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Measuring Assurance of Learning Goals: Effectiveness of Computer Training and Assessment Tools

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ABSTRACT

Teaching office applications such as word processing, spreadsheet and presentation skills has been widely debated regarding its necessity, extent and delivery method. Training and Assessment applications such as MyITLab, SAM, etc. are popular tools for training students and are particularly useful in measuring Assurance of Learning (AOL) objectives. Meeting these assessment objectives has become a crucial issue in business schools as it now plays a major role in AACSB accreditation. It is our contention that these tools are fundamentally necessary to train and assess students to meet specific objectives that support a particular goal. In our experience, the simulation component of these tools is not enough to ensure all objectives. In this paper, we describe our experience with the use of in-the-application assignment projects to supplement the assessment and training simulation in order to improve final assessments and close the AOL loop.

Keywords: assessment, computer applications

1. INTRODUCTION

Teaching office applications such as word processing, spreadsheet and presentation skills has been widely debated regarding necessity, extent and delivery method. Some contend that entering freshman should have had exposure to these applications and require the passing of an assessment exam (Shannon, 2008). Others believe that high school exposure does not ensure necessary advanced skills in applications such as spreadsheets and require additional training (Hulick & Valentine, 2008). Traditional training in computer applications has generally included lecture and lab assignments in the particular application (Mykytyn, Pearson, Paul, & Mykytyn, 2008). In more recent years, many universities have turned to assessment and training tools such as MyITLab, SAM, SimNet and SNAP (Hill, 2011; Morris, 2010).

These tools require students to complete various tasks in a simulated application. The tools are also debated, as some wonder if students are really just learning to "click and point" to learn specific tasks but do not have the ability to actually apply these learned tasks to solve business problems (Coleman, Thrasher, & Atkinson, 2010).

However, many universities not only use these simulation tools for training but also for implementing assurance of learning (AOL) standards mandated by the AACSB. Meeting these standards has become crucial, as they now play a major role in the AACSB accreditation of business schools (AACSB, 2007). Program learning goals must be set, objectives must be measured across time, and the results used for continuous improvement (a.k.a "closing the loop" (Al-Mubaid, Abeysekera, Kim, Perkins-Hall, & Yue, 2011; Hollister & Koppel, 2006)).

In this paper, we examine the extent to which these tools can be useful in attaining AOL objectives with regard to computer application skills. After providing a brief overview of the debate over teaching computer application skills, we look at how schools have responded with the use of automated training and assessment tools. We then relate our own school's experience with teaching computer applications, the use of these automated tools and how we supplemented their use in implementing the continuous improvement process necessary for our school's maintenance of AACSB accreditation.

2. BACKGROUND

Office Applications

One assessment goal in many business schools is that students have the ability to use technology (Hollister & Koppel, 2007). Computer application skills in word processing, spreadsheets and presentations are vital for all business students as they matriculate and in future employment (Wolk, 2008).

The need for business schools to teach these skills and/or assess a student's skill level has been a subject of discussion in many schools. One question usually discussed is "shouldn't incoming freshman have these skills?" The answer is that some do but many don't. Research indicates that a large percentage of students are not able to successfully pass a beginning assessment (Hulick & Valentine, 2008; Shannon, 2008; Kline & Strickland, 2004), even in states where competency in technology is required for high school graduation (Grant, Malloy, & Murphy, 2009). This research also shows that students may overestimate their ability in office productivity tools. Students have a much higher perception of their level of skill in these applications than their actual performance on assessments (Grant, et al., 2009). Their study particularly indicated that students did not possess an adequate set of spreadsheet skills (as did (Kline & Strickland, 2004)). Thus, without curricular intervention of some sort, many students will not take a computer applications course and therefore continue to lack critical skills such as spreadsheets.

Assessment Tools

In order to ascertain that students obtain or have these computer application skills, universities have turned to training and assessment tools for test-out and instruction (Morris, 2010). Assessment and training tools have become quite popular in business programs to ensure that students have adequate skills in office production software, and to assess skill level and determine placement (Coleman, Thrasher, & Atkinson, 2010; Tesch, Murphy, & Crable, 2006). Currently, the most popular tools include MyITLab, SAM, SimNet and SNAP (Hill, 2011).

