in Interdisciplinary and Occupational Courses -Perpetration Scenarios -Public Perpetration Scenarios	Mandatory		X		X
Prevention and Safety Strategies on Web	Mandatory		X		X
Annual Security Workshop on Cyberbullying Scenarios through Technology and Web	Optional	X	X	X	

	Guideline for Implementation	Administrators	Instructors	Staff*	Students
Other Levels					
Centers for Social Justice -Ethnic Focus -Gender Focus -Homophobic Focus -International Focus -Religious Focus	Optional	X			X
Centers for Social Justice - Intercollegiate programs	Optional	X			X
Club Programs -Fraternities and Sororities -Other Recreations	Optional				X
Cyberbullying Ethics Board on Safety Strategies	Optional		X		X
Cyberbullying Information Month	Mandatory	X	X	X	X
Cyberbullying Symposiums	Mandatory		X		X
Cyberethics Portal Zine for Public Sources	Mandatory	X	X	X	X
Guest Presentations on Safety Strategies from Security Industry	Optional	X	X	X	X
Mentoring Network for At-Risk Students and Student Victims	Optional		X		X
Peer Resources	Mandatory	X	X	X	X

and Sources on Cyberbullying Topics -www.isafe.org - www.netsmartz.org - www.wiredsafety.com					

***Aide, Cafeteria, Clerical, Maintenance and Security Staff**

Table 4

Cyberbullying method at the university	%
Looking in to your cell phone	14%
Looking in to your email	14%
Sending you harassing emails	29%
Sending you harassing pictures	29%
Sending you pornographic images	14%
Posting harassing messages on a social networking site	43%
Posting harassing pictures on a social networking site	29%
Preventing a friend from contacting others on a social networking site	0%
Sexting	14%
Other	0%

Table 5

Cyberbullied Groups	%
Male students	25%
Female students	25%
Asian students	14%
Gay students	43%
Lesbian students	25%
Physically disabled students	14%
African-American students	10%
Hispanic students	10%
Muslim students	14%
African students	12%
Developmentally disabled	8%
Other	33%

Table 6

Cyberbullying method outside the university	%
Looking in to your cell phone	14%
Looking in to your email	9%
Sending you harassing emails	32%
Sending you harassing pictures	23%
Sending you pornographic images	14%
Posting harassing messages on a social networking site	64%
Posting harassing pictures on a social networking site	27%
Preventing a friend from contacting others on a social networking site	9%
Sexting	9%
Other	36%

Table 7

The university is sensitive to cyberbullying.		%
Strongly Disagree		1%
Disagree		16%
Neither Agree nor Disagree		62%
Agree		20%
Strongly Agree		1%

Table 8

The university is knowledgeable of cyberbullying		%
Strongly Disagree		4%
Disagree		5%
Neither Agree nor Disagree		48%
Agree		40%
Strongly Agree		5%

Table 9

Professors are knowledgeable of cyberbullying		%
Strongly Disagree		1%
Disagree		10%
Neither Agree nor Disagree		43%
Agree		41%
Strongly Agree		5%

Table 10

Question: The University Should …	**Percent Yes**
Publicize more its cyberbullying policy	82
Publicize more cyberbullying as a harmful activity	85
Sponsor student seminars on cyberbullying	72
Sponsor cyberbullying sensitivity seminars for professors	69
Sponsor cyberbullying sensitivity seminars for staff	65

Table 11

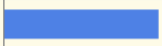
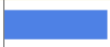
Cyberbullying is a serious issue for you		%
Strongly Disagree		17%
Disagree		16%
Neither Agree nor Disagree		32%
Agree		21%
Strongly Agree		13%

Table 12

Answer	**Cyberbullying is a violation of privacy, regardless of intent**	**Cyberbullying, pure and simple, is wrong**
Strongly Disagee	1%	2%
Disagree	3%	1%
Neither Agree nor Disagree	23%	14%
Agree	37%	21%
Strongly Agree	36%	63%

Table 13

What should be the penalty for cyberbullying?		%
No penalty by the University		7%
Warning sent to the student by the University		63%
University informs police of the incident		50%
Student is suspended by the University		57%
University immediately expels the student		20%

Table 14

Whom would you contact if you were cyberbullied		%
The President of the university		16%
The Dean of Students		39%
The Dean of your school		25%
The Chair of your department		14%
The Counseling Center		44%
The Security Department		29%
Your local Police Department		24%
Your fraternity or sorority		11%
Your best friend		63%
Your parents		57%
No one		9%