Predicting Success in the Introduction to Computers Course: GPA vs. Student's Self-Efficacy Scores

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ABSTRACT

This study examines whether students' final grades in an introductory college business computing class correlate with their self-reported computer skill levels provided at the beginning of the course. While significant research effort has been devoted to studying the effects of student self-efficacy on course outcomes and studying the moderating effects of various demographic variables (such as age and gender) and experience variables (such as computer access at home), there is a dearth of studies examining a student's grade-point-average (GPA) as a predictor of final course success in the introductory computing class. For the fundamentals of computer applications course at the medium-size state college, student self-perceptions of their own computer abilities explained very little of the variation in the final course grade outcomes. GPA, however, was a more powerful predictor (adjusted R^2 = 0.365) of the final class grade as well as the students' grades on individual course modules. Students' perceptions of their own computer abilities added very little additional predictive value, increasing the full model's adjusted R^2 only to 0.393. Given the predictive power of GPA relative to course success, discussion is included concerning ways to use this information to offer additional assistance to lower performing students. The study contributes to the existing literature and refutes the value of self-assessment of skills and abilities as a sole predictor of success. Although the literature has suggested non-traditional or adult students may have more difficulty with the computer course, our findings do not support this. Areas for future research are suggested.

Keywords: information literacy, business student, introduction to computers, self-efficacy, computer literacy

1. INTRODUCTION

Information literacy research is growing due to the Internet, digital media, and the pervasiveness of personal computers. With electronic media and devices proliferating, what encompasses computer literacy and fluency becomes a changing construct and universal definitions still do not exist. McDonald (2004) agrees the definition of computer literacy continues to change as technological innovations are adopted by the marketplace. There is broad agreement, however, that college students need computer and information literacy as part of their studies to be competitive as graduates in an environment that increasingly relies on information technology.

The challenge for universities is to ensure their students meet a minimum level of competency when using constantly changing technology. McDonald (2004) further suggests universities incorporate flexible testing tools to measure basic computer skills such as an Internet-based, interactive skills test. Hawkins and Oblinger (2006) indicate technology is nearly ubiquitous on campus; and, although conversations about the digital divide are relatively uncommon today, it remains incorrect to assume all students own a computer or have an Internet connection.

2. LITERATURE REVIEW

Colleges have traditionally used the freshman- or sophomore-level course in microcomputer applications/introduction to computers to accomplish basic computer literacy. The purpose of this research is to determine if predictors exist for student success in this course. Most studies focusing on students' skill and success in the introduction to computers course at the college level examine a variety of experience variables, demographic variables, and students' self-reported skill levels on a variety of microcomputer applications. This latter variable is termed self-efficacy.

Self-Efficacy

Self-efficacy is a social cognitive construct popularized in the 1970s and later formally defined by Bandura (1986) as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 39). Bandura (1986) argued beliefs about efficacy influence a person's choice of activities, the level of effort an individual is willing to expend, their persistence even in the presence of difficulties, and their overall performance. Self-efficacy remains a key concept in social cognitive theory.

Computer Self-Efficacy

Computer self-efficacy is a derivation of self-efficacy in general (Bandura, 1986, 1997) and has been defined as "...a judgment of one's ability to use a computer" (Compeau & Higgins, 1995, p. 192). It has also been studied and found to be a determinant of computer-related ability and the use of computers (Hasan, 2003). Hasan and Jafar (2004) empirically examined computer-learning performance and used the definition of self-efficacy as referring to an individual's judgment of their own capabilities to organize and execute courses of action to attain designated performance.

Compeau, Higgins, and Huff (1999) found that those individuals with a higher computer self-efficacy participate in computer-related activities, expect success in these activities, persist and employ effective coping behaviors when encountering difficulty, and exhibit higher levels of performance than individuals low in computer self-efficacy. Karsten and Roth (1998a) found that the construct captures the competence and confidence management information systems (MIS) professors hope to provide their students. The construct has been studied in depth by a number of MIS researchers (see Agarwal, Sambamurthy, & Stair, 2000; Marakas, Johnson, & Clay, 2007; Marakas, Yi, & Johnson, 1998).

