An Examination of Students' Self-Efficacy Beliefs and Demonstrated Computer Skills

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Abstract

For the past 20 years or more, the issue of computer literacy has been on the forefront of education and employment. Since the evolution of the personal computer, human resource recruiters have identified computer literacy as a viable skill essential for prospective employees. Computer literacy necessitates understanding and knowledge of computer usage with the ability to retrieve, organize, analyze, describe, and present various types of information in an appropriate manner.

Research dating back to the early 1990's conveyed overwhelmingly a lack of computer literacy skills found in college students and graduates. It is important to understand how today's growing population of students are progressing with technological advances relative to computer applications. By common consent, nearly every job seeker needs basic computer skills and the ability to use such applications as word processors, spreadsheets, database programs and presentation software to function in today's job market. Thus, this article considers students' self-efficacy beliefs regarding their level of computer proficiency and their demonstrated knowledge and skills using Microsoft Word, Excel PowerPoint and Access.

The study spans a period of 3 years and is conducted at two historically Black institutions located in the southern part of the United States. Data collection includes a survey and graded application assignments from 156 students enrolled in Microcomputer Application courses offered through the College of Business. The findings revealed discrepancies between students' self-efficacy beliefs regarding their level of computer knowledge and skills and students' demonstrated abilities using Word, Excel and Access; on the other hand, no discrepancies were reported with PowerPoint.

Keywords: computer literacy, self-efficacy, computer skills, computer applications, technology.

Introduction

The growing intricacy of modern industry suggests that creating and editing documents, generating computational-intensive spreadsheets, preparing class project presentations and recordkeeping in database management systems are becoming fundamentally the norm in computer literacy skills (McDonald, 2004). Simonson, Mauer, Toradi and Whitaker (1987) define computer literacy as "an understanding of computer characteristics, capabilities, and applications, as well as an ability to implement this knowledge in the skillful, productive use of computer applications suitable to individual roles in society."

Since the evolution of the personal computer, human resource recruiters have identified computer literacy as a viable skill essential for prospective employees (Burgess, Davidson, & Ginter, 1987; Dologite, 1987; Massey & Engelbrecht, 1987). Inasmuch, computer literacy has long been a topic of interest and research dating back to the 1990's. Over a decade ago, researchers studied the impact of technology on both students' education and employment and conveyed overwhelmingly a lack of computer literacy skills found in college students and graduates (Brock, 1992; Hignite and Echternancht, 1992).

A more recent review of literature suggests that researchers have found similar results as reported a decade ago. Johnson, Bartholomew, and Miller (2006) used objective and subjective computer competency evaluations to assess business management students for a three-year period. Evaluation results revealed a decrease in students' skill and confidence levels in computer literacy skills by graduation. Likewise, after assessing 140 business freshmen computer literacy skills, Wallace and Clariana (2005) recommend an introduction to computer course for incoming students due to their demonstrated lack of computer knowledge, skills and abilities.

Grant, Malloy, and Murphy (2009) explored the perceived mastery of computer skills compared to actual scores on a computer skills assessment of 200 business students in a medium sized public university located in North Carolina. The researchers used a survey to report students' perceived computer proficiency and a computer skills assessment to measure their actual performance. The assessment tool evaluated students' knowledge of word processing, presentation, and spreadsheet application software. The results were mixed; some differences in students' perception of their word processing skills and actual performance, no difference in perception and performance of their presentation skills, and a significant difference in perception and performance for their spreadsheet skills.

In contrast, Karsen and Schmidt (2007) compared computer self-efficacy of students enrolled in an introduction to information systems course in 1996 and 2006. Students in 2006 reported significantly more computer experience, computer use and frequency and took significantly more core courses that required computer use than their 1996 counterparts.