These tools offer many benefits:

- Individualized instruction – students can work on modules that focus on skills in which they are deficient (Morris, 2010).
- Consistent content across sections in multi-section courses – this also encourages consistency of results across sections (Kline & Strickland, 2004).
- Automated grading is quick, and speeds the gathering of assessment data (Merhout, Benamati, Rajkumar, Anderson, & Marado, 2008).
- Distance learning - automated tools can be incorporated in online courses relatively easily (Huan, Shehane, & Ali, 2011).

However, as mentioned earlier, some question the effectiveness of these tools, and what few results have been reported have been mixed (Morris, 2010; Coleman, Thrasher, & Atkinson, 2010; Paranto, Neumann, & Zhang, 2008; Kline & Strickland, 2004).

Assurance of Learning

The importance of assessment in business schools has increased significantly since 2003

when the AACSB adopted new standards for accreditation and reaccreditation. Prior to 2003, the AACSB had only 10% of the criteria related to assessment. Currently, one third of the standards are assessment-related (Pringle & Michel, 2007).

Assessment has played such an important role in accreditation because stakeholders in universities such as state legislators, taxpayers, parents, donors and the federal government are requiring direct evidence of student learning (Bollag, 2006; Suskie, 2004). Computer application simulation tools can be used to easily measure relevant AOL objectives. The model in Figure 1 shows the loop that is referred to by the phrase "closing the loop", with regard to assurance of learning. Simulation tools can fill the assessment role depicted in Al-Mubaid, et al.'s (2011) model. See their paper for a complete description of the assessment process.

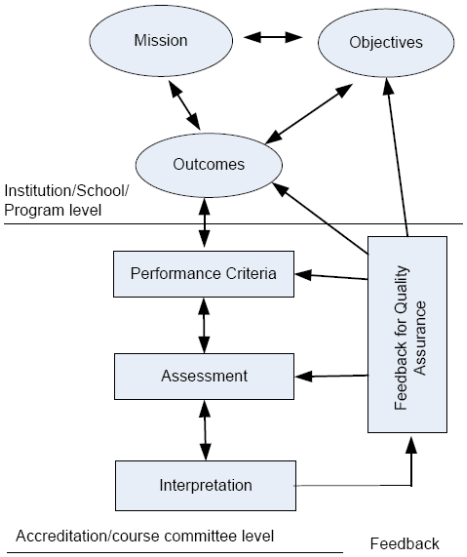

Figure 1. Conceptual Model of Assessment (reprinted from Al-Mubaid, et al., 2011)

3. ASSESSMENT STRATEGY

Teaching Business Applications

At our university, most faculty members in the school of business agree that a sound curriculum include a student's mastery of fundamental computer applications such as word, presentation, spreadsheet and database. However, delivery of training for these tools continues to be widely debated.

We informally surveyed nine of the largest schools by enrollment in the North Carolina state university system. Results show that schools address this delivery issue in a variety of ways:

- Require all students to take a course.
- Pass an assessment or take a course.
- Incorporate computer application skills with a Management of Information Systems (MIS) course.
- Pass an assessment initially or use a self-study application tool until passing the assessment.

Additionally, the course and or courses have a variety of content including:

- One course or assessment that includes word processing, spreadsheet and presentation applications (sometimes with an office database application such as Microsoft Access).
- Separate courses for word processing/presentation and spreadsheet/database.
- An MIS course that includes spreadsheets only.
- An MIS course that includes spreadsheets and database applications.

Although this data is limited in scope and size, it can reasonably be assumed that other business schools debate the best way to ascertain the delivery of application skills. Over the past several years our university has used a variety of delivery modes. In Fall 2008 and Spring 2009, we offered one business computer applications course that included word processing, spreadsheets and presentation skills and a separate course that includes office database applications.