Students gain self-efficacy from a variety of sources (Bandura, 1997), including their personal successes and failures, observing the successes and failures of friends and classmates, encouragement, and confidence or anxiety when faced with tasks. Computer self-efficacy is dynamic, changing as students gain new information and computer-related experiences (Gist & Mitchell, 1992), but Karsten and Roth (1998b) found that it is the kind of experience, and not just the experience per se, that changes perceptions of computer self-efficacy. Marakas, Yi, and Johnson (1998) studied the construct and separated task-specific measures of computer self-efficacy from general computer self-efficacy. They defined the task-specific measures as "...an individual's perception of efficacy in performing specific computer-related tasks within the domain of general computing" (Marakas, Yi, & Johnson, 1998, p. 128).

Hasan (2006a) further described the construct as a judgment of efficacy (or success or skill) in performing a well-defined computing task using a particular application, including word processing, spreadsheet, or database programs. Qutami and Abu-Jaber (1997) studied gender and cognitive learning styles to determine students' self-efficacy in computer skills. Shiue (2003) studied the effect of cognitive learning styles and prior computer experience on students' computer self-efficacy in computer literacy courses, while Albion (2001) used pre- and post-tests and found that students' self-efficacy, after completing computing courses, was influenced by their personal ownership of computers. Hsu and Huang (2006) found that computer use and interest had a significant, direct effect on student computer self-efficacy. They further found that computers at home and work had indirect effects on computer self-efficacy as did trend motivations and interests. Computers are pervasive in business and education, and Buche, Davis, and Vician (2007) agree it would be easy to assume that all individuals embrace technology. However, their study found that 30 to 40 percent of individuals experience some level of computer anxiety.

Self-Efficacy, Computer Literacy, and Demographics

Studies of the first computer course have explored gender differences in self-efficacy and attitudes toward computers (Busch, 1995). Busch (1996) added group composition and cooperation variables to his subsequent study. Introductory information systems course-related factors were also studied as indicators of computer self-efficacy (Karsten & Roth, 1998a), while Houle (1996) studied student differences (including a variety of demographics characteristics) in his research on understanding student differences in computer skills courses.

Davis and Davis (2007) surveyed 58 students in technology teacher education and training to determine self-perception of their competency in five constructs made up of 43 elements related to personal computer knowledge and skills. While gender did not make a difference, they did find a statistically significant difference between the perceived competencies of the participants based on age range, with students 35 years old or younger perceiving a higher level of competence compared to those 36 years old or older. Further analysis within construct variables revealed instances of statistically significant differences based on gender and age range.

Divaris, Polychronopoulou, and Mattheos (2007) agree an accurate assessment of the computer skills of students is a pre-requisite for success in other areas, including e-learning. They studied 50 post-graduate students and calculated competence scores and gathered socio-demographic characteristics. Using both descriptive statistics and linear regression modeling, the authors found that competence scores were normally distributed but that gender and use of e-mail were significant predictors of computer literacy.

Students believe they are computer literate according to Wilkinson (2006). Her research compared students' perceptions with reality and found that students did not perform well on pre-tests of Microsoft Office™, but improved their post-test scores with instruction. She found that a comparison of student classifications regarding perceptions with the reality of computer productivity yielded no significant differences but did find significant differences between Caucasian students and ethnic minorities.

Goh, Ogan, Ahuja, Herring, and Robinson (2007) investigated the relationship among computer self-efficacy, mentoring, and the gender of students and their mentors. Students with male mentors reported significantly higher computer self-efficacy as compared to those students with female mentors. Kuhlemeier and Hemker (2007) studied the impact of secondary students' use of the Internet and the computer at home on the digital skills they need in school and found that home access to e-mail and students' use of home computers for various tasks, including surfing, e-mailing, chatting, and text processing were related to Internet and computer interest. Ballantine, Larres, and Oyelere (2007) studied the reliability of self-assessment as a measure of computer competence. They agreed recent research on the topic has employed self-reported ratings as the sole indicator of students' computer competence. They compared the self-assessment to results on objective tests and found that students significantly overestimated their level of computer competence. Interestingly, they found that students' home and high school computer use did not affect the results, and they questioned the use of self-assessment as a measure of computer competence.