As computer literacy requirements for most job levels increase, so does the need for more computer-literate employees. Appropriately, colleges and universities are becoming increasingly responsible for graduating students with skills and abilities necessary to compete in a rapidly changing technological environment (Banta & Howard, 2004). As technology permeates our society, the question remains whether college students and graduates are adequately prepared to use this technology.

The current study examines students' self-efficacy beliefs with regard to their computer literacy skills. Early research suggests that self-efficacy may be an important factor related to the acquisition of computer skills (Miura, 1987). Kinzie, Delcourt, and Powers (1994) define self-efficacy as "an individual's confidence in his/her ability to perform the behavior required to produce specific outcome and it's thought to directly impact the choice to engage in a task, as well as the effort that will be expended and the persistence that will be exhibited" (p. 747).

Albert Bandura (1997) argues that individuals want control over events that affect their lives; consequently, they have a stronger incentive to act if they believe that control is possible. He further claims that those individuals with high self-efficacy are more likely to have high aspirations, set difficult challenges and commit to meeting those challenges. On the other hand, individuals with low self-efficacy have low aspirations and weak commitment to their goals. In a study conducted with Zimmerman and Martinez-Pons (1992), Bandura reported that students' beliefs in their efficacy for self-regulated learning affected their perceived self-efficacy for academic achievement. The current study examines business students' self-efficacy and their demonstrated computer literacy skills.

Background and Methodology

This study encompasses students from two business schools located at two separate universities and spans a period of 3 years beginning fall 2007 through spring 2009. Located in Fayetteville, North Carolina, Fayetteville State University (FSU) is a historically Black land grant institution founded in 1867. It serves a student population of 6,072 where 75% are African American, 17% are Caucasian, 4% are Hispanic and 4% are reported as other. Tennessee State University (TSU) is also a historically Black land-grant institution located in Nashville, Tennessee. Founded in 1912, this comprehensive urban university serves a student population of 8,254 where 74% are African American, 22% are Caucasian, and 4% are reported as other. Both universities have received accreditation from the Association to Advance Collegiate Schools of Business (AACSB) a distinguished accrediting institution for business programs in higher education.

Historically Black Colleges and Universities (HBCUs) were established for the explicit purpose of educating African Americans at a time when they were the only postsecondary option available to this populace. Presently, these institutions are exceedingly recognized for graduating a significant number of minority students by promoting an environment that encourages student engagement, retention and success (Buzzetto-More & Sweat-Guy, 2007).

The population studied was business students self-enrolled in the 200-level microcomputer application courses. The instructor, who holds a doctorate in Instructional Systems Design and has extensive pedagogical research in the area of computing, taught all courses used in this study in the traditional format. At the start of each class a 5-page survey containing a mixture of Likert-scale, multiple-choice, and yes/no responses were administered to examine students' reported computer knowledge and skills. The following process was used to validate the Likert-type questions on the survey:

- First, statements were developed that were clearly favorable or unfavorable.
- Second, a panel of 5 research Business faculty judged the statements and classified each as positive, negative or neutral.
- Third, those statements classified as neutral were eliminated.
- Fourth, the survey was then administered to a small sample size of the population for whom the survey was intended.
- Fifth, correlation was computed for each statement response and the total scale score.
- Sixth, those statements whose correlation with the total scale was not statistically significant (<.6) were eliminated.

The study examined grade distribution for the following computer software: Word—a word processing application; Excel—a spreadsheet application; PowerPoint—a presentation application; and Access—a database application. Students were required to complete: (a) step-by-step lessons; (b) projects that present students an opportunity to apply many of the skills learned in the unit; and (c) two simulations about real-world tasks. The step-by-step lessons and unit projects counted at 30% of the application grade while the unit simulations counted at 40%. The course objectives for each application are listed in Table 1.