At this writing, our first business computer applications course includes only spreadsheet skills. The decision to not teach word processing and presentation is largely based on student's requirement to have these skills in other courses and their ability to learn these skills on their own. Additionally, incoming freshman do not have the ability to complete even basic spreadsheet tasks (Grant, et al., 2009; Kline & Strickland, 2004) and these skills are deemed vital for matriculation and post-graduation employment.

Students can test out of the first business computer applications course (Microsoft Excel). The database application course is an elective. Our teaching and assessment tool is Pearson's MyITLab. All business students are required to obtain a score of 70% or better on an

assessment or take the business applications course. This percentage is based on the business school policy of requiring students to matriculate with a C or better in all their coursework. All students who take the course are required to take the same assessment as a post-test.

In the Fall of 2008 and Spring of 2009 this assessment included the testing of 10 MS-Excel skills, 5 MS-Word skills and 5 MS-PowerPoint skills. In the Fall of 2009 the pre- and post-test assessed 20 MS-Excel skills. Seven MS-Excel skills are persistent during the entire test period of Fall 2008 to Spring 2011. Each of these tested skills includes 2-5 tasks. All of the tasks for each skill must be completed successfully.

AOL Goal

We use this pre- and post-test of all business students to measure our technology AOL goal. The criterion for meeting this goal is that 70% of the students correctly complete each skill tested. A summary of our AOL report is included in Appendix A.

Each semester's post-tests are reviewed and a strategy to reach our goal of 70% on all skills is determined. In spite of several strategies, our post-test results in Fall 2008 through Spring 2009 indicated that, on average, half of the original 10 tested skills were below standard.

Project Implementation

A criticism of the assessment and application tools is that students only learn to click and point in a simulated environment and these skills do not always translate to "in-the-application" skills. Project-based courses in business applications may be more successful (Murray, Hooper, & Perez, 2007) but are not always practical in terms of training large numbers of students.

After the initial introduction of the MyITLab tool, Pearson Education received numerous requests for a built-in grader for problem solving projects that could be performed in the actual application. In Fall 2009, MyITLab offered an applications enhancement called Project Grader. This enhancement offered in-the-application projects. Students would download a beginning spreadsheet and perform a variety of tasks in MS-Excel, upload the completed spreadsheet and receive a grade based on the correct completion of those tasks.

In order to determine what effect the projects would have on the overall performance of students on the final assessment, we implemented projects in one section over two consecutive semesters (Fall 2009, Spring 2010). Projects were implemented in all sections in the Fall 2010 semester. Instructors determined how many projects to include in their section. In Spring 2011, all sections included 7 projects in addition to the simulation training. See Appendix B for the results of these sections.

4. WHAT WE LEARNED

Teaching and/or assessing students in computer applications skills and measuring our AOL objectives remain an ongoing process. However, our experience has taught us that:

- Incoming freshmen do not always have the necessary computer application skills, in particular spreadsheet skills.
- Training and Assessment simulation tools have proven to be an effective method for training students and measuring AOL objectives.
- Augmenting simulation training with projects that require the use of the actual spreadsheet application improves AOL measured objectives.

The average compliance improved each semester except one. However the most dramatic increases in the percentage of correct tasks were in the one section using 7 projects in Fall 2009 (see Table 2). When 3 projects were used in one section, improvement was noted in some skills but not in others. When instructors determined how many projects to implement in Fall 2010, results were mixed. In Spring 2011, all sections implemented the 7 projects used in Fall 2009 and all persistent skills (of the original 10) tested met the standard. Although our data is not scientific proof that adding projects, in particularly these 7 projects, increases a student's overall skill level, it gives us a base for improvement. Additionally, we show continued improvement over time.

Simulation tools are extremely useful especially in assessing and training computer applications to large numbers of students. Additionally, students' acceptance of this type of training is high (Baker, 2004). However, simulation training may not completely prepare students to successfully apply the skills learned to later tasks and projects using computer application skills. Project-based training in-the-application only is not practical in terms of time and

resources for large numbers of students. In our experience, a combination of simulation training and in-the-application training increases the likelihood that students will be able to complete any given task in that application.