In their study of the digital divide, Tien and Fu (2008) used multiple regression and logit models and found that demographic and socioeconomic family background did not predict computer skills of first year college students. They did find that different kinds of computer knowledge affect student learning with knowledge of software helping students learn the most. Some differences in computer knowledge were found among female students, minorities, and those with blue-collar or unemployed parents. These students were at a disadvantage in digital understanding. Banister and Vannatta (2006) suggest colleges must develop strategies to assess technology competencies of beginning college students and then move beyond such assessments to provide student support for achieving technological competencies. They found that various methodologies have been used to measure a student's computer competencies but agree that there are no standardized scales for assessing competence.

In her study of the introduction to computers course, Webster (2004) examined the relationship between computer use confidence and computer literacy scores before the course began and repeated the test at the end of the course to assess gains in computer usage confidence and literacy. She found that prior computer classes and computer usage positively influenced literacy scores and confidence. In addition, she found that hours using the computer for e-mail purposes also influenced confidence scores. After completing the introductory course, students had higher confidence and literacy ratings than the control group.

In their study of the reported experience, comfort level, and perceived information technology skills of 233 college students, Messineo and DeOllos (2005) found that students view their computer competence differently depending on whether they are using the technology for personal or course-related tasks. They discovered that even when the expressed levels of experience and comfort for some forms of technology were high, exposure to and confidence with more advanced applications were lacking. They agreed faculty members may make false assumptions about student preparedness, which hinders their students' success. Their research found differences by gender and race/ethnicity and suggested faculty should be aware of the varied skill levels and experiences of their students.

Cassidy and Eachus (2002) developed a computer user self-efficacy scale. They agree self-efficacy beliefs have been identified as a success factor for completing tasks. With the increasing reliance on computer technologies in all aspects of life, it is important to measure the construct. Their research found a significant positive correlation between computer self-efficacy and computer experience. Familiarity with computer software packages was a significant predictor of computer self-efficacy, and computer ownership and training increased efficacy. In their study, males reported higher results than females. This supports the findings of Varank (2007) who found that gender was significant for predicting computer attitudes but not perceived skills. In Mayall's (2008) study of technology self-efficacy among high school students, no statistically significant differences based on gender were detected in either pre- or post-tests.

Stephens (2006) found that subjects with low computer self-efficacy will avoid interacting with computer technology when given a choice or opportunity. Oblinger and Hawkins (2006) suggest that when faculty, staff and administrators see how easily students use technology, they may mistakenly assume students have more than adequate IT competency. They question whether students are competent or just overly confident and caution having no fear is not the same as having knowledge or skill. 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.

Computer Course and Instruction

In their research, Creighton, Kilcoyne, Tarver, and Wright (2006) ask 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 that 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. They found the higher the ACT score, the better the students scored on the objective pre-test exam and the performance-based post-test exam, but found only a weak relationship between taking a previous computer course and pre-test scores.

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 re-design the content and pedagogy of the computer literacy course. Mykytyn (2007) agrees 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 in a computer lab may not be the best instructional mode. He suggests 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 that higher levels of perceived computer experience positively affected lecture and lab homework and exam scores.

Hindi, Miller, and Wenger (2002) investigated students' perceptions of computer literacy skills they had obtained prior to enrolling in a university to develop implications and recommendations for teaching a college-level computer course. Students perceived themselves better prepared in word processing than they were in spreadsheet and database applications. However, computer self-efficacy measures suffered from degradation of their explanatory power over time (Marakas, Johnson, & Clay, 2007).

The proposed research model developed by Hasan (2006b) makes a clear distinction between general and application-specific computer self-efficacy and found that both had negative effects on computer anxiety. A model by Thatcher and Perrewe (2002) found that computer anxiety mediates the influence of situation-specific traits on computer self-efficacy.

Karsten and Schmidt (2008) in their ten-year study of business student computer self-efficacy found that when controlling for changes over time, students have lower computer-self efficacy in 2006 than in 1996. It was surprising that increased use of computers and technology over time did not lead to higher self-efficacy scores. Sharkey (2006), in her study of information fluency and computer literacy, found that universities are responding with a more rapid integration and adoption of technology and emphasizing information use and retrieval. Findings on self-efficacy and computer skills acquisition among graying workers by Reed, Doty, and May (2005) suggested older participants' beliefs about their efficacies in acquiring computer skills were lower than their actual abilities.