Table 1: Microsoft Applications Course Objectives

Word	Excel
• Understand Word basics • Track changes in a document • Compare and combine documents • Create master documents and subdocuments • Use navigation tools • Create a bibliography • Create and modify footnotes and endnotes • Add figure references • Insert a table of figures • Create cross-references	• Understand Excel basics • Create and copy formulas • Use relative and absolute cell addresses • Use AutoSum • Insert basic statistical functions • Use the IF function • Use the VLOOKUP function • Use the PMT function • Use the fv function
PowerPoint	**Access**
• Understand PowerPoint basics • Examine slide show design principles • Enhancing with illustrations (shapes, smartart, WordArt, and objects) • Enhance with multimedia (pictures, movies, and sound) • Create a photo album • Record and play narration	• Understand Access basics • Back up, compact, and repair Access files • Understand relational power • Create tables • Create, copy and run a query • Understand the order of precedence • Create a calculated field in a query • Create expressions with the expression builder • Create and work with data aggregates • Create, edit, and perform calculations in reports

Students' knowledge and skills measured by each application were consistent with the knowledge and skills measured by the self-efficacy survey.

Findings

There were 156 students who participated in the survey, 102 (65.4%) enrolled at FSU and the remaining 54 (34.6%) enrolled at TSU. Of that number, 71 (45.5%) were male and 85 (54.5) were female. The majority of the study participants were between the ages of 17-21 (67.9%) while only 12.2% were between the ages of 22-25; 7.1% were between 26-30; 4.5% between 31-35; and 8.3% were 36 and older. The ethnicity breakdown consisted of the following: 17 (10.9%) African; 114 (73.1%) African American; 2 (1.3%) Asian; 18 (11.5%) Caucasian; 2 (1.3%) Hispanic; and 3 (1.9%) listed other.

Thirty students (19.2%) were classified as freshmen; 71 (45.5%) were sophomores; 41 (26.3%) were juniors and 14 (9.0%) were seniors. Only 60 (39%) of the study participants reported living on campus while 94 (61%) were commuters. Additionally, Figure 1 illustrates students' reported computer knowledge and skill prior to classroom instruction with only 2 (1.3%) students rated

themselves as expert, 45 (28.8%) as advance, 84 (53.8%) as intermediate and 25 (16.0%) as beginners.

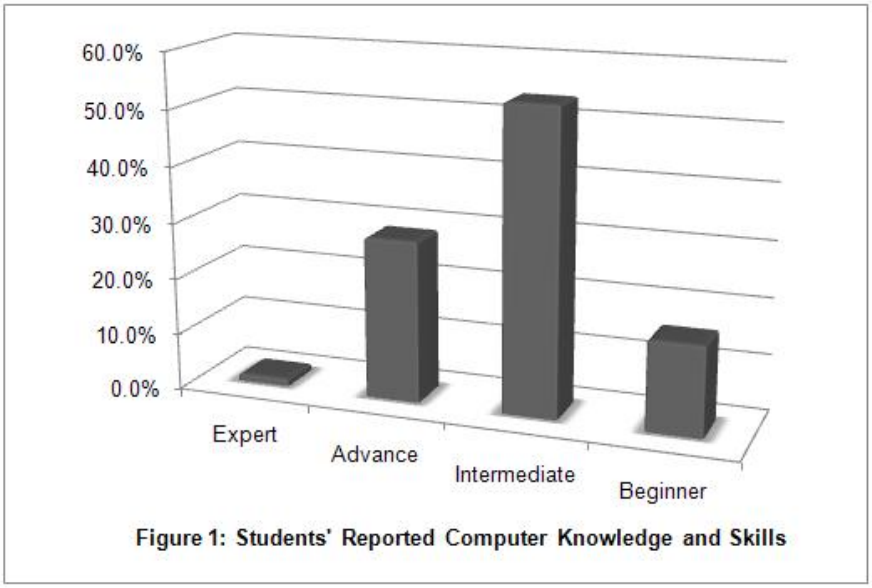

Figure 1: Students' Reported Computer Knowledge and Skills

At the beginning of each academic semester, students were asked to report their perceived level of knowledge and skills with each computer application by completing a 5-page survey. From this survey, we learned the following. In trying to ascertain students' access to computers, we asked the study participants whether or not they owned a computer: 50% reported owning a desktop; 40% owned a laptop; while only 10% did not own a computer at all.