5. MOVING FORWARD

Our experience supports previous research that project-based courses in computer application increases the skill level of the students. Specifically, the addition of application-based projects in our courses increased the percentage of students who could successfully complete the tasks tested and closed the loop for our technology AOL goal. Meeting AOL goals for AACSB accreditation is vital for business schools. Evaluating our assessment goals every semester and supplementing simulation training with live application projects significantly increased our ability to "close the loop."

We plan to continue using these projects and measure the student's success with the additional 13 skills in the pre- and post-tests (please contact author for a list of these skills). Additionally, based on the pre- and post-tests, we will adjust the project focus to tasks that specifically address the desired skill.

6. REFERENCES

AACSB. (2007, November 20). *AACSB Assurance of Learning Standards: An Interpretation.* Retrieved June 25, 2011, from The Association to Advance Collegiate Schools of Business: http://www.aacsb.edu/accreditation/papers/aolpaper-final-11-20-07.pdf

Al-Mubaid, H., Abeysekera, K., Kim, D., Perkins-Hall, S., & Yue, K. (2011). A Model for Long Term Assessment of Computing and Information Systems Programs. *Information Systems Education Journal, 9*(3), 59-67.

Atkinson, J. K., Thrasher, E., & Coleman, P. (2010). Simulation software's effect on college students spreadsheet project scores. *Academic and Business Research Institute Conference.* Orlando.

Baker, J. (2004). Spreadsheet Applications: Prototyping an Innovative Blended Course. *Turkish Online Journal of Distance Education, 5*(1), 1-9.

Bollag, B. (2006, December 6). *Fears of Possible Federal Learning Standards Grow as Liberal-Arts Accreditor Is Penalized.* Retrieved 7 6, 2011, from The Chronicle of Higher Education: http://chronicle.com/article/Fears-of-Possible-Federal/119555/

Coleman, P. D., Thrasher, E. H., & Atkinson, J. K. (2010). Simulation software's effect on college students' spreadsheet project scores. *Academic and Business Research Institure Conference.* Orlando: AABRI.

Grant, D., Malloy, A., & Murphy, M. (2009). A Comparison of Students Perception of their Computer Skills to their Actual Abilities. *Journal of Information Technology Education, 8*, 141-160.

Hill, T. (2011). Word Grader and Powerpoint Grader. *ACM InRoads, 2*(2), 34-36.

Hollister, K., & Koppel, N. (2006). Framework for meeting AACSB International's assurance of learning requirements: application to information technology. *Journal of Informatics Education Research, 8*(3), 1-14.

Hollister, K., & Koppel, N. (2007). Curricular Changes in Response to Assurance of Learning Results in Information Technology. *IABE-2007 Annual Conference*, *III*, pp. 152-158. Las Vegas.

Huan, T., Shehane, R., & Ali, a. (2011). Teaching computer science courses in distance learning. *Journal of Instructional Pedagogies, 6*, 1-14.

Hulick, F., & Valentine, D. (2008). Computer competency of incoming college students: yet more bad news. *ISECON* (pp. 1-7). Phoenix: EDSIG.

Kline, D., & Strickland, T. (2004). Skill Level Assessment and Multi-section Standarization for an Introductory Microcomputer

Applications Course. *Issues in Information Systems, 5*(2), 572-578.

Merhout, J., Benamati, J., Rajkumar, T.,Anderson, P., & Marado, D. (2008). Implementing direct and indirect assessment in the MIS curriculum. *Communications of the Association of Information Systems, 23*(24), 419-436.

Morris, K. (2010). *College and the digital generation: Assessing and training students for the technological demands of college by exploring relationships between computer self-efficacy and computer proficiency.* The University of Alabama: Unpublished Doctoral dissertation.

Murray, M., Hooper, J., & Perez, J. (2007). A project-based approach to assessing student competency with productivity software. *SIGED-IAIM* (pp. 1-14). Montreal, Quebec, Canada: AIS.

Mykytyn, J., Pearson, A., Paul, S., & Mykytyn, P. (2008). The use of problem-based learning to enhance MIS education. *Decision Sciences Journal of Innovative Education, 6*(1), 89-113.

Paranto, S., Neumann, H., & Zhang, L. (2008). Information systems: performing application-specific assessment of student performance. *Issues in Information Systems, 9*(1), 87-94.