GPA

Research has considered a number of demographic variables as determinants of student performance in various business courses. Trine and Schellenger (1999) studied determinants of student performance in an upper level corporate finance course and found that GPA, the financial accounting grade, basic finance grade, math ACT, a self-motivation factor, an information processing factor, and sharing living quarters with non-family members were all significant in determining the student's course performance. Typically the list of variables is more limited to gender, age, or ethnicity.

Wilson, Ward, and Ward (1997) found that both self-reported and actual data on ACT scores, GPAs, and grades earned in specific courses were similarly correlated with accounting course performance. Christensen, Fogarty, and Wallace (2002) studied the directional accuracy of self-efficacy and performance in accounting courses mid-way through the academic term. They found the more conservative a student's self-efficacy of their skill levels and abilities, the higher the second exam score and final course grade, even when controlling for cumulative GPA in accounting courses, average exam performance, number of accounting classes completed, and the extent of involvement in extracurricular activities. There is a dearth of studies focusing on these demographic characteristics, specifically GPA, in the introduction to computers course.

3. METHODOLOGY

The literature on students' self-efficacy in general and computer self-efficacy in particular considers a number of demographic characteristics and skill levels. However, inconsistencies remain as to which variables have the most predictive power. Our study extends the research on this topic and gathers data on student's self-efficacy in a number of specific computer applications. The research examines if the self-rated skill sets are predictive directly or indirectly of the knowledge-level scores of the various computer applications or of the final, overall course grade and whether such predictions are significantly improved by the inclusion of demographic and prior experience variables. The model shown in Figure 1 (Appendix B) indicates our hypothesized relationships and leads to our hypotheses.

H1: Student self-assessment of skills and abilities with Windows XP™ and selected Microsoft Office™ applications (Word™, Excel™, PowerPoint™, and Access™) and related skills and abilities is **not** a predictor of final course outcomes (final overall letter grade).

H2: Student demographic and experience data from the survey and the college Banner™ database system (including gender, age, high school computer training experience, prior college computer training experience, bachelor or non-bachelor degree candidate, previous attempts of the computer literacy course and overall/current GPA) are **not** predictors of final course outcomes (final overall letter grade).

H3: Student self-assessment of skills and abilities with Windows XP™ and selected Microsoft Office™ applications (Word™, Excel™, PowerPoint™, and Access™) and available student demographic and experience data from the survey and the college Banner™ database system are **not** predictors of final course outcomes (final overall letter grade).

The course chosen for study was an introduction to computer applications course. Appendix C includes an abbreviated course syllabus highlighting topic coverage and weights. The course covers multiple modules, including hardware and operating systems, productivity applications such as word processing, database and spreadsheet software, information literacy, networking, and the Internet. A survey instrument was developed based on key topics and constructs from the literature review. The survey was reviewed and further edited by management information system faculty for completeness and accuracy.

Survey Instrument

Students reported their name, e-mail address, and various phone numbers, as well as computer courses (identified by name) they had completed in high school, college, and/or technical school. They also completed a list of other computer training and experiences. On a five-point Likert-type scale, they rated their level of knowledge on various applications from 1 (none) to 5 (expert), with points in between for novice, intermediate, and advanced. No specific definitions of these terms were given. Applications included Windows XP™, MS Word™, MS Excel™, MS Access™, and MS PowerPoint™, as well as e-mail, Internet searching, and general computer hardware/ software concepts.

The next questions focused on student's personal goals as an outcome of the class and included their expected grade and a place for open-ended comments on what they hoped to achieve and the knowledge they expected to gain. The final three pages asked students to check their specific skills for each of the applications, including the computer operating systems, word processing, spreadsheets, databases and presentation software (See Appendix D for a copy of the survey instrument). Specific skill variables for each application were developed from the textbook used in the course.

Survey Population and Sample Demographics

Self-reported data were collected from 259 students in a freshman/sophomore-level microcomputer applications and introduction to information technology course at a medium-size, AACSB-accredited state college. The course is required for all business majors and is an elective for a number of associate and bachelor's degree programs. Due to incomplete and missing data, 207 student surveys and records were used for the analysis.