Using a 5-point Likert scale, students were asked to rate their knowledge and skill level of each software application feature. Reliability of the Likert scale items were determined by computation of Chronbach's alpha. The standardized alpha for the 15 item scale of features was .934, indicating a high degree of internal consistency.

The majority of the sampled population reported having "excellent" knowledge and skills when moving and copying text (48.1%), changing indents and spacing (35.5%), and inserting headers and footers (34.6); however, Table 2 shows that a larger percentage felt that their knowledge and skills were "average" when using mail merge (30.5%) and creating footnotes and endnotes (36.4%).

Table 2: Students' Reported Knowledge and Skill Level of Microsoft Word

Features	Extremely Poor	Below Average	Average	Above Average	Excellent
Moving and copying text	.6%	1.3%	26.3%	23.7%	48.1%
Using mail merge	13.0%	31.2%	30.5%	14.3%	11.0%
Changing indents & spacing	.6%	4.5%	32.3%	27.1%	35.5%
Inserting headers & footers	2.6%	4.5%	27.6%	30.8%	34.6%
Creating footnotes & endnotes	7.8%	16.2%	36.4%	16.9%	22.7%

The Word unit included the following lessons with an estimated completion time of 13 hours: Word basics; basic editing; helpful word features; formatting text; formatting paragraphs and documents; working with graphics; working with documents; and increasing efficiency using word. Figure 2 illustrates student grades for Microsoft Word in which a large percentage (35.7) earned A's, while 13% earned B's, 13.9% earned C's, 8.7% earned D's, and 28.7% earned F's.

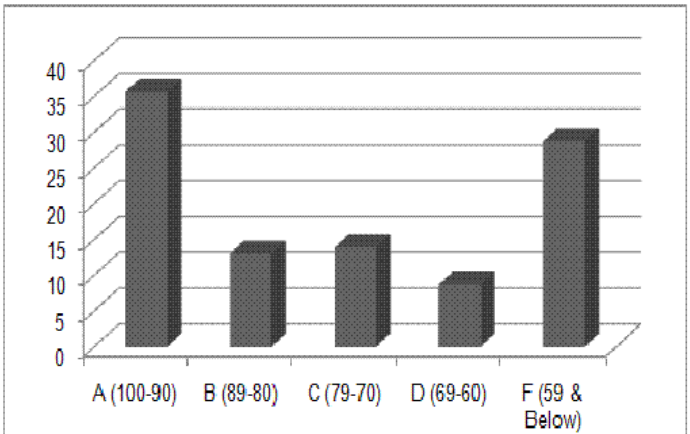

Figure 2: Grades for Microsoft Word

Less than 11% of the population sampled felt that their knowledge and skills were "excellent" when creating and embedding charts (10.9%), creating formulas (7.7%), and sorting data (7.7%) while a larger percentage reported their knowledge and skills were "average" 31.4%, 29.7%, and 33.5%, respectively (see Table 3).

Table 3: Students' Reported Knowledge and Skill Level of Microsoft Excel

Features	Extremely Poor	Below Average	Average	Above Average	Excellent
Creating and embedding charts	17.9%	27.6%	31.4%	12.2%	10.9%
Creating formulas	21.3%	31.6%	29.7%	9.7%	7.7%
Sorting data	17.4%	29.7%	33.5%	11.6%	7.7%

The Excel unit included the following lessons with an estimated completion time of 16.5 hours: Excel basics; changing the appearance of a worksheet; organizing the worksheet; worksheet formulas making the worksheet useful; working with multiple worksheets; and worksheet charts. Figure 3 illustrates student grades for Microsoft Excel. Over half (57.4%) of the students earned "A's", 10.4% earned "B's" and "C's", 4.3% earned "D's", and 17.4% earned F's.