Pringle, C., & Michel, M. (2007). Assessment Practices in AACSB-Accredited Business Schools. *Journal of Education for Business, 82*(4), 202-211.

Shannon, L. (2008). Information and Communication Technology Literacy Issues in Higher Education. *Information Systems Education Journal, 6*(23), 3-13.

Suskie, L. (2004). *Assessing Student Learning: a common sense guide.* Bolton, MA: JB-Anker.

Tesch, D., Murphy, M., & Crable, E. (2006). Implementation of a Basic Computer Skills Assessment Mechanism for Incoming Freshman. *Information Systems Education Journal, 4(13)*, 1-11.

Wolk, R. (2008). How important is student computing ability? The role of information technology competence in business school accreditation. *Information Systems Education Journal, 6*(39), 1-16.

APPENDIX A. - AOL Summary Results

Date	# of students enrolled	# of students assessed	Below standard	Post Assessment Action (to close the loop)
Fall 2008	259			
Pre-test		201	90%	Current Term: 10 trainings, 4 exams.
Post-test		206	50%	Next term: demonstrate skills in class at least 3 times in areas where average is less than 70%.
Spring 2009	199			
Pre-test		110	90%	Current Term: 10 trainings, 4 exams.
Post-test		128	40%	Next term plan to demonstrate skills in class at least 3 times in areas where average is less than 70%. Introduce in-the-application projects in one section as a test.
Fall 2009	302			
Pre-test		142	80%	Current Term: 10 trainings, 4 exams, 7 projects in one section; 10 trainings, 4 exams in remaining sections.
Post-test		169	30%	Continue to roll out in-the-application projects.
Spring 2010	248			
Pre-test		158	90%	Current Term: 10 trainings, 4 exams, 3 projects in one section; 10 trainings, 4 exams in remaining sections.
Post-test		175	20%	Continue to roll out in-the-application projects.
Fall 2010	139*			
Pre-test		51	100%	Current Term: 10 trainings, 4 exams, 3 projects in one section; 10 trainings, 4 exams in remaining sections.
Post-test		111	10%	Projects in all sections. For comparison on this report only original 7 objectives are included.
Spring 2011	122*			
Pre-test		80	100%	Current Term: 10 trainings, 4 exams, 7 projects in all sections
Post-test		85	0%	Projects in all sections and determining that all objectives are covered in the project content. For comparison on this report only original 7 objectives are included.

***Not all business students were required to show competency in computer business applications and therefore enrollment dropped.**

Appendix B: Percentage of Compliance with assessment objectives by semester

Objectives (Skill Tested)	Fall 2008	Spring 2009	Fall 2009	Fall 2009 with 7 Projects	Spring 2010	Spring 2010 with 3 Projects	Fall 2010 with 3-7 Projects	Spring 2011 With 7 Projects
Compute the Gross Pay	**51.46%**	**60.23%**	**60.00%**	74.42%	**41.33%**	**68.00%**	**69.37%**	75.56%
Use the IF Function	**67.96%**	**63.16%**	**69.05%**	79.07%	**52.67%**	**40.00%**	**48.65%**	73.33%
Start Microsoft Office Excel 2007	96.12%	98.83%	100.00%	95.35%	100.00%	100.00%	98.20%	94.44%
Apply Number Formatting	90.29%	92.40%	89.05%	88.37%	94.40%	92.00%	92.79%	95.56%
Copy the Formulas with the Fill Handle	86.41%	88.30%	89.05%	93.02%	88.00%	92.00%	91.89%	91.11%
Insert a Row and Compute Totals	77.18%	80.12%	79.52%	76.74%	82.67%	80.00%	87.39%	86.67%
Change the Chart Type	**67.96%**	70.18%	75.24%	**69.77%**	**69.33%**	76.00%	76.58%	76.67%
Average Compliance	*76.77%*	*79.03%*	*80.27%*	*82.39%*	*75.49%*	*80.00%*	*80.69%*	*84.76%*
Objective not meeting at least 70% compliance	3	2	2	1	3	2	2	0