Additional gathered information, as shown in Table 1 (Appendix A), included status as bachelor's or non-bachelor's degree student, overall GPA, gender, age (as date of birth), and overall course grade (all of which were gathered from the campus Banner™ database system following course completion). The age was separated to account for traditional versus non-traditional students using the breakdown used by Justice (2001) in her study of traditional and nontraditional-age college students. Justice (2001) defined traditional-age students as between 18 and 23 years of age and non-traditional-age college students as age 24 and above (through age 64). These are the age ranges used in this analysis. Individual student's scores on each individual computer package (word processing, spreadsheet, database, and operating system) were obtained from the professor of record's lab and lecture grades.

Research Design

Analysis was conducted by regressing students' course grades (GRADERCD) on their self-rated level of knowledge of Windows XP™ (WINXP), MS Word™ (WORD), MS Excel™ (EXCEL), MS Access™ (ACCESS), MS PowerPoint™ (PPT), email (EMAIL), Internet search (INTSRCH), and hardware and software concepts (HWSW); on demographic variables gender (GNDR) and age (AGE); and experience variables representing students' prior computer training in high school (HS_NONE) or college (COLL_NONE), bachelor's and non-bachelor's degree students (DEGRRCD), previous course attempt (PREVATT), and overall/current GPA. All independent variables except DEGRRCD were included because of their importance as a skill needed by students or their mention in the literature. Standard stepwise linear regression was used with criteria of probability of F to enter set at ≤ .050 and to exit ≥ .100. Three variables were found to be significant; see Table 2 in Appendix A. The resulting model is summarized in Tables 2, 3, and 4 (Appendix A).

4. FINDINGS

Since student self-assessments of Hardware/Software Concepts and MS Word™ knowledge and skills are significant in the model, **the first hypothesis is rejected**; student self-assessment of skills and abilities with Windows XP™ and Microsoft Office™ applications (Word™, Excel™, PowerPoint™, and Access™) and related skills and abilities **is** a predictor of final course outcomes.

Since GPA is significant in the model, **the second hypothesis is rejected**; student demographic and experience data from the survey and the college Banner™ database system (including gender, age, high school computer training experience, prior college computer training experience, bachelor or non-bachelor degree candidate, previous attempts of the computer literacy course and overall/current GPA) **are** predictors of final course outcomes.

Since two self-assessment items (Hardware/Software Concepts and MS Word™) and one demographic item (GPA) are significant in the model, **the third hypothesis is also rejected**; student self-assessment of skills and abilities with Windows XP™ and selected Microsoft Office™ and related applications and available student demographic and experience data from the survey and the college Banner™ database system **are** predictors of final course outcomes. The more interesting finding, however, is the small additional explanatory power associated with including Hardware/Software Concepts (adjusted R^2 increase = 0.016) and MS Word™ (adjusted R^2 increase = 0.012) compared with GPA (adjusted R^2 increase = 0.365).

The relative explanatory power of GPA and other factors is indicated in Table 5 (Appendix A). The increase in R^2 for course grade and individual computer package lecture and lab grades for GPA is greater than the combined R^2 increase for all other significant variables in all cases but one. In the one exception, Windows XP™ Lecture, GPA provides the single greatest increase in R^2 and enters the model first.

Comparing GPA and grade using the longitudinal data for this course, we find students with a 0.0 to 1.6 GPA are predicted to make an F in the course and a 1.7 to 2.1 GPA are predicted to make a D. Students with a 2.2 GPA or higher are predicted to pass the introduction to computers course with a grade C or better. GPAs of 2.8 to 3.2 are predicted to earn a course grade of B, while students with a 3.3 GPA or higher would be predicted to earn an A in the overall course.

Given the overwhelming importance of GPA in explaining course outcomes, it is probable student anxiety or "technophobia" regarding skills-based introduction to computer classes should not be an issue for good students (defined as having a high overall grade-point average). This result should be encouraging for the growing cadre of "non-traditional" or adult students returning to college, particularly in the current economic downturn. These students, who did not grow up with computers as did the traditional Millennial Generation college students of today, may feel at a disadvantage in the course or some level of stress upon entering the course. Faculty can reassure students about the similarity of the learning process in the computer course to other courses and stress that study skills and other study preparation resources are more important to course success than prior skills or perceived computer expertise.