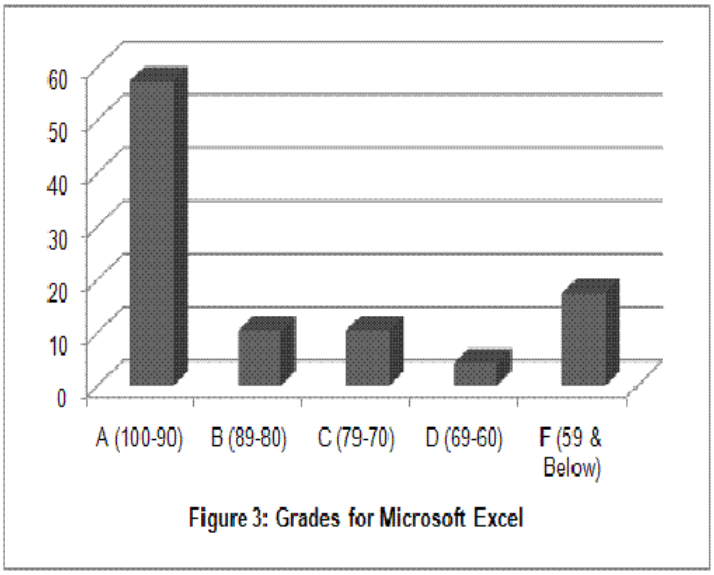

Figure 3: Grades for Microsoft Excel

Table 4 illustrates only 17.3% of the population reported skills below the average when creating a slide presentation, 24.4% when using multimedia, 26.3% when creating shapes and objects and 34.2% when working with organizational charts while a larger percentage reported above the average skill level with 56.5%, 46.2%, 43.0% and 31.0%, respectively.

Table 4: Students' Reported Knowledge and Skill Level of Microsoft PowerPoint					
Features	Extremely Poor	Below Average	Average	Above Average	Excellent
Creating a slide presentation	8.3	9.0	26.3	24.4	32.1
Using multimedia	10.9	13.5	29.5	21.8	24.4
Creating shapes & objects	12.8	13.5	30.8	23.1	19.9
Working with organizational charts	14.8	19.4	34.8	12.9	18.1

The PowerPoint unit included the following lessons with an estimated completion time of 7 hours: PowerPoint basics; creating and enhancing PowerPoint presentations; working with visual elements; and expanding on PowerPoint basics. Figure 4 illustrates student grades for Microsoft PowerPoint. Over half the population sampled earned high marks with 75.7% earning A's, 7.8% earning B's and C's, 3.5% earning D's, and 5.2% earning F's.

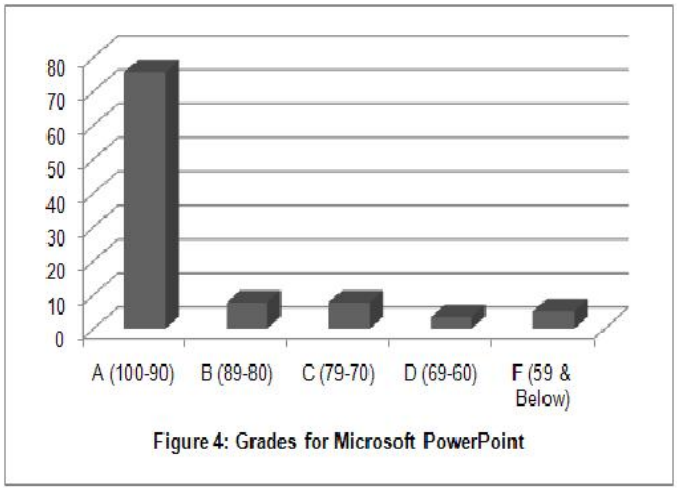

Figure 4: Grades for Microsoft PowerPoint

Table 5 shows only 1.9% of the population sampled reported "excellent" knowledge and skills when creating and modifying forms, using queries, and developing macros; while 32.1%, 37.2%, and 41.3%, respectively, reported "extremely poor skills".

Table 5: Students' Reported Knowledge and Skill Level of Microsoft Access					
Features	Extremely Poor	Below Average	Average	Above Average	Excellent
Creating and modifying forms	32.1	35.3	25.6	5.1	1.9
Using queries	37.2	35.9	19.9	5.1	1.9
Developing macros	41.3	32.9	20.6	3.2	1.9

The Access unit included the following lessons with an estimated completion time of 9 hours: Access Basics, Manipulating Data, Creating and Modifying Forms, Finding and Ordering Data, Reports and Macros and integrating Access. Figure 5 illustrates student grades for Microsoft Access. A larger percentage (68.7) of the participants earned A's, 14.8% earned B's, 5.2% earned C's, 1.7% earned D's, and 9.6% earned F's.

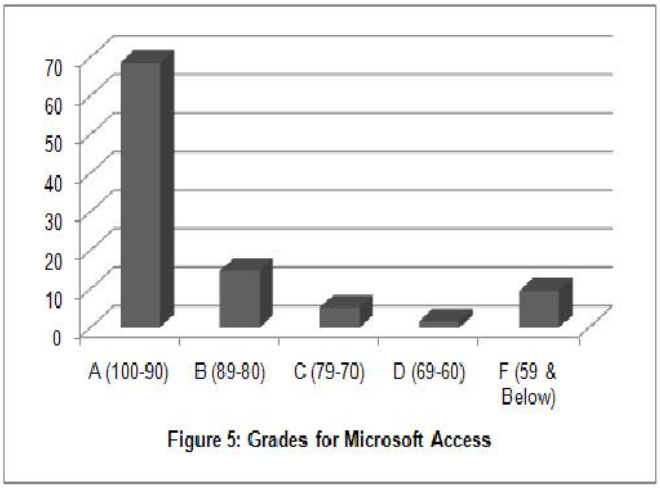

Figure 5: Grades for Microsoft Access

Finally, students were asked to rate their overall skill level of each application. As reported in Table 6, .6% felt that their knowledge and skills were "extremely poor" when using Word, 10.5% when using Excel, 5.2% when using PowerPoint and 24.0% when using Access. Quite the opposite was reported with 28.4%, 5.2%, 15.6% and 1.3% reporting "excellent" knowledge and skills in Word, Excel, PowerPoint and Access respectively.

Table 6: Students' Reported Knowledge and Skill Level of Microsoft Applications

	Extremely Poor	Below Average	Average	Above Average	Excellent
Word	.6	3.9	28.4	38.7	28.4
Excel	10.5	24.8	42.5	17.0	5.2
PowerPoint	5.2	11.0	33.8	34.4	15.6
Access	24.0	39.0	26.0	9.7	1.3

Once more, Cronbach's coefficient alpha was used to calculate the reliability of the 4 item scale of applications which was .787, an acceptable degree of internal consistency.

Discussion

As a matter of discussion, it is important to note that only 115 (73.7%) students completed the course while the remaining 41 (26.3%) either dropped the course or were administratively removed because of nonattendance. Of the 115 study participants, 73 (63.5%) were from FSU while only 42 (36.5%) were from TSU. Accordingly, the grades for each application represent only 73.7% of the sample population who completed the surveys at the onset.

There appears to be some discrepancy amid students' reported knowledge and skill level of Word versus their actual performance, with over 60% reporting "above average" to "excellent" with regard to basic skills while nearly 50% (48.7) earned A's and B's.

At both institutions, students were allowed to register and enter classes until the end of week 2. Consequently, since Word was the first application completed, the late enrollment may have contributed to the large percentage of F's (28.7) earned. Additionally, the results are consistent with the study conducted by Grant, et al. (2009) in which 75% of students perceived a "high" degree of proficiency in word processing applications compared to the overall score on basic MS Word tasks was 85%.