5. DISCUSSION & AREAS FOR FUTURE RESEARCH

When assisting students with lower overall grade point averages, professors of the introduction to computers course should focus not only on course-specific skills, but on overall resources appropriate to improve students' study habits. It may be that students having problems in the course are juggling work, family, and school demands or taking too many courses. Short sessions on managing time, improving concentration, preparing to study, reading textbooks, setting goals, managing test anxiety, and improving study habits may be more important for these students. Short workshops emphasizing these skills are often offered on college campuses. Advising students with low GPAs to take one or more of these targeted workshops prior to enrolling in the introduction to computers class may be warranted.

While our study was exploratory in nature, further studies should better pinpoint the GPA range that indicates whether students will have difficulty in the course. If future analysis confirms GPA as a key predictor, then faculty may want to advise students with these lower GPAs to enroll in workshops or college success courses as a possible prerequisite. Surveys of prerequisites and remediation at other colleges and universities would be helpful in starting the dialogue.

One interesting note from the study is the negative coefficient for student-reported ability with MS Word™. This sign was unexpected but may be due to students' greater familiarity with Word™ than the other selected Microsoft Office™ applications (Excel™, PowerPoint™, and Access™). This familiarity with Word™ may lead students to overestimate their skills and abilities as compared to the other applications within the course based solely on the name recognition and general familiarity.

Further studies are needed on the design of the introduction to computers course. While beyond the scope of this study, there has been much discussion in schools of business that today's entering students may have enough experience in computer applications from high school and/or work experience to omit all or part of 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). However, 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 (McDonald, 2004; Stephens, 2006). A comparative article that profiles the structure of the course at various institutions is also needed, along with further discussion in the academic community. Further study of how the course is taught and organized at other colleges and universities would also be helpful for academicians.

Further replication and extension of this study too could determine the GPA cut-off point for remediation and study skills instruction prior to attempting the introduction to computers course. This study found students with a GPA of 2.1 or lower would earn either a D or F in the introduction to computers course, with those students with a 1.6 or lower earning an F. Further studies should attempt to validate this scale.

This study found overall student GPA to be a better predictor of the final course grade than the variables in the self-reported skills inventory. GPA was also a better predictor of performance in each of the various computer skills and packages lab and lecture modules. Further research is needed with a larger sample size, across additional time periods, and with samples from a variety of institutions to confirm the findings. If the findings continue to point to GPA as a better predictor over time, then the current stream of research in self-efficacy will need to be amended, as will the focus on various individual and combinations of demographic variables as predictors of course performance. Further research is needed to determine if targeted interventions to improve overall GPA would help the overall grades in the introduction to computers course.

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APPENDIX A

TABLE 1

Sample Demographics

Variable		Total	Percent		Total	Percent
Gender	Male	94	45.6%	Female	112	54.4%
Age	Under age 24	138	66.7%	24 and older	69	33.3%
High School Computer Training Experience	None	146	70.9%	Some	60	29.1
Prior College Computer Training Experience	None	54	26.2%	Some	152	73.8%
Major	Non-Bachelor's Degree Seeking	100	48.3%	Bachelor's Degree Seeking	107	51.7%
Previous Course Attempts	None	141	68.1%	One or More	66	31.9%

Overall GPA	**< 1.00**		**1.00 to < 2.00**		**2.00 to <3.00**		**3.00 to 4.00**	
Number|%-age	2	1.0%	18	8.7%	82	39.6%	105	50.7%

Course Grades	**A**		**B**		**C**		**D**		**F**	
Number|%-age	45	21.8%	99	48.1%	53	25.7%	4	1.9%	5	2.4%

TABLE 2

Variables Entered/Removed During Stepwise Regression[a]

Model	Variables Entered	Variables Removed	Method
1	GPA	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	HWSW	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	WORD	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a Dependent Variable: GRADERCD

TABLE 3

Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Model					**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.607(a)	.368	.365	.713	.368	118.422	1	203	.000
2	.622(b)	.387	.381	.704	.019	6.221	1	202	.013
3	.634(c)	.402	.393	.697	.014	4.846	1	201	.029

a Predictors: (Constant), GPA
b Predictors: (Constant), GPA, HWSW
c Predictors: (Constant), GPA, HWSW, WORD

TABLE 4

Regression Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.482	.226		2.129	.034
	GPA	.827	.076	.607	10.882	.000
2	(Constant)	.133	.264		.504	.615
	GPA	.841	.075	.617	11.175	.000
	HWSW	.121	.049	.138	2.494	.013
3	(Constant)	.466	.302		1.543	.124
	GPA	.833	.075	.611	11.153	.000
	HWSW	.176	.054	.200	3.246	.001
	WORD	-.136	.062	-.135	-2.201	.029