Quite the reverse is true for the Excel application. Although there were discrepancies with students perceived knowledge and skill versus their actual performance, less than 25% of the population sampled reported "above average" to "excellent" skill level while over half (57.4%) earned A's. These results appear to be consistent with the research conducted by Wallace and Clariana (2005) in which a pretest and posttest revealed that students' knowledge and skills increased after course instruction.

Nearly 70% of the students reported their knowledge and skill level of PowerPoint as "average" to "excellent". Similarly, their actual performance mirrored these statistics with an overwhelming 75.7% earning A's. More A's were earned with PowerPoint than any other application. There are a number of studies that found students' knowledge and skill level of PowerPoint ranked among the highest primarily because students are required to use this application in other classes hence building a level of confidence and skill (Grant, et al., 2009; Johnson, et al., 2006).

Similarly to the Excel application, the same discrepancies exist with Access. While less than 10% of the students reported "above average" to "excellent" knowledge and skill level of Access, over 68% earned A's. Access is reportedly the least used application among the four. Students ex-

pressed anxiety and fear in most cases regarding Access thereby apportioning their full undivided attention to instruction.

Overall, when asked to rate their knowledge and skill level of each application, students reported higher skill levels with Word and PowerPoint because of their repeated use and integration across the business curriculum and other disciplines. In contrast, students reported lower skill levels with Excel and Access because of their sporadic use and unfamiliarity of the two applications.

Study Limitations

As with any primary research study, there were a number of limitations that may impact this study; accordingly, caution is necessary when interpreting the findings. While this study provides research on a population that has largely been omitted from the literature, it also gives way to the first limitation in focusing on participants attending minority-serving institutions with no comparative data available from majority-serving institutions. Additionally, this limitation also prevented the authors from validating comparisons between racial groups because of the low enrollment of non-Blacks as revealed with the racial distribution.

A second limitation pertains to the disproportionate number of participants between the two institutions that completed the survey and the microcomputer applications course. Of the 156 participants, 65.4% were from Fayetteville State University and 34.6% were from Tennessee State University. Only 115 of the 156 students actually completed the course. Of that number, 63.5% were from FSU and 36.5% were from TSU. Finally, because the surveys were administered anonymously, the authors were unable to make comparisons between students' reported knowledge and skills measured against their academic performance.

Conclusion

This study contributes to the scholarship on computer literacy and enables us to offer a nuanced interpretation of differences derived from students' self-efficacy beliefs and their actual abilities. The current data gathered confirms recent studies that revealed discrepancies in students' perception of their knowledge and skill level versus their actual performance using various software applications (Grant, et al, 2009; Wallace and Clariana, 2005). Overall, while performing above average on the assessment of each application, students' reported their knowledge and skill level of such below average.

Due to the confidential responses from the survey, the authors were not able to statistically compare the means of both variables; nevertheless, these findings set a reasonable level for comparison between students' self-efficacy beliefs and their academic performance. The relationship between computer literacy and employment demands that colleges and universities alike continue to evaluate and assess the knowledge and skills of college students.

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Biographies

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Dr. Millicent Gray Lownes-Jackson is the Associate Dean of the College of Business at Tennessee State University. She is a small business specialist, author of 15 books, an entrepreneur, newspaper columnist, researcher, certified small business coach, and a tenured Professor of Management. Dr. Lownes-Jackson's educational background includes a Bachelor of Business Administration Degree from Fisk University. She also has a Master of Business Administration Degree and a Doctor of Philosophy Degree, both of which were conferred by Vanderbilt University. Dr. Lownes-Jackson has many research articles, publications and talk show appearances to her credit. She has been featured in numerous stories including articles appearing in Black Enterprise magazine, Contempora magazine, the Tennessee Tribune and the Urban Journal.