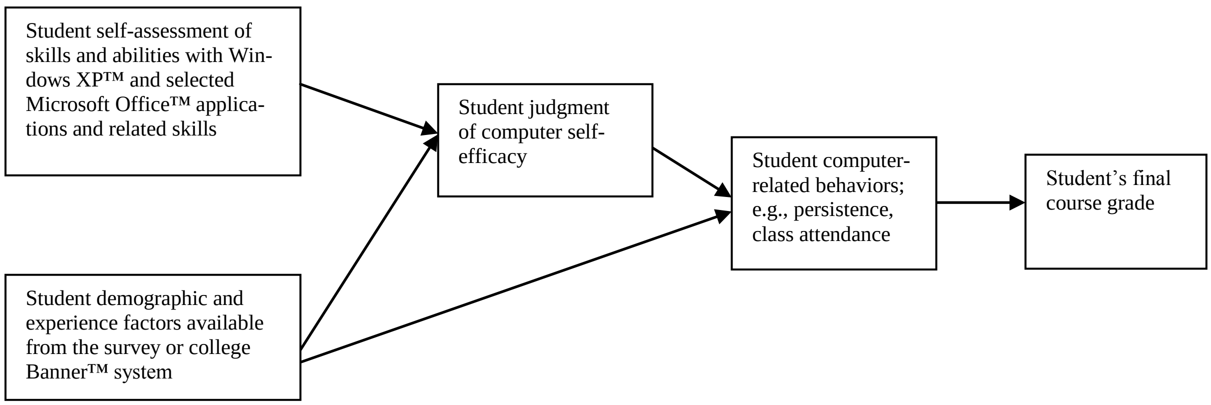
TABLE 5

R^2 Increase for Course Grade and Individual Computer Packages Due to GPA and Other Significant Factors

DEPENDENT VARIABLE	R^2 Increase GPA	R^2 Increase Sum of Other Sig. Factors	Order of GPA Entry Into Model
Course Grade	0.368	0.033	1
XP Lecture	0.151	0.175	1
XP Lab	0.049	0.000	1
Word Lecture	0.218	0.016	1
Word Lab	0.056	0.000	1
Excel Lecture	0.326	0.016	1
Excel Lab	0.158	0.000	1
Access Lecture	0.374	0.031	1
Access Lab	0.250	0.041	1

APPENDIX B

Figure 1



APPENDIX C

ABRIDGED SYLLABUS

CLASS TEXT:

Shelly, Gary B., T. J. Cashman, and M. E. Vermaat. 2008. *Microsoft Office 2007: Introductory Concepts and Techniques, Windows Vista Edition*. Thomson Course Technology: Boston.

COURSE DESCRIPTION:

Assures a basic level of computer applications literacy to include spreadsheet, database, word processing, LAN, e-mail, presentation software, and Internet utilizations. This course satisfies the computer literacy requirement.

STUDENT LEARNING OUTCOMES:

To successfully complete this course, the student should achieve the following objectives:

1. Understand how information technology aids business decision making.
2. Identify the components of a typical microcomputer system.
3. Identify and describe the most widely used general microcomputer software applications, the difference between application software and system software and understand the role of operating system software.
4. Demonstrate knowledge of computer hardware and software, including "multimedia" and be familiar with the legal, ethical, and privacy issues relating to the use of hardware and software in a business environment.
5. Be familiar with computer networks and know the basic components of a communications system to include e-mail, user interfaces, communications, and the Internet.
6. Effectively use a word processing software program, a spreadsheet program, a database management program, and develop a simple presentation using a presentation software program.

These objectives will be measured through written tests, laboratory assignments, and laboratory tests.

ASSESSMENT SCALE:

A = 90 – 100   B = 80 - 89   C = 70 - 79   D = 60 - 69   F = < 60

ASSESSMENT:

Component	Percent of total grade
Lecture tests (3-4 @100 points)	60%
Lab and Other Assignments	15%
Lab tests	25%
	100%

ATTENDANCE AND OTHER MATTERS:

Regular lecture and laboratory attendance is expected. If you miss a class, it is your responsibility to find out what you missed, including announcements of homework, lab assignments, test dates, etc. Exams are to be taken on designated test dates. No makeup tests for missed exams will be given, except in the case of extreme emergency and only with prior notification, if possible.

All assignments that have due dates are to be turned in at the beginning of the class meeting on the assigned due date. Late work will be accepted, but with a 10% penalty for each class day the work is late.

APPENDIX D

Survey Instrument

I have read, understand, and agree to abide by the policies established in this course.

Printed Name: ____________________ Signature: ______________________________
Date: __________

Please complete the following information:

Email address: ___________________________________

Phone number where you can be reached:

Day: _____________ Night: ________________ Cell Phone: _______________

Computer courses completed in:

High School: ____
____

College (or technical school) _________________________________
____

Other computer training, experience, etc.: _______________________________

____

Please rate your level of knowledge in each of the following:

Application	None	Novice	Intermediate	Advanced	Expert
Windows Vista	_____	_____	_____	_____	_____
MS Word	_____	_____	_____	_____	_____
MS Excel	_____	_____	_____	_____	_____
MS Access	_____	_____	_____	_____	_____
MS PowerPoint	_____	_____	_____	_____	_____
E-mail	_____	_____	_____	_____	_____
Internet Searching	_____	_____	_____	_____	_____
Computer Hardware/					

Software concepts ____ ____ ____ ____ ____

My personal goals as an outcome of this class:

expected grade: ______

what I hope to achieve: ____

____

knowledge I expect to gain: ____

____

I can perform the following activities (check all that apply):

Operating System:

____ Create text files

____ Create folders

____ Format disks with operating system (make a boot disk)

____ Format disks without operating system

____ Copy files

____ Move files

____ Create subfolders

____ Capture a screen image

Word Processing:

____ Create a document

____ Set margins

____ Set Tabs (left, right, center, dot leader)

____ Center text

____ Bold text

____ Underline text

____ Add borders

____ Add shading

____ Import graphics

____ Create tables

____ Add headers

____ Add footers

____ Create page breaks

____ Print a document

____ Show formatting marks

____ Show reveal formatting task pane

____ Customize word processor toolbars

____ Change font characteristics

____ Inserting dates (static and dynamic)

____ Create a hyperlink

____ Create a bulleted list

____ Save a document

____ Save a document as a web page

____ Create endnotes and footnotes

____ Find and replace text

____ Align text in a document

____ Align text in a table

Spreadsheets:

____ Create a new workbook

____ Select a cell

____ Enter text in a cell

____ Justify text in a cell

____ Enter numbers

____ Change font type, style, size and color

____ Save a workbook

____ Create formulas to add, subtract, multiply, and divide cell contents
Use built-in functions (e.g., SUM, MIN, MAX, AVERAGE)

____ Add shading and borders

____ Change column width and row height

____ Delete text in cells

____ Delete rows and/or columns

____ Copy cell contents

____ Move cell contents

____ Insert dates as text, as numbers, as system

____ Use relative, mixed and absolute addressing of cells

____ Create charts (both embedded and on a separate sheet)

____ Create X-axis, and Y-axis and Chart titles

____ Create an exploded pie chart

____ Name individual worksheets in a workbook

____ Make decisions using IF statements

____ Create static and dynamic web pages

____ Perform what-if analysis using
Goal-Seek

Databases:

____ Create a new database

____ Create tables

____ Create forms

____ Create reports

____ Create queries

____ Add, change, and/or delete data to/in/from a table

____ Create permanent relationships among tables

____ Enforce referential integrity

____ Specify cascade deletes and cascade updates

____ Create calculated fields

____ Specify validation rules for entering data

____ Apply filters to a query

____ Create a parameter query

____ Change the structure of a table

____ Save a database

____ Create an index

____ Create a primary key

____ Use wildcards in queries to search for certain records

____ Compact and repair a database

____ Backup a database

____ Use comparison operators to look up records

____ Use AND and/or OR operators in a query

Presentation Software:

____ Create a presentation file

____ Create slides in the presentation

____ Add graphics to the presentation

____ Create bullets

____ Change the background of the slides

____ Create animation effects

____ Add a new slide

____ Create a slide show

____ Check presentation for spelling errors

____ Create an outline

____ Print a presentation as slides, notes, and/or handouts

Please put your initials here: ____